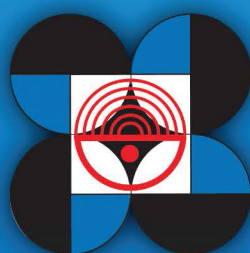




PHILIPPINE SCIENCE & TECHNOLOGY ABSTRACTS



**SCIENCE AND TECHNOLOGY INFORMATION INSTITUTE
INFORMATION RESOURCES AND ANALYSIS DIVISION**

**Department of Science and Technology
Bicutan, Taguig City, Metro Manila
Philippines**

DECEMBER 2020



PHILIPPINE SCIENCE AND TECHNOLOGY ABSTRACTS

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**Information Resources and Analysis Division
SCIENCE AND TECHNOLOGY INFORMATION INSTITUTE
Department of Science and Technology
Bicutan, Taguig City, Metro Manila
Philippines**

PSTA Production Team:

**ALAN C. TAULE
ARJAY C. ESCONDO
MARIEVIC V. NARQUITA
LOUELLA D. LABASBAS
ELMER B. GENERALAO
JEFRREY T. CENTENO**

PHILIPPINE SCIENCE AND TECHNOLOGY ABSTRACTS

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Philippine

An agro-economic assessment of white potato manuring trials: Benguet and Mountain Provinces

Potts, M. J. , De Los Santos, A. B. , Sano, E. O. , Rutab, F. R.

Two sets of manuring trials on white potato crops, in farmers' fields in Benguet and Mountain Provinces, are described. In the first set the traditional application of chicken manure to the seedbed was eliminated and in the second set all commercial fertilizer (as a compound: 14:14:14) was applied to the seedbed instead of as the customary side- dressing.

Agronomic practices and economic costs pertaining to the changes in practice were carefully recorded. A yield increase of atleast 15% and an increase of at least 10% in net returns were taken as the minimum that could be regarded as significant under field conditions.

Yield response to the elimination of chicken manure varied considerably according to site. Two sites showed an increase, two a decrease and six no change in yield. In terms of net economic returns, four sites showed an increase, two a decrease and four no change. The beneficial effect of chicken manure was most marked on dry soils or sites consisting of sub-soil. It is suggested that moisture retained by the chicken manure facilitates improved nutrient uptake.

The placement of all commercial fertilizer into the seedbed increased yields significantly at six sites with no change at the remaining seven sites. Monetary returns were increased at ten sites and decreased at one, due to poor fertilizer incorporation and subsequent crop damage.

Keywords: *White potato, Organic manuring, Commercial fertilizer, White potato, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 283-290
1982 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Alternative feed rations for grower stage backyard swine

Gican, Kersey Chene P. , Agdeppa-Namoco, Rhoda P.

In the Philippines, backyard swine raisers try to find alternative swine feed ingredients which are cheap and locally available. In formulating swine ration, feeds must contain adequate amount of energy, protein, vitamins and minerals. Unlike commercial feeds, locally available feed ingredients do not guarantee optimal nutrient content. This study aims to come up with a feed formulation that is economically cheaper while meeting the required nutrients of swine. To achieve the goals of the study, a survey has been conducted to determine the alternative feed ingredients commonly used by backyard swine-raisers. Various combinations of these feed ingredients are then considered and the corresponding mathematical programming formulations of these combinations are solved in order to come up with cheaper feed rations while meeting the required nutrients for each formulation.

Keywords: *Back swine-raising, Grower stage, Feed ration, Mathematical programming, Agriculture*

Mindanao Journal of Science and Technology, Volume No. 10 Issue No. 1, 93-106
2012,
(Filipiniana Analytics)
NP

Assessment of backyard goat raising in Claveria, Misamis Oriental, Philippines

Ellacer, Rioniel , Hebron, Imelda U. , Cosadio, Alma L.

The purpose of this study was to assess the status and limitations of the current management practices of backyard goat production in the municipality of Claveria, Misamis Oriental, Philippines. Forty-three backyard goat raisers were visited and interviewed using structured questionnaire as the main research instrument.

The assessment showed that 58% of the goat raisers owned a breeder buck but 30% of these farmers maintained breeders of unknown breeds. Most of them (62%) constructed a goat shed for their animals but about 28% tethered their goats under the raisers' house. Benefits of the farmers engaging in goat production are as a source of food and an additional income for the family. The biggest problems they met were coughs and colds, lack of capital, limited forage, and incidence of theft. The immediate goal of the farmers was to uplift their family's standard of living and to send their children to school. With goat farming, their quality of life was quite improving because of the additional income they derived from the operation and the maximum utilization of resources it has done to their farms. On farm management, only 51% of the farmers kept records of the activities in the farm. On breeding management, most of the farmers prefer upgrades and improved breeds of goat because accordingly these animals have good performance. They looked for traits such as faster growth and larger body conformation. Breeding sires were selected on the basis of individual performance but 60% of the farmers did not practice the culling of animals. Based on the survey, farmers would like to be enhanced through trainings in the production management of the goat enterprise.

Keywords: *Backyard goat raising, Goat production, Agriculture*

Mindanao Journal of Science and Technology, Volume No. 9 Issue No. 1, 73-86
2011,
(Filipiniana Analytics)
NP

Biochemical changes in the developing coconut fruit *Cocos nucifera*

Del Rosario, Ricardo R., Rosario, Aldaba, Teodoro, Emma, Noel, Marissa G., Requina, Teodora

The chemical changes in the developing coconut fruit were studied. The proximate composition, sugars, phospholipids and enzyme activities were determined. The different proteins were fractionated at different stages of growth. With the increase in maturity, the following changes were observed: a) decrease in moisture, carbohydrate and ash with subsequent increase in fat content, b) highest invertase activity and reducing sugar concentration at around the sixth month, these sugars being glucose in the meat and glucose and xylose in the water; c) the predominance of albumins in the younger stages and globulins in the more mature nuts with both fractions comprising 80-91% of the total proteins at all stages of nut development. Positive activity for esterases, phosphatases, catalase, invertase and peroxidase was noted. A thin-layer chromatographic analysis of brown mature coconut phospholipids and glycolipids are also given.

Keywords: *Coconut fruit, Sugars, Phospholipids , Enzyme , Cocos nucifera, Agriculture*

NRCP Research Bulletin, Volume No. 34 Issue No. 2, 107-130
1979 June,
(Filipiniana Analytics)
Fil(S) Q179.9 N38

Changes in endogenous growth hormone levels associated with the flowering of cabbage (*Brassica oleracea* L. var. *capitata*)

De Guzman, Nena C. , Del Rosario, Dafrosa

Chromatographic analysis and bioassay of growth hormones were done at different growth stages of cabbage (*Brassica oleracea* L. var. *capitata*). The effect of gibberellic acid treatment on endogenous levels of gibberellin, auxin and cytokinin activity in relation to flowering cabbage cv. KK and Leo 80 were determined.

Exogenous application of 1000 ppm GA3 resulted in a significant increase in endogenous levels of gibberellins and auxins. With cytokinins, no significant difference was observed between the control and the GA3 -treated plants.

The highest levels of gibberellins activity were observed 50 and 90 days after sowing. The significant increase of gibberellins in cv. KK 90 days after sowing was correlated with flowering.

Significant increase in auxin and cytokinin activity 60 and 70 days after sowing corresponded to a decrease in gibberellins activity.

Keywords: Growth hormone levels, Flowering of cabbage, Cabbage plants, Agriculture

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 221-234

1982 July-September,

(Filipiniana Analytics)

Fil(S) S19 P53

Characterization and flowering behavior of eleven Philippine native *Phalaenopsis* species and gamma irradiation effects on *Phalaenopsis aphrodite*

Magdalita, Pablito M., San Pascual, Alangelico O. , Villarea, Ruben L.

Eleven species of *Phalaenopsis* or butterfly orchids collected from different places in the country were characterized for flower traits, leaf characters, growth habit, and capsule maturity, length, and width; evaluated for flowering behavior; and tested for self-compatibility and capsule setting under ambient conditions in Los Baños, Laguna, Philippines. Also, *Phalaenopsis aphrodite* was used for mutation breeding via gamma irradiation. Subjecting self-fertilized progenies to irradiation will generate mutants with potential for breeding and selection. The eleven *Phalaenopsis* species studied flowered consistently under ambient conditions for two years with degrees of self-compatibility and capsule setting varying from 3.8 to 50%. *P. aphrodite* and *P. hieroglyphica* embryos cultured *in vitro* germinated successfully at 80–90% within 3–4 wk after explanting. Germinating embryos of *P. aphrodite* subjected to different levels of gamma irradiation at 10, 15, 20, and 25 Gy responded differently to the treatments. The number of complete regenerants, and those regenerants with shoot only, also differed significantly among the treatments. In addition, leaf length, width, and thickness differed significantly among the treatments after 2 yr of growth. Early flowering was observed in two plants of *P. aphrodite* irradiated using 15 Gy. Normally, tissue culture-derived *P. aphrodite* seedlings flower 3 yr after potting out, but one plant flowered at 1 yr and 8 mo while the other did at 2 yr after potting out.

Keywords: Breeding, Butterfly orchids, Irradiation, LD50, Protocorms, Agriculture

Philippine Journal of Science, Volume No. 149 Issue No. S1, 1-10

2020,

(Filipiniana Analytics)

NP

Coconut water with either tomato juice or garlic extract as extender components for Paraoakan native chicken semen at different storage temperatures

Sangel Percival P. , Magpantay, Veneranda A. , Quimio, Julianne Maria Undine Paz H. , Junsay, Carla Alilie L. , Dichoso, Geleo A. , Esguerra, Jane Pauline M.

Computer-assisted Semen Analyzer (CASA)- based analysis of extended semen from 18 adult Paraoakan Philippine native chickens using coconut water (CW) with either tomato juice or garlic extract were carried out in this study. Only extended semen samples passing the preliminary quality evaluation were further analyzed. Pooled semen were randomly distributed into four types of semen extender: (1) Ringer's solution (RS), (2) RS + 20% CW + 0.02 g sodium phosphate (SP), (3) RS + 20% CW + 7% tomato juice + 0.04 g SP, and (4) RS + 20% CW + 2% garlic extract + 0.04 g SP and stored at either low (7–10 °C) or room (22–25 °C) temperature. The procedure was done for 13 collection periods, which served as the blocking factor. Results showed that except for garlic-supplemented extender, semen diluted with other types of extender and maintained at low temperature (7–10 °C) demonstrated the longest average shelf life, which is characterized by the period of time observed before sperm motility falls below 20%. Collectively, the addition of 20% CW on RS, with supplementation of 7% tomato juice can maintain sperm motility above 20% for 24 h at low temperature. This can be attributed to the chemical composition of CW and tomato juice that are beneficial to sperm cell metabolism, control of pH, and osmotic pressure and inhibition of microbial growth. Results also showed that CW can be used as an effective and economical partial substitute to RS.

Keywords: *Coconut water, Garlic extract, Paraoakan native chickens, Semen extension, Tomato juice, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. 1, 121-131
2020 March,
(Filipiniana Analytics)
NP

DOST-PNRI mutant variety: *Dracaena* 'sun beam'

Aurigue, Fernando B.

Dracaena braunii is one of the priority ornamental plants. *Dracaena* 'Sun Beam' (NSIC 2014 Or 85) is a chlorophyll mutant of *D. braunii* developed by gamma irradiation (Cobalt-60 source) of 15-cm stem cuttings and registered by the DOST-PNRI with the National Seed Industry Council of the Bureau of Plant Industry, Department of Agriculture (DA-BPI-NSIC) and to the Mutant Variety Database of the Joint Food and Agriculture Organization of the United Nations / International Atomic Energy Agency (FAO/IAEA) Program. In all aspects, *D.* 'Sun Beam' is similar to the parent material except for the shorter leaf and its broad bar. The propagation of the mutant is true-to-type by cutting (top cutting, stem cutting, and nodal cutting) and separation of suckers. *D.* 'Sun Beam' is very attractive and shoots or top cuttings may be used as cut foliage in flower arrangements or grown individually or in a group as containerized plants, materials for terrariums, dish gardens, and landscaping.

Keywords: *Chlorophyll mutant, Dracaena braunii, Dracaena sanderiana, Gamma irradiation, Mutation induction, Ornamental plant, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. S1, 11-14
2020,
(Filipiniana Analytics)
NP

Economic profitability of rejuvenated robusta coffee intercropped with banana

De Asis, Leonida S.

The economic profitability of rejuvenated Robusta coffee intercropped with banana gives significant impact to farmers specifically for coffee growers. The study aimed to evaluate the economic performance of coffee and banana; assess the quality of green beans and banana fruits as a result of intercropping banana in coffee at different distances; and compute its cost and return analysis. A randomized complete block design (RCBD) with four treatments (T1-No intercropping; T2-coffee+banana intercropped at 2m x 4m distance; T-coffee+banana intercropped at 2m x 6m; T4- coffee+banana intercropped at 4m x 4m distance) was used replicated three times. Agronomic and economic data were obtained from the two crops. Fresh coffee berries weighed up to 2.95 ton/ha when intercropped with banana and yielded up to 1.65 tons/ha dried berries. Highest marketable yield was 0.99 ton/ha obtained by coffee + banana in 2m x 4m distance with percent recovery of 65.43%. Banana yielded up to 15.02 kg per bunch when intercropped at a distance of 2m x 6m. Highest yield per hectare was obtained when a banana was intercropped at a distance of 2m x 4m with value 12.51 tons. The Net Income and ROI was highest in coffee + banana intercropped at 2m x 4m distance Php217,455.00 while ROI was highest in coffee+banana at 4m x 4m distance of 84.51%. Intercropping is more profitable than monocropping. Intercropping banana in coffee trees at a distance of 2m x 4m performed best where it gave the highest combined net income.

Keywords: *Economic profitability, Intercropping, Coffee, Banana, Agriculture*

Mindanao Journal of Science and Technology, Volume No. 12 Issue No. 1, 25-38
2014,
(Filipiniana Analytics)
NP

Ecotypes of *Rottboellia exaltata* L.f. in the Philippines; III. Competitive relationship with corn (*Zea mays* L.)

Pamplona, P.P. , Mercado, Beatriz L.

Five ecotypes of *Rottboellia exaltata* L.f. were allowed to compete with corn (DMR Syn. #2) in pots at the 1:2 weed to crop ratios. All the ecotypes were less competitive than corn based on tillering, height, seed yield, dry matter and corn yield as parameters. The general order of their competitive ability against corn was Ecotype 3 > Ecotype 4 > Ecotype 5 > Ecotype 1 > Ecotype 2.

Keywords: *Ecotype variations, Corn crops, Rottboellia exaltata, Weed control, Corn seeds, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 395-402
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

Effect of gamma irradiation on coconut leaf beetle, *Brontispa longissima* (Gestro) (Coleoptera: Chrysomelidae)

Javier, Abigaile Mia V. , Obra, Glenda B., Zipagan, Mateo B.

The effect of irradiation on the fecundity, egg hatchability, and longevity of the coconut leaf beetle (CLB) – *Brontispa longissima* (Gestro) – was studied using different doses of gamma radiation ranging from 20–50 Gy for pupa and adult males, and 20–40 Gy for adult females. The fecundity and fertility of adults decreased with irradiation dose. The pupae were more sensitive to irradiation than the adults based on LD50 values after 14 d. Adult females were more sensitive to irradiation than males based on fecundity and egg hatchability. No eggs were hatched at 40 Gy in irradiated females (IF) mated with unirradiated males (UM) and at 50 Gy in unirradiated

females (UF) mated with irradiated males (IM), albeit with a significant effect on longevity at this dose. Using 45 Gy for mating competitiveness studies at a ratio of 1:15:1 (UF: IM: UM), wild females' acceptance of IM was high based on the relative sterility index (RSI) value of 0.66..

Keywords: *Egg hatch, Ionizing radiation, Life span, Mating, SIT, Sterility, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. S1, 175-181
2020,
(Filipiniana Analytics)
NP

0012

**Effect of seedling number per hill and seedling age on the competitive ability of rice
(*Oryza sativa* L.) grown at different plant spacings**
Kim, Soon Chul , Moody, K.

Generally, weed weights were not affected by the number of seedlings per hill but were significantly affected by the weeding regime and plant spacing. In the nonweeded plots, a significantly lower weed weight was obtained from the 10 x 10 cm plant spacing than from the other plant spacings. The highest weights were from rice transplanted at 10 days old. In the hand weeded plots, grain yield of rice from the 40 x (10 x 10) cm plant spacing was significantly higher than that from the 10 x 10 cm and 40 x 5 cm plant spacing which did not differ significantly from each other or the 20 x 20 cm plant spacing. In the nonweeded plots, however, the highest grain yield was obtained from the 10 x 10 cm plant spacing because of better competition against weeds. Significantly higher yield was obtained from the 10 x 10 cm plant spacing than from the 20 x 20 cm plant spacing for the 10-, 20-, and 30- day-old seedlings. For the 40-day-old seedlings, no difference was observed. For both weeding regimes, the lowest grain yield was obtained from the 40- day- old seedlings. The yield from the other seedlings ages did not differ significantly from each other. There was a high negative correlation between grain yield and weed weight for all seedling ages.

Keywords: *Transplanted rice culture, Seedling number per hill, Seedling age, Plant spacing , Weed control, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 177-194
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

0013

**Effects of water and weed management on the weed density, grain yield, and water
productivity of wet-seeded rice**
Ariola, Christian Paul , Martin, Edwin C. , Samoy-Pascual, Kristine

Shifting from conventional transplanting to direct seeding of rice is an alternative option to save irrigation water and reduce labor cost. Weeds are one of the major challenges in direct seeding. Field experiments in split-plot design were conducted to evaluate the effects of different water and weed management modes on the weed density, grain yield, and water productivity of direct wet-seeded rice during two dry seasons (DSs) in Nueva Ecija, Philippines. Three water management (W) modes were used: continuous flooding (CF); safe alternate wetting and drying (AWD); and modified CF (mCF). The four weed management (M) modes were: unweeded (UW); hand-weeding at 21 and 42 days after seeding [DAS] (HW); application of pre-emergence herbicide [pretilachlor] at 5 DAS (PR); and application of post-emergence herbicide [bispyribac sodium] at 15 DAS (PO). M modes showed significant effects ($p < 0.05$) on the weed density and grain yields in both years, with UW obtaining the lowest grain yield and highest weed density. No significant differences in grain yields were noted among weed control treatments. They only increased grain yields by 18–52% relative to UW. HW and PR treatments showed maximum yields. The W modes did not affect the grain yields nor the weed density, but water productivity was highest in

AWD in both years. The higher grain yield and lower total water input in AWD maximized water productivity relative to the conventional practice of CF.

Keywords: *AWD, Grain yield, Rice, Weed density, Wet seeding, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. 1, 121-131
2020,
(Filipiniana Analytics)
NP

0014

Evaluation of 4-aminopyridine as a bird control agent in the Philippines

Garrison, M. V. , Ammayao, Aurora , Libay, J. L.

Acute LD₅₀ values and distress behavior responses of 4-aminopyridine (Avitrol[®])², a chemical frightening agent, were determined for three species of manikins, *Lonchura punctulata*, *Lonchura leucogaster*, *Lonchura malaca* and one species of sparrow, *Passer montanus*. LD₅₀ values of 7.94, 3.11, 4.45, and 3.54 mg/kg were found for the four species, respectively. *P. montanus* exhibited the most pronounced distress behavior.

Keywords: *4-aminopyridine, Bird control, Sparrow, Mannikin, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 53-58
1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

0015

Evaluation of potato germplasm for resistance to *Pseudomonas solanacearum* (E.F. Smith) and adaptation in Mindanao

Kloos, J. P. , Fernandez, Jerene Bashia B.

Potato germplasm was evaluated for bacterial wilt (BW) resistance in more than 20 experiments from April 1983 to September 1985 in Mindanao.

High and uniform BW pressure permitted selection for BW resistance. Of the traditional varieties, Greta and Alpha showed the best resistance to BW. A degree of resistance to root knot nematodes (RKN) of these two varieties was probably responsible for the BW resistance observed.

BW resistant germplasm derived from the BW resistant source *S. phureja*, BR- and MS- groups and Cruza 148, had superior BW resistance compared with traditional varieties.

Germplasm with widened genetic base for BW resistance and heat adaptation showed improved BW resistance. The maximum yield potential of this adapted material is higher when compared with the *S. tuberosum* ssp. *tuberosum* varieties. This material was less affected by the short days and had improved late blight resistance. After three generations of cultivation in Mindanao, however, increased latent BW infection of the tubers and more importantly seed infected with RKN caused serious BW infections. Resistance to RKN has to be incorporated in the germplasm to make BW resistant genes effective.

Keywords: *Potato species, Potato germplasm, Bacterial wilt, Resistance, Adaptation, Agriculture*

The Philippine Agriculturist, Volume No. 69 Issue No. 2, 263-276
1986 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Gamma radiation and *in vitro* induced banana bunchy top virus (BBTV) resistant mutant lines of banana cv 'Lakatan' (*Musa* sp., AA)

Descalsota, Jonathan C. , Tayobong, Ryan Rodrigo P. , Dela Cueva, Fe M. , Damasco, Olivia P.

Gamma irradiation coupled with *in vitro* technology was used to develop BBTV resistance in banana cv 'Lakatan.' Ten (10) resistant lines were selected after several generations of evaluation and selection. The selected lines (M1V3–M1V4) showed low disease incidence in the field under high disease pressure and, likewise, low disease incidence with aphid inoculation of the virus. Further disease evaluation (M1V4–M1V5) on these lines consistently showed low BBTV disease incidence (11.62–28.57%) 30 mo from planting (MAP). The genetic variability in morpho-agronomic traits derived from SHAN cluster analysis grouped the selected lines into four major clusters for qualitative traits at 0.636 coefficient of similarity and three clusters for quantitative traits at 0.11 Euclidian distance coefficient. Selections based on agronomic traits showed significantly earlier flowering in three mutant lines and shorter stature in two mutant lines. Short strand repeat (SSR) analysis using 11 primers detected a high level of polymorphism in mutant lines. Mutant lines were differentiated from the 'Lakatan' control by the absence of one or few alleles in mutant lines with four primers and/or addition of one or few alleles in mutant lines with two primers. SSR analysis revealed genetic differences among mutant lines and between mutant lines and 'Lakatan' control. The results of the study further affirmed stable BBTV resistance in advanced generation evaluation (M1V4M1V5). Five out of ten resistant lines were selected for further evaluation in multi-location field trials as a requirement for registration and release of new BBTV resistant mutant variety of 'Lakatan.'

Keywords: *Banana, BBTV, Gamma radiation, Lakatan, Resistant lines, Somaclonal variation, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. S1, 159-173
2020,
(Filipiniana Analytics)
NP

In-ground storage of white potato: a preliminary assessment

Potts, M. J. , Sano, E. O. , Pacuz, L. M.

A series of trials is described intended to provide basic information about the “in-ground” storage of white potato (*Solanum tuberosum* L.) for table use in Benguet Province, Philippines. Particular attention is given to losses in yield and quality, farmer reaction and the role of “in-ground” storage in the farming system.

Losses in yield were minimal (6%) during the 3-month period following maturity, thereafter falling markedly to 25% after 5 months. Quality changes showed a similar pattern with excess sprouting and shrivelling of the tubers being observed after 5 months. Little pest or disease damage was observed.

Field observations indicate that the practice is probably most suited to smaller farmers on the margins of the production zone. More information is required on farmers' attitudes generally, to the economics of the practice and to any possible alternatives if satisfactory storage recommendations are to be made regarding the increase in potato production proposed by the National Potato Programme.

Keywords: *White potato, In-ground storage, Potato production, National Potato Programme, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 269-274
(Filipiniana Analytics)
Fil(S) S19 P53

Nitrogen and phosphorus requirements for potato production on an adtuyon clay in Bukidnon, Philippines

Kloos, Jeroen P.

The effects of eight levels of inorganic fertilizer combined with two levels of chicken manure (CM) and their residues on two consecutive potato crops were studied on an adtuyon clay in Bukidnon, Philippines. Potatoes responded sharply to small applications of nitrogen, while yields leveled off with higher applications. The main effect of N was delayed canopy cover decline after the maximum was reached. P was required in much larger quantities on these highly weathered soils for optimum potato production and appeared to have good residual efficiency. Chicken manure (CM) had a marked beneficial effect, particularly during the relatively dry growing period of the first crop by increasing average yields from 8.2 to 18.2 t/ha. All mineral fertilizer treatments, but especially N, had a better canopy development and yielded higher with CM. The P from the CM was readily available for plant growth. The highest yield (23.7 t/ha) in the first crop was produced by 280-280-280 kg of N, P₂O₅ and K₂O with 5.0 t/ha of chicken manure.

Keywords: *Potato yield, Nitrogen, Phosphorus, Chicken manure, Agriculture*

The Philippine Agriculturist, Volume No. 69 Issue No. 2, 251-262
1986 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Note: Competitive ability of six Philippine corn varieties against *Ipomoea triloba* L.

Cadag, Maria Rebecca T., Mercado, Beatriz L.

A pot experiment was conducted to determine locally developed corn varieties that can compete favorably against *Ipomoea triloba* L.

I. triloba at the density of 5 plants per pot did not adversely affect the increment in height of any of the six corn varieties during the first 4 weeks of growth. Height at flowering time of UPCA Var. 1, UPCA Var. 3, UPCA Var. 5, Phil. DMR Comp. 1 and DMR Comp. 2 was reduced but that of DMR 2 was not affected.

Yield of corn varieties was affected by the presence of *I. triloba*. The sensitivity of corn varieties to the weed can be ranked in decreasing order as follows: UPCA Var. 1, UPCA Var. 5, UPCA Var. 3 and Phi. DMR Comp. 2. Phil. DMR 2 and Phil. DMR Comp. 1 suffered much less reduction in yield, the former being the least sensitive variety.

Keywords: *Philippine corn varieties, Metalaxyl, Ipomoea triloba L., Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 297-300
1982 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Note: Control of *Phytophthora* on pepper using captafol and metalaxyl

Schlub, R. L., Johnston, S. A.

Losses from *Phytophthora* root rot, crown rot and blight of bell pepper (*Capsicum annuum* L.) caused by *Phytophthora capsici* can be reduced by fungicide applications. Both captafol and metalaxyl provided excellent protection of the foliage in the greenhouse when applied 1 to 6 days before inoculation. When the application was delayed until 24 hr after inoculation, only metalaxyl gave any significant disease control, indicated by a 2.4 disease severity rating on a scale of 0 to 5. When the fungicides were applied in the field 1 week before inoculation, the

disease severity rating of the metalaxyl-treated plants was 0.2 while that of the captafol-treated plants was 2.7. When applied 3 weeks before inoculation, both treatments provided disease control, with a disease rating of 2.7 for captafol and 3.5 for metalaxyl. When the fungicides were applied as a transplant soil treatment along with foliar-sprays throughout the season, disease losses were 1% with captafol and high as 28% with metalaxyl.

Keywords: *Phytophthora, Bell pepper, Fungicides, Captafol, Metalaxyl, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 215-219
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

0021

Note: Cultivating padi-straw mushrooms on industrial wastes

Lim, G., Tee, L. L., Avadhani, P. N.

Padi-straw mushroom (*Volvariella volvacea*) may be cultivated on composted mixtures on tropical wood wastes and pineapple skin wastes. A mixture of wood shavings to pineapple skin (1:2 by weight) and composted for 4 to 5 days was found to be a suitable substrate for growing the mushroom which could be cropped within a short time. The compost mixture need not be autoclaved nor supplemented with nutrients.

Keywords: *Padi-straw mushroom, Tropical wood wastes, Pineapple skin wastes, Composting, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 209-214
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

0022

Note: Floral cross morphology and histology of 'carabao' mango (*Mangifera indica* L.) treated with a chemical flowering inducer

Ona, Ma. L. D., De Guzman, E. V.

The response of carabao mango (*Mangifera indica* L.) shoots to a thiocarbamide-based flower inducer has been studied. The gross morphological and histological observations presented support the idea that the flowering response elicited by the flower inducer is a case of artificial floral induction.

Keywords: *Carabao mango, Thiocarbamide-based flower inducer, Flower inducer, Flowering, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 201-203
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

0023

Note: *Peronosclerospora philippinensis* spore germination in metalaxyl (Apron 35 SD) solutions

Mendoza, Evelyn Mae T., Buenaflor, Hilda G.

As low as 1 ppm metalaxyl (Apron 35 SD or Ridomil) inhibited spore germination of *Peronosclerospora philippinensis* by 50%. Greater than 10 ppm held spore germination to a minimum of 20%.

Keywords: *Spore germination, Ridomil, Fungicides, Peronosclerospora philippinensis, Agriculture*

Note: Quantitative methods for improved fertilization in lowland rice

Alva, A. K.

A fertilization program, developed in Denmark and based on quantitative methods for the evaluation and control of plant nutrition, was transferred to the tropics for lowland rice cultivation. These methods help diagnose nutritional status and predict grain yield, based on the integrated chemical composition of young rice plants. The methods also determine the amount of supplement nutrients for optimum grain yield. Findings on the development, trial and application of these methods in lowland rice cultivation are discussed.

Keywords: *Fertilization program, Quantitative methods, Plant nutrition, Lowland rice cultivation, Agriculture*

On-farm evaluation of potato (*Solanum* Spp.) in Cagayan during the 1983-1985 dry seasons

Taja, Yabes H. , Tianza, G. , Vander Zaag, P.

Potato can play a major role in providing more food and income for Cagayan farmers. Small on-farm trials is the first step in developing a viable potato industry.

Trials involving a total of 25 on-farm production plots ranging from 412 to 1000 m² were conducted. Recommended agronomic practices and the seed of the cultivar Cosima from the Benguet highlands were used. Six trials gave yields of more than 16 t/ha, all in Gonzaga and Sto. Nino. Yields of 7 to 16 t/ha were obtained in five trials, four in Solana and one in Piat. Yields of less than 7 t/ha were obtained in Alcala, Penablanca, Tuao, Enrile, and Amulung. Low yields were generally associated with clay loam soils and lack of water . Yield of 7 t/ha was calculated as the financial breakeven point, however, 12 t/ha is required before farmers would prefer growing potatoes over the crops such as corn or mung bean. With more experience, growers can greatly improve yields and profits.

Potatoes were locally consumed, sold in local markets and purchased by merchants. Prices ranged from ₱4 to ₱8/kg depending on size . Farmers perceived seed, capital and marketing to be the major problems. All farmers wanted to grow potatoes as did their neighbors.

Future emphasis needs to be placed on providing credit, seed potatoes and eventually a guaranteed market price. This can be administered by a para-government agency or bank or by a private company interested in contact growing of table potatoes for processing.

Keywords: *Potato yield, Potato farming, Agriculture*

Optimization of moist-heat and dry-heat treatment for the production of stabilized brown rice using Box-Behnken design

Capanzana, Mario V. , Diaz, Dahlia A. , Garcia, Rosemarie G. , Palomo, Alex M.

This study aims to optimize the processing parameters of combined moist- and dry-heat treatment to stabilize brown rice. The processing parameters including moist-heat treatment (MHT) time, dry-heat treatment (DHT) temperature, and DHT time were modeled using the Box-Behnken design. The optimum processing condition was verified by actual experimental runs and shelf-life study. The responses evaluated were free fatty acid (FFA) content, peroxide value (PV), and sensory properties of brown rice samples. The results showed that all processing parameters significantly affected the FFA content. MHT time has a significant effect on PV and off-odor, while DHT time affected the acceptability of texture and taste of brown rice. Some interaction effects among the processing parameters were also found significant. The optimum processing parameters were 75 min MHT time, 65 °C DHT temperature, and 70 min DHT time. The actual values of responses from actual experimental runs were in close agreement with the predicted values of the models. Treated brown rice samples have significantly lower FFA than control samples during storage. Decreased sensory acceptability of odor of treated brown rice samples was observed during longer storage time.

Keywords: *Brown rice, Free fatty acid, Heat treatment, Optimization, RSM, Shelf-life, Agriculture*

Philippine Journal of Science, Volume No. 149 Issue No. 1, 43-53
2020 March,
(Filipiniana Analytics)
NP

Physiological basis of low tuber yield from basal sweet potato [*Ipomoea batatas* (L.) Lam.] cuttings

Nzima, M.D.S. , Del Rosario, Dafrosa

The study determined the physiological basis of the lower yield in sweet potatoes [*Ipomoea batatas* (L.) Lam.] grown from basal cuttings compared to those grown from terminal cuttings. Sweet potatoes grown from basal cuttings produced significantly less dry matter than those grown from terminal cuttings. In basal cuttings, the initial absence of meristem and the few leaves may account for initial differences in the amount of endogenous growth regulators and subsequently fewer leaves in basal compared to terminal cuttings. These differences resulted in fewer roots produced per node (1.15) and per cutting (6.75) from basal cuttings than those from terminal cuttings (5.54 and 41.44, respectively). Roots from basal cuttings were also shorter and less branched and had less leaf area per plant. As a result basal cuttings produced less dry matter. Nutrient uptake and distribution were not generally affected by the type of planting materials used.

Keywords: *Sweet potato, Basal cuttings, Terminal cuttings, Planting materials, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 119-129
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Plate counts of freshly-gathered tuba and lambanog toddy

Fernandez, William L., Altoveros, Nestor C., Oldan, Consorcia F.

Coconut sap is obtained from excised, unopened spadix of the coconut palm. The addition of the powdered tanbark of *Ceriops tagal* (Perr) C.B. Robinson causes the sap to become astringent and reddish to orange in color. The resulting product is an alcoholic beverage called *tuba* (coconut wine). Freshly-gathered *tuba* has an alcohol

content (by volume) of 5.77 to 9.26 with an average of 7.78; a sp. gr. of 0.992 to 1.013 with an average of 0.99; and a pH of 4.35 to 5 with an average of 4.58. The *lambanog* toddy is the pearly white, coconut sap allowed to ferment and later distilled to produce *lambanog* (coconut brandy). The toddy has an alcohol content (by volume) of 4.25 to 6.6 with an average of 1.016; and a pH of 3.6 to 4 with average of 3.82. Microbial plate counts were made of the *tuba* and the *lambanog* toddy of three culture media, namely tryptone glucose yeast extract agar (TGYA), tryptone glucose yeast extract rose bengal streptomycin agar (TGYRBSA) and tryptone glucose yeast extract green actidione agar (TGYBGAA). TGYA gave the highest counts, followed by TGYRBSA, and TGYBAA, the lowest. The yeast predominate over the bacteria in the TGYA. Only the yeast appeared in TGYRBSA. Mainly bacteria and occasional yeast grew in TGYBGAA. Molds were absent. The gram reaction and spore formation of the microorganisms were also noted.

Keywords: *Coconut sap, Plate counts, Lambanog, Tuba, Lambanog toddy, Agriculture*

NRCP Research Bulletin, Volume No. 34 Issue No. 2, 131-150
1979 June,
(Filipiniana Analytics)
Fil(S) Q179.9 N38

0029

Potential of methiocarb seed treatment for protection of sprouting rice from Philippine bird pests, *Lonchura* spp. *Garrison, M. V. , Libay, J. L.*

Repellency effect (R-50) of methiocarb was determined in the laboratory on three species of *Lonchura* R-50 values of 0.043%, 0.057%, and 0.036% were found for *L. malacca*, *L. punctulata*, and *L. leucogaster*, respectively. Field test with seed treater (Mesurol) proved to be effective in reducing damaged to sprouting rice. The percent damage determined at the conclusion of the test was significantly ($P < 0.01$) lower for the treated plot (5.3%) than the control plot (61.7%).

Keywords: *Methiocarb seed, Sprouting rice, Philippine bird pests, Lonchura, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 363-366
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

0030

Presence of growth regulatory substances in sugarcane bagasse *Famoso, Erlinda B. , Bautista, Ofelia K.*

Seedbox and petri dish tests were conducted to determine the cause of chlorosis and stunting of tomato seedlings mulched with sugarcane bagasse 4 months after milling. The seedbox study indicated that chlorosis and stunting of the seedlings were due to inhibitory substances leached from the 1- to 5-month-old sugarcane bagasse. The petri dish test proved that these substances are water -extractable, gradually lose activity, and diminish as the bagasse ages. After 6 to 8 months, the bagasse concentration of the substances no longer inhibited but instead stimulated the growth of tomato seedlings.

Keywords: *Sugarcane bagasse, Seedbox study, Petri dish tests, Tomato seedlings, Agriculture*

The Philippine Agriculturist, Volume No. 64 Issue No. 1, 147-151
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Rodent activity and damage in clean and weedy cropfields

Hoque, Melanda M. , Olvida, Jaime L.

Weedy and clean corn and rice fields were compared to find out the effect of weed density on rodent activity and damage to the crops. Rat damage was directly dependent on weed density for both corn ($r=.96$; $\alpha=.01$) and rice ($r=.5$; $\alpha=.05$). Increase in rat activity followed an increase in rat damage in corn but not in rice. Heavy weed population renders crops susceptible to rat infestation. Weed control has an indirect benefit in reducing losses due to rats.

Keywords: *Rodents, Weed population, Weedy corn, Weedy rice, Yield losses, Agriculture*

The Philippine Agriculturist, Volume No. 69 Issue No. 3, 329-340
1986 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Rodent damage assessment in corn

Hoque, M. M. , Benigno, E. A. , Palis, F. G. , Olvida, Jaime L.

A regression analysis was performed on the ratio of area or length of damage to ear length (X) versus the logarithm or weight loss from the damaged area (Y) to come up with estimating equations for grain loss per damaged ear for five Recommended Philippine corn hybrids. The estimating equation for circular type of damage is: $\log Y_c = 1.15 + .95 X$ ($r^2 = .902$) and $\log Y_s = .83 + .15 X$ ($r = .907$) for the strip type. To use the predicting equations the value of X (i.e. circular or strip type) are estimated from 10 random ears from each damage type. The predicting equations could be used for any of the hybrids and perhaps for any similar hybrid. A survey was conducted from corn producing provinces to establish an appropriate sample size to use for corn damage assessment over a wide scale. The sample size obtained from damage survey data had established the optimum sample size at 17, one hectare cornfields per province, 13 and 4 fields should be taken from low and high damage areas respectively. The requirements for the complete assessment of losses to corn have been developed with these studies reported here.

Keywords: *Corn rodent, Rodent damage, Damage assessment, Agriculture*

The Philippine Agriculturist, Volume No. 69 Issue No. 3, 317-328
1986 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Synergism between endomycorrhizas, *Rhizobium japonicum* CB 1809 and soybean [*Glycine max* (L.) Merr]

Halos, P.M. , Luis, Elsa M. , Borja, Marilyn S.

Soybean plants responded differently to the eight exotic and indigenous endomycorrhizal isolates both in field and pot experiments. Differences in mean height between treatments were significant. Inoculated plants were noticeably larger, taller, greener, healthier, and more vigorous than the control plants. In the field experiment, the number of pods, yield, dry weight and height of soybeans inoculated with endomycorrhizas and *R. japonicum* were significantly higher than those of plants inoculated with either endomycorrhizas or *R. japonicum* alone. Not all plants inoculated with the endomycorrhizal isolates alone exhibited significant nodule formation. However when such isolates were combined with *R. japonicum*, the plants showed strikingly increased nodule formation compared with plants inoculated with *R. japonicum* alone.

Keywords: *Endomycorrhizas, Soybean plants, Nodule formation, Rhizobium japonicum, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 93-102
1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

0034

Temporal and rate of vermicompost application on early growth of physic nut (*Jatropha Curcas L.*) in degraded soil
Palma, Richmond A.

This study was conducted to determine the effects of rate and timing of vermicompost application on: root collar diameter; height increment; number of leaves; and root – shoot ratio of *Jatropha curcas* L. planted in degraded soil. The generative characteristics of *Jatropha* in response to the treatments were evaluated under field conditions. The results showed that addition of vermicompost significantly increased root collar diameter, number of leaves and height increment while, timing of application has also increased the root collar diameter and number of leaves but not the height increment. Both treatments had no significant effect on the root – shoot ratio. Based on the study, *Jatropha* pits filled with vermicompost during outplanting will performed better than those applied 10 to 20 days after planting in degraded soil.

Keywords: *Vermicompost, Biodiesel, Jatropha, Growth, Agriculture*

Mindanao Journal of Science and Technology, Volume No. 14 Issue No. 1, 106-119
2016,
(Filipiniana Analytics)
NP

0035

Weed control in dry-seeded wetland rice (*Oryza sativa* L.)
Ahmed, Nizam U. , Moody, K.

The results of three experiments to determine the weeding requirements for dry-seeded wetland rice and the effect of seeding method and weed control practices on yield are reported. In all experiments, weed competition greatly reduced yield, and significantly reduced the number of productive tillers. Yields from plots weeded once at 3 to 4 weeks after seedling emergence were not significantly different obtained from plots that were weeded two to three times or that maintained weed-free. Weeding time was more important than the number of weeding. The seeding method had no effect on weed suppression and yield and had little effect on yield components.

Keywords: *Weed control, Wetland rice, Seeding method, Planting method, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 1-15
1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

0036

Weeds in cropping systems as affected by landscape position and weeding regime.
I. Well-drained upland
Ahmed, Nizam U. , Moody, K.

In a well-drained upland soil, the effects of four weeding regimes applied to four sequentially grown crops on weed population changes and weed seed reserves in the soil were determined. The number of different weed

species decreased as the length of cropping increased in the control plots. Different weed species dominated each crop and each season. The coefficient of similarity was only 26.0% between the communities growing in association with dry-seeded rice (*Oryza sativa* L.) in 1977 and 1978. The number of weeds increased by 5.6% in the control plots in a fifth crop which received no weeding, compared to that in the first crop. The number decreased in the weeded plots over the same period (maximum decreased 86.8%). Weed seed reserves increased by 8.2% in the control plots but decreased 35.7 to 63.8% in the weeded plots because of the weeding regimes applied to the previous for crops.

Keywords: *Weed control, Cropping system, Weeding, Dry-seeded rice, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 35-44
 1982 January-March,
 (Filipiniana Analytics)
 Fil(S) S19 P53

0037

Weeds in cropping systems as affected by landscape position and weeding regime.

II. A very low ponding potential

Ahmed, Nizam U., Moody, K.

Echinochloa colona (L.) Link was the dominant weed in dry-seeded rice *Oryza sativa* L. sown on the 1977 and 1978 wet seasons but it comprised a greater proportion of the weed flora on the basis of relative dry weight in the first rice crop than in the second crop. *Eleusine indica* (L.) Gaertn. and *Digitaria ciliaris* (Retz.) Koel. were important and the weed flora was more diverse in the second rice crop than in the first. *Portulaca oleracea* (L.) which was the dominant weed in corn *Zea mays* (L.) - the second cropping sequence - had minor importance both rice crops.

The coefficient of similarities between the weed communities growing in association with the different crops was less than 40%, indicating a marked difference in the weed flora associated with each crop. As a result of weeding treatments applied to the previous three crops, the total number of weeds in the fourth crop decreased 8.2 to 79.2% compared with that in the first crop. The unweeded dry-seeded rice crop yielded no grain in both years because of severe weed competition. Weeding did not result in a significant yield increase for corn.

Keywords: *Cropping system, Weed control, Dry-seeded rice, Corn, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 45-52
 1982 January-March,
 (Filipiniana Analytics)
 Fil(S) S19 P53

0038

Weeds in cropping systems as affected by landscape position and weeding regime.

V. Comparisons between the first rice crop grown in different fields, 1977 wet season

Ahmed, Nizam U., Moody, K.

The number of weed species, the total number of weeds, and weed weight per unit area were higher when the land was prepared dry than when it was puddled. In dryland preparation, the number and weight of weed decreased as the ponding potential increased.

Grasses predominated in all the fields in terms of the number and weight, except in the land with a high ponding potential where broadleaf weeds predominated in terms of number and grasses dominated in terms of weight.

The dominant weed species varied between fields. There was little similarity between the weed populations growing in the different fields except in the case of the weed communities growing on land with a low ponding potential and on land with a high ponding potential where the coefficient of similarity was 75.8%.

Grain yield of rice (*Oryza sativa* L.) increased in the weeded plots with increase in ponding potential. Weeds did not cause a significant yield loss in the rice crops grown on puddled soil but complete yield loss occurred when they completed with rice grown after dryland preparations.

Keywords: *Rice crops, Cropping system, Weed control, Weeds, Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 367-375
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

0039

Weeds in cropping systems as affected by landscape position and weeding regime.

VI. Comparisons between dry-seeded rice grown in fields with different ponding potentials

Ahmed, Nizam U. , Moody, K.

Grasses predominated in all fields regardless of ponding potential. They accounted for 58.7 to 89.5% of the weed flora based on weed weight. Weight of broadleaf weeds decreased as the ponding potential increased.

Digitaria ciliaris (Retz.) Koel. was the predominant weed in well-drained upland. *Echinochloa colona* (L.), a minor weed in the well-drained upland, was the major weed in the other fields. *E. colona* *Calopogonium mucunoides* Desv. were the only weeds common to all fields.

There were less weed species in fields that have been previously puddled than in fields that had been prepared dry but neither puddling nor water impoundment reduced the number of weeds or weed weight.

There was little similarity between the weed flora in each field which indicates the difficulty of choosing a suitable herbicide for weed control in these dry-seeded fields.

In all fields no yield was obtained if the rice (*Oryza sativa* L.) was not weeded. When the crop was weeded the yield was dependent on the ponding potential of the field. The higher the ponding potential, the greater the yield.

Keywords: *Dry-seeded rice, Cropping system, Weed control, Herbicide , Agriculture*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 377-384
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

0040

Weeds in cropping systems as affected by landscape position and weeding regime.

III. Land with a low ponding potential

Ahmed, Nizam U. , Moody, K.

In three different rice (*Oryza sativa* L.) crops grown in the field, weed weights were greatest in dry-seeded rice and least in transplanted rice, indicating the importance of puddling, water, and crop competition in weed suppression. The number of weed species in the dry seeded crop also increased compared to those grown on puddle soil. *Leptochloa chinensis* (L.) Nees was the dominant weed in the crops grown on puddled soil whereas *Echinochloa colona* (L.) Link was the most important in dry- seeded rice. The weed communities growing in association with rice crops grown on puddled soil were very similar but these populations had little similarity with those growing in association with dry-seeded rice. The unweeded dry-seeded rice crop produced no yield whereas weeds caused no significant yield reduction in the rice crops grown on puddled soil.

Keywords: *Cropping system, Dry-seeded rice, Wet-seeded rice, Transplanted rice, Weed control, Agriculture*

Weeds in cropping systems as affected by landscape position and weeding regime.

IV. Land with a high ponding potential

Ahmed, Nizam U. , Moody, K.

In a cropping sequence where transplanted rice (*Oryza sativa* L.) was followed by transplanted rice in 1977 and dry-seeded rice was followed by transplanted rice in 1978, there was little similarity in the weed populations growing in association with the two transplanted rice crops because of differences in flooding time of the fields after transplanting. A greater similarity was observed in the weed flora between the second transplanted rice crop and the dry-seeded crop than between both transplanted crops. The weeding regimes imposed on first three crops in the cropping sequence affected the number of weeds in the fourth crop in the sequence and the weed seed reserves in the soil. No yield losses due to uncontrolled weed growth in the transplanted crops were observed whereas complete yield loss occurred in the dry-seeded crop.

Keywords: *Cropping system, Weed control, Transplanted rice, Dry-seeded rice, Agriculture*

White potato yield survey: Benguet Province

Potts, M. J. , Pacuz, L. M. , Sano, E. O.

A survey is described in which samples were taken at harvest from potato fields in Benguet Province and an estimate of the yield was made. A total of 419 fields were surveyed during the wet seasons, 1980 and 1981, and the dry seasons, 1980-81 and 1981-82. Respective mean seasonal yields were: 28.2t/ha, 17.1 t/ha and 2828 t/ha.

The range of yields varied according to season; being concentrated about the seasonal mean during the wet season, 1980, and the dry season, 1981-1982, but showing marked variability during the other two seasons. Weather factors were considered to primarily responsible for the variability.

During the wet season, the cultivars Conchita, Cosima and great were most commonly grown. Cv. Conchita and cv. Greta were particularly popular in the more remote localities, were good late blight resistance and a long dormancy period were considered essential. Cv. Cosima was grown in localities where there was a concentration of cooperation in the local RP/German Seed Potato Program.

During the dry season availability of seed pieces dictated the cultivar grown, with a preference being shown for cv. Red Pontiac. Cultivars showed little difference in yield, except that cv. Cosima yielded slightly less than average for both the wet-season crops, 23.7 t/ha and 16.2 t/ha, respectively; and cv. Greta yielded below average during each of the dry season, 21.8 and 25.4 t/ha, respectively.

Keywords: *White potato, Cropping season, RP/German Seed Potato Program, Potato cultivars, Agriculture*

Yield performance of ten white corn hybrids under Claveria condition

Bautista, Elpidio R. , Alcantara, Charly G. , Elmundo, Elizar M.

This study aimed to evaluate the performance and profitability of different corn hybrids conducted at MOSCAT, Claveria, Misamis Oriental, Philippines. The ten white corn hybrids (TSG 108 w, 30W30, USMARC 8102w, DAS 2W 042, USMARC 704w, MM7314w, USMDA 062 Hw, TCT 112w, USMDA 064 Hw, and 30W40) tested vary significantly in their agronomic parameters except for the plant height and stand count during the dry season cropping which showed no significant difference among each treatment means. It signifies that different corn hybrids differ significantly in its genes. The yield and yield components also showed slightly to highly significant difference among the corn hybrids giving MM7314w as the high yielding hybrid with 5.95 tons/ha followed by 30W40 with yield of 5.21 tons/ha during the 1st cropping and 30W40 in the 2nd cropping as the high yielding hybrid of 6.73 tons/ha. In the cost and return analysis, for the 1st cropping, MM7314w gave the highest Return of Investment (ROI) of 1.19 per peso invested and USMARC 704w gave the lowest of 0.18 per peso. In the 2nd cropping, 30W40 obtained the highest ROI of 2.39 while USMARC 8102w obtained the lowest of 0.67.

Based on the results of the study, 30W40 and TSG 108w corn hybrids were the two best hybrids to be recommended since it gave significantly higher yield compared to other hybrids used. These hybrids did not give the highest yield during the 1st cropping. However, the difference between their means with that of the highest yield which was MM7314w is not significantly different.

Keywords: *Yield performance, Hybrids, Return of investment, Agriculture*

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2011,
(Filipiniana Analytics)
NP

Yield performance of the different yellow corn hybrids under Claveria condition

Bautista, Elpidio R. , Alcantara, Charly G. , Elmundo, Elizar M.

The main objective of the study is to evaluate the performance and profitability of different corn hybrids under Claveria condition. Fifteen hybrids of yellow corn were used. Different yellow corn hybrids vary significantly in their agronomic parameters except for the plant height in the wet season which showed no significant difference among treatment means. The yield and yield components also showed slightly to highly significant difference among the corn hybrids giving NM08A5 as the high yielding hybrid with 7.46 tons/ha during the 1st cropping and NM08A4 in the 2nd cropping as the high yielding hybrid of 9.34 tons/ha. The highest return of investment (ROI) for the 1st cropping was obtained by NM08A5 corn hybrid of 1.98 per peso invested and MM888 gave the lowest ROI of 0.74 per peso. In the 2nd cropping, NM08A4 obtained the highest ROI of 2.76 while MM888 showed to have a losing production of -0.15 computed ROI. Based on the result of the study, NM08A4 and NM08A5 are the two hybrids suitable under Claveria condition. NM08A4 did not get the highest value of yield during the 1st cropping but the difference between their means with NM08A5 was not significantly different based on DMRT. Likewise, NM08A5 did not also give the highest value of yield in the 2nd cropping but still their means between NM08A4 did not also differ significantly.

Keywords: *Hybrids, Performance, Profitability, Agriculture*

Mindanao Journal of Science and Technology, Volume No. 8 Issue No. 1, 57-72
2010,
(Filipiniana Analytics)
NP

Accessibility to and utilization of healthcare services pre- and post-typhoon Yolanda as perceived by senior citizens in a rural area in the Philippines

Silvano, Arnulfo M.

The problems of accessibility to and utilization of healthcare services are fundamental and constant issues in every country's healthcare system especially among the senior citizens.

The study investigated the accessibility to and utilization of healthcare services among senior citizens in the Province of Leyte as determined by the predisposing, enabling, and need factors.

The sample consisted of 496 60 years old and above senior citizens from randomly selected barangays of Districts 1 and 2 of Leyte Province. An interview schedule was designed to gather data through structured interviews. The data were analyzed using descriptive statistics to determine the level of accessibility and utilization, Point-biserial and Pearson product-moment correlation coefficient (Pearson's r) and eta correlation to check significant relationships among variables, and multiple linear regression to identify predictors of accessibility and utilization.

Findings revealed that sex, occupation, primary source of income, health status, medical condition, and disability had weak correlations with accessibility and utilization during pre-typhoon and post-typhoon. Lastly, medical conditions and health status were the best predictors of accessibility and utilization during pre-typhoon and post-typhoon. These findings lead to the development of a local model on the accessibility to and utilization of healthcare services that are more reflective for senior citizens in rural areas in the Philippines.

More research is needed to replicate these results to substantiate the significance of addressing the healthcare needs of the senior citizens in rural areas.

Keywords: *healthcare, accessibility, utilization, senior citizens, rural Philippines, Anthropology*

Philippine Journal of Health Research and Development, Volume No. 22 Issue No. 3, 30-44
2018/09,
(Filipiniana Analytics)

Association of topography with demographic and socioeconomic factors to the compliance and non-compliance of mothers to reproductive health services

Gadong, Joshua Vincent Y. , Dofitas, Adrian Bernard A. , Bordon, Jenn Margarette B. , Brazas, Jodelyn M. , Azarraga, Alyssa Faye N. , Gestuveo, Rommel J. , Arbizo, Joseph L. , Padilla, Phillip Ian P. , Sumayo, Marilyn S., Matinong, Kathleen Erica D. , Paguidopon, Cyril L. , Tabañar, Bianca Ysobel S. , Tantuan, Liza Beth F. , Temelo, Jason Andrei C. , Ynzon, Samuel P.

In order to alleviate the reproductive health status of mothers in the Philippines, there should be a better understanding of the factors influencing their compliance to reproductive health services. The study examined the association of topography with demographic and socioeconomic characteristics on the compliance of reproductive health services.

This study analyzed survey data collected in 2017 among mothers in the rural community of Maasin, Iloilo, Philippines. The statistical tools Chi-square, T-test and logistic regression were used to determine the factors associated with the likelihood of mothers to comply with prenatal care, family planning and delivery care services.

There is no significant difference in the number of mothers who comply with prenatal care services and family planning services between lowland and highland barangays. However, mothers from the highland barangays are more likely to have non facility-based delivery (NFBDD). Only educational attainment was found to be significantly associated for prenatal services. Only parity was significantly associated with compliance to family planning services. Age, parity, educational attainment and occupation were significantly associated with compliance to delivery care service. The odds of NFBDD in the highland area is 2.44 (95% CI: 1.40 to 4.23) times higher as

compared to the mothers residing in the lowland area. The odds of NFBD also increases by 7% (95% CI: 3% to 11%) per year increase in age.

There is a great need to restructure the delivery of reproductive health services to accommodate mothers from highland barangays who still opt for NFBD. Topography, demographic and socioeconomic factors should be considered in developing strategies and implementation of reproductive health care services in the Philippines. Furthermore, the researchers recommend to include in future studies other reproductive health services such as postnatal care in order to fully grasp the reproductive health in the country.

Keywords: *family planning, prenatal care, facility-based delivery (FBD), reproductive health services, topography, demographic and socioeconomic characteristics, Anthropology*

Philippine Journal of Health Research and Development, Volume No. 22 Issue No. 2, 53-60
2018/06,
(Filipiniana Analytics)

0047

A bond between man and woman: religiosity, moral foundations, and same-sex marriage attitudes in the Philippines

Quiñones, Diwa Malaya , Manalastas, Eric Julian , Sio, Christie P. , Ochoa, Danielle P.

Same-sex marriage in the Philippines remains a highly contentious issue due to the influence of religion in this predominantly Catholic country, where it is often framed as an issue of morality. However, the psychological underpinnings of this religious influence still merits further exploration. Thus, we examined the role of religious behaviors and moral foundations in predicting attitudes toward same-sex marriage among Filipinos. Data from 385 participants revealed that the particular behavior of reading the main sacred text of one's religion, rather than the often-used predictor of religious attendance predicts negative attitudes. Beyond these religious variables, the moral foundation of Purity/sanctity also predicts negative attitudes. Recommendations for further research and possible implications on attitude change are discussed in light of these findings.

Keywords: *same-sex marriage, same-sex marriage attitudes, religiosity, moral foundations theory, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 151-171
2016,
(Filipiniana Analytics)

0048

A comparative study of 4Ps beneficiaries and non-4Ps beneficiaries in the 8th national nutrition survey

Chavez, Milagros C.

The Conditional Cash Transfer (CCT) or Pantawid Pamilyang Pilipino Program (4Ps) is a human development measure of the national government that provides cash to the poorest of the poor upon their compliance with health, nutrition and education conditionalities. The 4Ps started in 2008 and is now on its sixth year of implementation. It has expanded to 41,517 barangays, all 144 cities and 1,483 municipalities in 80 provinces as of March 26, 2015. This study was done to determine the awareness and participation of households to 4Ps; and to compare the nutrition condition of household beneficiaries with that of non-beneficiaries. Data was taken from the 8th National Nutrition Survey Database selecting only those households with children aged 0-14 years and/or with a pregnant woman in the household. Face-to-face interview with the respondents was done for the 4Ps questionnaires and socio-economic information using the electronic Data Collection System (e-DCS), weight and height/ recumbent length measurements were taken from all household members following standard techniques. Blood samples were obtained from pre-school children through finger prick method and the other household members by venous blood samples. Statistical analysis of data was done using SPSS and STATA. Of the 35, 825 households, 73% were aware of the 4Ps program, while 27% were not aware of the program. Across all regions, awareness was highest in Zamboanga Peninsula (87.9%) while the lowest awareness was in NCR (57.7%). Among the eligible households in the 8th National Nutrition Survey, 16.6% qualified as beneficiaries and most of them

were found in Zamboanga Peninsula (34.0%), ARMM (31.3%) and Bicol (28.6%). Distribution of household beneficiaries by place of residence showed that majority reside in rural areas (71.1%). The mean household size of 4Ps households was 6.4. Majority of the household heads were elementary undergraduate, and they worked either as skilled agricultural, forestry or fishery. Distribution of the household beneficiaries by wealth quintile showed that most of them belong to the poorest (45.3%) and poor (29.1%) households. Comparing the nutritional status of 4Ps beneficiaries with that of the non-4Ps, undernutrition was higher among 4Ps children as compared to their non-4Ps counterpart. Among the 10-14 years of age, underheight was significantly higher at 42.3% compared to non-4Ps at 26.5%. There were more at-risk pregnant women among the 4Ps beneficiaries (26.8%) than non-4Ps beneficiaries (24.1%). Anemia was noticeably more prevalent among the 4Ps beneficiaries than its non-4Ps counterpart. Highest anemia prevalence was reported among infants, 6-11 months (52.4%), elderly (20.9%), and pregnant women (24.8%). Participation of children (0-71 months) in government programs was relatively higher among the 4Ps beneficiaries than those non-4Ps except in Newborn Screening. Majority of the households were aware of the 4Ps program, however less than 20% qualified as beneficiaries. The results also showed that those who qualified belong to the poorest and the poor quintiles, whose household heads were elementary undergraduate and worked in skilled agricultural, fishing, and forestry occupations. Comparing the results of 4Ps beneficiaries with that of non-4Ps showed that, in general, undernutrition and anemia prevalence was higher among 4Ps beneficiaries. However, participation of children in government programs was higher among 4Ps beneficiaries than its non-4Ps counterpart.

Keywords: *conditional cash transfer, 4Ps, national nutrition survey, beneficiaries, poor household, undernutrition, pregnant women, Anthropology*

41st FNRI Seminar Series Abstract, Volume No. Issue No. , 35
2015,
(Filipiniana Analytics)

0049

A comparison of job satisfaction among Filipino nurses employed in the Philippines and overseas

Legaspi, Ruth Sha

The shortage of nurses has led to increasing competition in the recruitment and retention of nurses globally. According to literature, retention of nurses is correlated with job satisfaction, making it an important topic for research. This study compared the level of general, intrinsic, and extrinsic job satisfaction of Filipino nurses employed locally and overseas. It identified the major motivators and problems that affect their job satisfaction.

Eighty-four nurses were surveyed using the Minnesota Satisfaction Questionnaire. Fifty-five were locally-employed, while 29 were overseas Filipino nurses. The Mann-Whitney U Test was used to determine the significant difference in the level of satisfaction among the two groups. Answers on the open-ended questions were used to validate the quantitative data.

The results showed that Filipino nurses employed both locally and overseas have an average level of general satisfaction. Both groups also showed a high degree of intrinsic satisfaction and an average degree of extrinsic satisfaction. There is no significant difference found in the level of general, intrinsic, and extrinsic job satisfaction of locally and overseas employed Filipino nurses.

The study found that social service, an intrinsic factor, is the major motivating force of job satisfaction. Workload, an extrinsic factor, is the most common problem encountered for both groups of nurses. Salary serves as one of the factors that keeps Filipino nurses overseas satisfied, while it is one of the factors that causes dissatisfaction among locally-employed nurses.

Keywords: *job satisfaction, nurses, overseas Filipino nurses, Anthropology*

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 1, 38-47
2019/03,
(Filipiniana Analytics)

The development and validation of a Filipino social desirability scale

Cagasan, Louie P. Jr.

This paper is composed of two studies that describe the construction and validation of a Filipino Social Desirability (SD) Scale. Study 1 details the phases in developing the SD scale: item writing, item selection, and cross validation. In the item-selection phase, twelve of the twenty-six candidate items were selected based on a number of criteria. One is the correlation of items with self-criterion residuals, defined as the discrepancy between self-report scale scores and an objective criterion, in this case, peer-rating on the same scale. Residuals were generated from the five domain scores of the Mapa ng Loob. Other criteria were psychometric properties of the items and ratings of experts and target participants on the appropriateness of the items. On a sample with $n=157$, the test-reliability of the scale was found to be .706. In the cross validation phase, SD scale scores (from 12 items) were found to be significantly correlated with self-peer discrepancies on Neuroticism, Agreeableness, and Conscientiousness. The scale reliability was computed at .731 ($n=162$). In Study 2, convergent validity of the local SD scale was examined. Results showed that the Filipino Social Desirability Scale was significantly correlated with Paulhus' Balanced Inventory of Desirable Responding and the Marlowe-Crowne SD Scale.

Keywords: *social desirability, indigenous measure, self-criterion residuals, personality traits, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 1, 19-42
2016,
(Filipiniana Analytics)

Factors associated with unmet need for family planning among young women in the Philippines

Latorre, Angelica Anne E.

The sociodemographic shift in sexual initiation, low contraceptive and family planning use pose threat in the reproductive health and well-being of young people. Despite the rise in sexual activity among young people before reaching the age of 18, prevalence of contraceptive use remains low while unmet need for family planning among married and sexually active women is consistently highest among women 15-19 years old compared to any other age group.

The observed trend in the reproductive health practices of young people, as well as the paucity of literature on adolescent reproductive health, warrant the need for studies that focus on family planning and sexual behavior of young people. This study aims to determine the factors associated with unmet need for family planning among sexually active women aged 15-19 years in the Philippines.

This study used the data from the National Demographic Health Survey 2017. The analysis included only the fecund and sexually active women aged 15-19 years old. Logistic regression was performed in order to determine the significant predictors of unmet need for family planning among young women.

Sixty-eight percent of women reported secondary education as the highest level of education attended. Knowledge on modern family planning method is high at 99% while the proportion of women with knowledge of ovulatory cycle, and knowledge on possibility of getting pregnant after giving birth and before the return of menstrual cycle are 21% and 61%, respectively. The proportion of women who responded that their husbands/partners desire the same number of children is 68%. Multiple logistic regression and stepwise selection procedure showed that husband's fertility preference is a significant predictor of having unmet need.

Addressing the issue on low family planning and contraceptive use among young women in the Philippines requires concerted efforts that aim to cater to the needs of both men and women in this age group. The consistently low family planning practice among young people despite the overall improvement in the proportion of family planning users among women indicates the need for variability in strategies that target young and older age groups. Further research should be conducted in order to gain better understanding of the determinants of unmet need for family planning among young people.

Keywords: *unmet need for family planning, young women, adolescent reproductive health, teenage contraceptive use, family planning services, Anthropology*

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 2, 10-19
2019/06,
(Filipiniana Analytics)

0052

Gay and behind bars: life stories of Filipino gay prisoners in the Leyte Regional Prison
Mercines, Monique I. , Agustin, Zoreen E. , Relis, Leonel J.

This is a qualitative study on the life stories of Filipino gay prisoners in the Leyte Regional Prison (LRP) to explore their lived experiences and how they make meaning of these experiences. A triangulation process was conducted through interviews with six Filipino gay prisoners and their romantic partners in prison and an analysis of the participants' profiles in the LRP. Being a Filipino gay prisoner presents several hardships but it does not make him a captive of misery. Instead, the Filipino gay prisoner continues to find meaning in his life and hopes to gain full acceptance and respect from society. Writing about the life stories of the participants can provide them with an opportunity to be heard and can help the institution tasked to rehabilitate them in coming up with more holistic understanding of this segment of the population which will facilitate future programs to promote the well-being of Filipino gay prisoners.

Keywords: *LGBT, gay prisoners, life stories, lived experiences, meaning making, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 61-84
2016,
(Filipiniana Analytics)

0053

Journeying to a safe space: sexual and religious identity integration of Filipino LGBT-affirmative church members
Nelson, Grant , Dumaop, Darren E. , Evangelista, Zyra M.

Identity is a complex concept. It is pluralistic and cuts across several domains. Some domain specific identities may oppose another, like in the case of sexual identity and religious identity, where successful integration is achieved for some individuals, while for others, a significant amount of conflict can occur, especially for religious sexual minorities. The present study analyzes the integration stories of members of an LGBT-affirmative church, the Metropolitan Community Church-Quezon City (MCC-QC). In two kwentuhan sessions, 12 MCCQC members shared their lived experiences of identity integration. Based on participant accounts, the process of integration began with experiences of oppression, followed by personal quests towards a deeper faith and knowledge of one's self, and eventually culminating in a continual personalization of faith. Identity integration was facilitated by participation in a safe and supportive faith community. We found that this process is relevant especially in promoting well-being among LGBT faithful.

Keywords: *identity integration, LGBT, MCC, religion, identity, identity conflict, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 101-133
2016,
(Filipiniana Analytics)

“Girl, bi, bakla, tomboy”: the intersectionality of sexuality, gender, and class in urban poor contexts

Alonzo, Danielle Celine P. , Santos, Emmanuel C. Jr. , Ceperiano, Arjohn M. , Ofreneo, Mira Alexis P.

Intersectionality as a theoretical framework argues for the need to account for people’s multiple and intersecting social identities in understanding experiences of discrimination. We looked at the intersection of sexuality, gender, and class in shaping the particularity of Filipino urban poor lesbian women’s and gay men’s experiences of discrimination. Using four case narratives, we examined the experiences of a bisexual (masculine gay man), bakla (feminine gay man), tomboy (masculine lesbian woman), and girl (feminine lesbian woman) in urban poor contexts. Unique themes include: how gender, sexuality, and class identities intersect and fuse in the bakla and tomboy identities to create a distinct form of social inequality that constructs these identities as forms of moral degradation; how non-normative gender expressions trigger overt discrimination; how lesbian and gay identities and relationships are invisibilized; and how providing for the family can facilitate acceptance given the strong adherence to heteronormative gender roles embedded in the context of urban poverty.

Keywords: *intersectionality, discrimination, class, gender, sexuality, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 5-34
2016,
(Filipiniana Analytics)

The “I love lesbian and gay rights” pin: an experiential learning exercise to understand anti-LGBT stigma

Manalastas, Eric Julian , Muyargas, Moniq M. , Docena, Pierce S.

This study replicates and extends a teaching intervention study by Battle (2004) on the use of advocacy symbols to promote awareness of anti-LGBT stigma among university students. Seventy-one Filipino students in three university campuses taking an undergraduate course in LGBT psychology were given a task as a course requisite to wear an “I love Lesbian and Gay Rights” pin across different settings. Analysis of students’ reflection papers revealed themes related to stigma consciousness, intergroup empathy, allyship sentiments, and transformative learning. Experiences of nonverbal and verbal microaggressions, especially in the private sphere, as well as microvalidations from LGBT people and heterosexual allies were also reported.

Keywords: *stigma, teaching intervention, advocacy symbol, teaching, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 173-188
2016,
(Filipiniana Analytics)

Life satisfaction among older Filipino sexual minorities and their experiences of support

Guevara, Celinne Charmaine Angeles

Studies have shown conflicting views on whether or not sexual minorities aged sixty and above face the same challenges of aging that heterosexual persons do. In the Philippines, few studies feature the intersections of age and sexual orientation. This study discusses the perceived life satisfaction of five male and five female sexual minorities between ages sixty to seventy, considering that they have lived in environments of strong heteronormative beliefs reinforced by Filipino family values influenced by the state and cultural/religious institutions. Through interviews with ten older sexual minority respondents, I explore their experiences of acceptance and rejection from their families and friends. I look at how the factors of sexual orientation, gender identity, and expression (SOGIE) may have affected the quality of support they receive as they age, and ultimately,

how these influence their disposition as they experience changes brought by aging. Results of this study show the respondents' fears and insecurities over their lack of familial support, which can be attributed to how their sexual and gender identities have been stigmatized.

Keywords: *older adults, aging, family support, lesbian, gay, SOGIE, Anthropology*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 133-155
2016,
(Filipiniana Analytics)

0057

Millennium development goals (MDGs) by 2015: did Juan hit the targets?

Acuin, Cecilia Cristina S., M.D., Ph.D.

The Philippines, together with other members of the United Nations, committed to achieve the Millennium Development Goals (MDGs) between 1990 and 2015. The MDGs are a set of specific targets and milestones that will mark progress towards the elimination of extreme poverty and its accompanying development challenges. The Department of Science and Technology - Food and Nutrition Research Institute (DOST-FNRI) included the measurements for the attainment of health-related Millennium Development Goals (MDGs) in the 2015 survey, Updating of the Nutritional Status of Filipino Children and Other Population Groups upon the request and support of the Department of Health (DOH) through the DOST-Philippine Council for Health Research and Development. These health-related MDGs include MDG 1 (to eradicate extreme poverty and hunger), MDG 4 (to reduce child and infant mortality), MDG 5 (to improve maternal health), MDG 6 (to halt or reverse HIV/AIDS), and MDG 7 (to ensure environmental sustainability). The project aimed to evaluate 18 indicators of MDGs 1, 4, 5, 6 and 7 with tracking of national estimates from baseline levels and assessment of these indicators using different social equity lenses. Endline results would be critical benchmarks for the Sustainable Development Goals, successor of the MDGs, set from 2015 to 2030. The project was conducted through a household-based population survey using the de jure approach in enumerating individuals or survey respondents based on their usual residence and adopted a stratified multi-stage sampling design which covered all 17 regions of the Philippines. A total of 42,310 sample households and 202,570 individuals were covered from July to November 2015. Height and weight of children under-five years old were measured and one-day food weighing (from breakfast, lunch, supper, snacks and after supper meal) was done. Questionnaires were asked to the respondent through face-to-face interview. Questionnaires from Family Health Survey (FHS) and National Demographic and Health Surveys were adapted to measure health- and nutrition-related indicators while questionnaires from previous National Nutrition Surveys and Updating Surveys were updated, pre-tested and validated by DOST-FNRI. Descriptive statistics were analyzed using Stata version 12.0 while the World Health Organization's Anthro 3.3.2 were used to analyze the nutritional status of children under-five years old. The calculations for maternal mortality ratio and childhood mortality rates were done using the short method or the direct calculation based on the given formula while the long method used the Census and Survey Processing System (CSPPro) which includes the jackknife method used in calculating the standard error of the estimates and the 95% confidence interval. Based on the 2015 survey, goals on child mortality reduction and access to safe drinking water and basic sanitation were met, but the MDGs on undernutrition, adequacy of energy intake, infant mortality, and maternal mortality were not achieved. Mothers with children 0-36 months or currently pregnant with at least one antenatal visit and at least four antenatal visits increased; and family planning targets of an increase in contraception use, and reduction in unmet need were achieved. However, child immunization coverage for measles and fully immunized children rate missed the targets. Childbirths attended by skilled health personnel and those delivered in a health facility were lower than the 100% target despite substantial increases. Also, adolescent birth rate continued to rise. As knowledge and awareness on HIV/AIDS declined, knowledge and attitude on tuberculosis slightly improved. The health-related MDG endline results revealed that few targets were achieved. Some were of great concern because the indicators worsened than at baseline; these include adolescent birth rate, fully immunized children rate, and awareness on HIV/AIDS. The MDGs term ended in 2015 but fighting poverty and malnutrition, attaining better health and protecting the environment are not yet over. Endline results would be critical benchmarks for the Sustainable Development Goals (SDGs) set from 2015 to 2030. It is recommended to localize and translate the SDGs into local government-based measurements, to facilitate multistakeholders processes, and to enhance service delivery capacity at the frontlines.

Keywords: *millennium development goals, Filipino households, poverty, health and nutrition, non-communicable disease, DOST-FNRI, Anthropology*

Roadmaps and crossroads of life transitions: exploring career decision-making of Filipino gay high school students

Aquino, Rosemarie M. , Ledesma, Gian Carlo M. , Reyes, Marc Eric S.

The unique situations faced by lesbian, gay, bisexual, and transgender (LGBT) youth serve as important considerations in preparing them for their future career encounters. This research aimed to explore inclinations, considerations, and tribulations of Filipino gay high school students in choosing and deciding their future careers. Using a phenomenological inquiry design, the researchers conducted interviews with five selected gay high school students. Six themes emerged from the analysis and were used to come up with the roadmap and crossroad model of career decision-making by gay high school students. Implications and recommendations for career counseling with gay youth are discussed.

Keywords: *LGBT, career counseling, life transition, high school student, transformation, Anthropology*

Socio-demographic determinants of teenage pregnancy in the Philippines

Guirindola, Mildred O.

Teenage pregnancy is one of the serious public health issues of today's generation. The risk of death due to pregnancy-related causes is double among teen-age women compared to adult women. Teenage pregnancy creates a double burden for a young woman as the nutritional requirement of her growing body needs to compete with that of the growing fetus. Complications during pregnancy and childbirth are consistently the second cause of death for females below 20 years old (WHO, 2005). Among the countries in the Southeast Asia, Philippines was ranked third among the highest in terms of teenage pregnancy rate for the period 1991-2010 and is steadily increasing based on the report of United Nations Population Fund (Capanzana *et al*, 2015; UNFPA, 2012). This study aimed to identify the socio-demographic factors contributing to teenage pregnancy among Filipino women aged 15-19 years old. Results of the study will contribute to increase understanding of factors influencing teenage pregnancy. This will also provide basis in developing policies and interventions that will address the problem of teenage pregnancy in the country. 6,351 teenage girls aged 15-19 years old in the sampled households participated on cross-sectional study using data from the 2015 Updating of the Nutritional Status of Filipino Children and other Population Groups Survey which used multi-stage stratified sampling design. Descriptive statistics was employed to present the general profile of teenage women using bivariate and multivariate analyses to determine the strength of association between teenage pregnancy and their socio-demographic and household characteristics. Statistical analysis was performed using Stata version 12.0. Among the individual characteristics, only menarche was not associated to teenage pregnancy. Teenage pregnancy is highest among teenage girls aged 18-19 years old, had/have partner, those with primary education, no grade completed, those who were employed, those who were aware of contraceptives and those who have history of using contraceptives. Family type, family size, wealth quintile and food security status were found associated with teenage pregnancy. Teenage pregnancy was higher among adolescent coming from an extended family, large family size (5 or more), and from the poorest and food insecure households. Teenage pregnancy was more likely to occur among adolescents who are 16-19 years old, aware and users of contraceptives and from households with extended family. Teenage pregnancy was less likely to occur among adolescents with at least vocational and college education and from households from the rich and richest wealth quintiles. The study recommends improving the programs and services for teenagers by: Strengthening the integration of sex education program in school curriculum; having accessible health facilities in the community to cater to adolescent needs particularly on reproductive health; having friendly staff in the health centers that empathize with the issues of teenagers for them to feel comfortable and protected; and

strengthening the implementation of programs specific for teenage women such as education opportunities and skills training for gainful employment.

Keywords: *teenage pregnancy, Philippines, public health issue, complications, policies, interventions, household, sex education, DOST-FNRI, Anthropology*

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2018,
(Filipiniana Analytics)

0060

Temporary international labor migration and quantum fertility: evidence from the Philippines

Del Mundo, Jocelyn C. , Del Mundo, Michael Dominic C.

This paper examines the impact of temporary international labor migration on completed marital fertility using the 2010 Census of Population data from the Philippines. The case of the Philippines is investigated because it is uniquely a major source of male and female labor migrants to over 100 countries in the world. The study was conducted to identify the trends in male and female Filipino migrants to various destinations and to quantify the impact of international labor migration on completed marital fertility in the Philippines. A Two Stage Residual Inclusion Censored Poisson model was used to handle problems of endogeneity and observation censoring. The results provide strong evidence for the negative impact of international labor migration on completed fertility that can be similarly observed for married women with Overseas Filipino Worker spouses and married women who are Overseas Filipino Workers themselves. These women who are exposed to labor migration exhibit approximately 60 percent lower completed fertility compared to women not exposed to labor migration. The negative impact can be attributed to the long and cyclical spousal separations that disrupt couple childbearing and the assimilation and adaptation of destination country low fertility norms. The findings of the paper contribute to the sparse demographic literature on the effect of migration on fertility in sending regions and countries.

Keywords: *migration, fertility, Philippines, sending country, Anthropology*

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 3, 22-30
2019/09,
(Filipiniana Analytics)

0061

Trans on trains: lived experiences of Filipina transgender women on the MRT

Rivera, Mary Anne F. , Silan, Miguel Alejandro A. , Chulipa, Loraine T.

This study sought to explore the overall lived experiences of transgender women in riding the MRT using a qualitative field research design and conducting short interviews with one MRT official, three security guards, and in-depth interviews with five transgender women. Findings show that there is no official policy for transwomen in the existing MRT segregation scheme, which places the exclusion or inclusion of the women to be primarily dependent on security guards and personnel who have varying attitudes and conduct towards transwomen. Transwomen participants place primacy on the general hassles of the MRT system (long lines, congestion, and unpleasant environmental conditions), the experience of which seems to be influenced by the phase of transition and apparent femininity of the transwomen, with transitioning and less feminine-looking transwomen being more likely to be excluded and receive harsher reactions. All transwomen participants experienced sexual harassment in one form or another. The importance of changing the attitudes of people and the wider culture before structural and policy changes is recognized. Narratives of transwomen's coping strategies, experiences with officials and fellow passengers, and their outlook on various MRT issues are also presented.

Keywords: *transgender, transwomen, trains, public transportation, MRT, Anthropology*

Type and severity of intimate partner violence and formal help-seeking among women in the Philippines

De Guzman, Ma. Lourdes Rossana E. , Bermudez, Amiel Nazer C. , Co, Kim Carmela D.

In the Philippines, 25% of ever-married women reported experiencing some form of violence from their partner, but only 10% of them actually sought medical or legal help (NDHS, 2013). The objective of this study was to describe the type and severity of intimate partner violence experienced, and its association with formal help-seeking, among women aged 15-49 years in the Philippines.

The cross-sectional data used for this study came from the National Demographic and Health Survey of women ages 15-49 years old conducted in 2013. To estimate the association of interest, confounders were identified using the change-in-estimate criterion and were controlled by multiple logistic regression modelling.

Among women aged 15-49 years who experienced intimate partner violence, those who experienced all types of abuse had the highest proportion of formal help-seeking (7.3%), while women who experienced only sexual abuse had the lowest (0 out of 67). Controlling for the effect of other variables, women who experienced severe physical abuse were more likely to seek medical or legal assistance compared to those who experienced moderate physical abuse (OR=4.77; 95% Confidence Interval: 1.96–11.62).

Formal help-seeking rates were low among victims of intimate partner violence in the Philippines. Severity of abuse experienced is likely an important factor in seeking medical and legal help. These systems should thus be capable of handling severe cases of abuse in order to address the needs of women who seek help. Efforts should be made to increase formal help-seeking among all victims of domestic violence.

Keywords: *intimate partner violence, domestic violence, physical violence, help-seeking, formal help-seeking, Anthropology*

ARCHITECTURE

Adopting organized self-help housing approach in low-cost housing in Davao City, Philippines

Santos-Delgado, Rowena

“If dwellers participate in the design, construction and management of their housing, the process and environment thus created, stimulate individual and social well-being. If not, the project may become a barrier to personal fulfilment and a burden to the economy”. John Turner Self-help housing approach has long been applied by societies in general. At a time when professional services (such as that of architects and engineers) were not available, communities built houses and buildings based on customs, beliefs and traditional systems of building. This manual highlights organized self-help housing where a “facilitating organization both assists the household that have chosen self-help housing and that bears a responsibility to authorities and financial agencies.” (Rodriguez, Astrand: 1996). Despite resistance from target recipients, organized self-help housing has proven to benefit communities in terms of social, economic, educational and developmental aspects. A major factor that influenced the writing of this manual is the successful execution of organized self-help housing projects by the Fundacion Promotora de Vivienda (FUPROVI), a national housing organization for low income families in San

Jose, Costa Rica, through their Habitat Program for 20 years. Incidentally, a local model that serves as evidence for the potential of self-help housing approach in the country is Gawad Kalinga's GK777 Project that has brought about "beautiful, humane and quality but inexpensive houses" for the extremely poor families throughout the country, built through the people's "sweat equity" and a firm communal faith in God (GK Tatag Manual). This manual recognizes shelter provision as one of the priority programs of the present administration of Davao City Mayor Rodrigo Duterte who himself has actively supported the projects of the Gawad Kalinga. However, it also acknowledges housing demand, not just by the extremely poor constituents in the city, but the low-income families as well. Hence, it is aspired for in this manual that organized self-help housing for low-income families is carried out in the low-cost housing projects, with the cooperation of both government and non-government housing agencies in Davao City.

Keywords: *Low-cost housing, Self-help housing approach, Low income families, Architecture*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 3 Issue No. , 59-69
2009,
(Filipiniana Analytics)
NP

0064

Architectural design guidelines and deed of restrictions for the Taal view heights farmlot community in Talisay, Batangas *Silvestre, Jose Dan*

Many of the leading developers in the Philippines have commenced the development and marketing of farmlot communities in areas surrounding the National Capital Region. Some of the more significant of these are found in nearby outlying provinces as Cavite, and Batangas. The concept behind such developments is the provision of an alternative non-urban residential lifestyle which focuses on an agricultural base of activities. This is targeted on the so-called "gentleman" or "weekend farmer" whose primary urban residence is in Metropolitan Manila and its suburbs. A secondary market also exists among retirees, both local and expatriate, "Balikbayans" and Overseas Filipino Workers (OFWs). The physical development concept comprises the development of "farmlots" as opposed to purely "residential lots" with plot areas in excess of seven-hundred fifty (750) square meters, and generally ranging within the one thousand (1,000) square meter range. The gross footprint of any residential structure is generally limited to twenty percent (20%) of the gross plot area. Other than these basic restrictions, the provisions of the National Building Code remain largely applicable. The Department of Natural Resources (DENR) and the Housing and Land Use Regulatory Board (HLURB) are also responsible for establishing and implementing development guidelines and standards for Farmlot Subdivisions. As in most open-market residential subdivision developments, developers normally draft and issue a Deed of Restrictions that is appended to and is legally integrated with the Lot Title. As such a lot owner is legally bound to abide by the controls and limitations embodied in the Deed of Restrictions. In addition, most subdivisions also issue a set of Subdivision Guidelines which augment and further define the scale and character of residential construction within the subdivision. Though usually enacted by the developer, the Subdivision Guidelines are eventually turned over to the Home Owners' Association (HOA) for implementation and enforcement. Theoretically, there are legal avenues that make it possible for the Subdivision Guidelines Home Owners' Association to eventually revise or modify the Subdivision Guidelines. On the other hand, it is more difficult to enact subsequent revisions to the Deed of Restrictions, since these form a legal component of the Lot Title.

Keywords: *Farmlots, Physical development concept, Architectural design guidelines, Deed of restrictions, Architecture*

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Effective graphics in structure class: integrating structures into architecture

Dytoc Bronne C.

This paper focuses on alternative teaching methods of illustrating structural behavior and concepts for integration into architectural design thinking. To reach this state, the pedagogic gap between architectural and structural classes needs to be bridged. The teaching methods are based on two viewpoints: 1) To comprehend structures in a graphical manner, and 2) To understand structures as a potent sculptor of form. Keys to effectively teaching structures to an architectural class are to communicate with graphics, drawings, demonstration models, and familiar language. These keys are employed for topics such as stress-strain, shear-moment diagrams, beam-column shapes, Maxwell truss diagrams, Polygonal Force diagrams for profiles of arches and cables. Use of well-known examples from daily life further clarify and demystify structures, integrating it into architectural language and experience. Subsequent computations follow to appreciate comparative solutions, and material and construction issues. The formulae variables are recognized as tools for shaping structural-architectural elements. Furthermore, architectural cases are analyzed in a series of slide lectures, revealing the variety of dynamic forms generated from structural issues. Finally, bridge or tower models are built and tested to realize the three-dimensional aspect of structural behavior. To help validate these methods and ideas to the reader, the paper shall be more graphical than textual. The effectivity of these alternative methods are manifested in projects of later design studios, and are also noted in student evaluations of the structural class.

Keywords: *Structure, Graphics, Teaching methods, Architecture education, Architecture*

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Heritage conservation: applying scientific method in architecture the Lingayen Capitol Building (1918)

Mata, Rene L

The practice of Heritage Conservation in the context of the regular practice of architecture has either been largely misunderstood or, at worse, regarded as architecture with an outdated twist. Far too many practicing architects see no need or utility for conservation and regard it as useless nostalgia and retrograde. The conservation and restoration of old structures in practical construction terms could even be qualified as plain “retrofitting” and expensive.

It is within scientific parameters that we approach the special branch of architectural practice called Heritage Conservation, and its preservation of human – in this case Philippine – values. The important link that architecture has as a manifestation of Philippine Identity can only be seen if we regard the expression of space as socio-cultural in nature, including the intangible connections of the design process to our own Philippine value systems and concepts. How we assess a heritage resource using the scientific method, in this case a heritage structure or site, will only help but aid in its judicious conservation and future use as a contemporary functioning building. The interpretation of this assessment aids us in the proper adaptive re-use of the historic building without losing its heritage value.

The Capitol Building of Lingayen, Pangasinan (1918), an outstanding example of Philippine state architecture in the American Colonial Period, will be the test case. The building is also embodied in the official provincial seal and is of historical value, and thus is of great heritage value to the people of Pangasinan as a symbol of their ethnic- and self-identity.

The building functions today as a typical capitol building of a prosperous province, with its typical problems found in almost all government buildings of overcrowding, misuse and chronic lack of maintenance - perhaps also a manifestation of the lack of appreciation of state architecture as heritage. The conservation and restoration of this building type, retaining its heritage value without compromising its continued function as the prime administrative center of Pangasinan, will be the topic of this paper.

Keywords: *Heritage conservation, Scientific method in architecture, Architecture*

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0067

An initial study and application of basic plant characteristics that aid in the reduction of high urban temperatures

Villa Juan, Jose Dan V.

Urban heat is an ongoing phenomenon that affects everyone living in urban environments. Unhealthy living conditions have been produced as a result of high temperatures in urbanized areas. There are many studies on this and the ways in which to mitigate these high temperatures. Botanical controls have often been used as mitigation measures, using vegetation as a means to bring down urban heat, however little study has been done on what actually comprise the characteristics of plants that help bring down high temperatures. This study stresses that plants should not just be analyzed at a superficial level but rather, analysis of plants and their capabilities should go much deeper, looking at anatomical/physiological characteristics for their proper application in controlling excessive heat in urban environments. The objectives of the study is to understand what causes high urban temperatures and the botanical mechanisms that effect reduction in temperatures with prime focus on evapo-transpiration. The study is also an attempt to quantify a highly subjective (qualitative) component of Landscape Architecture of which are planting materials and planting design. These botanical mechanisms are applied in a method that can portray quantifiable reduction in high temperatures given by plants. The method gives an idea and an estimate on the cooling afforded by plants for given heat loads. To answer these objectives, a method was developed for ascertaining temperature reduction extents of plants by applying existing standard conversion factors for temperature, heat/energy, transpiration, heat load and cooling capacity. The output of this method is an estimate only, largely due to the limitations in data for actual urban environmental conditions and lack of equipment in the measurement of botanical characteristics. From the methodology employed, the study was able to come up with general values that equate cooling given by plants with specific characteristics and that can be used in their proper siting in urban locations. The methodology results in a planting framework that dictates the correct use of plant species with measured cooling potential for the control of high urban temperatures. This would thus be a significant contribution to planting design. The study impacts several entities as these have an effect on the total cooling potential given by plants and the total cooling of the urban environment. Firstly Landscape Architects and planting design, secondly Architects and the design of structures and thirdly Urban Planning and Design with the locations of buildings and structures. The study will also impact nursery as well as maintenance practices.

Keywords: *Urban heat, Botanical control, Anatomical characteristics, Physiological characteristics, Architecture*

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0068

Pedestrian-friendly streetscape in a tropical business district *Galingan, Zenaida C., Ramos, Grace C. , Alcazaren, Paulo G. , Santos, Romeo B.*

Streets are the lifelines of a community. Choke them, and the place dies; deprive them of their nutrients and ailments will be prevalent. A characteristic of a good street community is having all the necessary elements that will make the users feel safe and comfortable. Pleasant surroundings, appropriate lighting and other well-designed street furniture plus good maintenance all contribute to make a road both vehicular and pedestrian friendly. One of the major problems encountered in designing a successful streetscape in a tropical country is providing

convenience to pedestrians due mainly to the harsh climate. The usual unpredicted monsoon rains and hot rays from the sun make long and even short distance walking a hard task and something that is to be avoided if possible. This, coupled with air pollution due to vehicular emissions aggravated by traffic congestion, plus unsafe sidewalks, make walking unenjoyable. A community, to be successful and thriving, must have an efficient road network in order for it to be more accessible, attractive to investors and visitors and thus more prosperous. How a premier business district was able to cope with the challenges and problems will be discussed in this paper. Studies of other communities will also be considered. While many studies had been done on pedestrianization, very few has dealt with existing streets in tropical countries, especially the Philippines and making them pedestrian friendly vehicular roads. Recommendations that can serve as guidelines and innovative design ideas will be introduced which can be applied to other existing thoroughfares addressing the innate characteristics of the Filipinos when it comes to street usage.

Keywords: *Pedestrian-friendly streetscape, Tropical business district, Architecture*

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BIOLOGY

0069

Anti-angiogenic activity of coral plant (*Jatropha multifida* Linn.) crude leaf extraction on duck (*Anas platyrhynchos*) eggs using chorioallantoic membrane (CAM) assay **Domingo, Doreen , Luna, Keith , Sagsagat, Karizma Joy , Delos Reyes, Mitch Joe , Casimiro, Jerile**

The aimed to investigate the anti-angiogenic activity of the leaf crude extract of Coral plant (*J. multifida*) using Chorioallantoic Membrane (CAM) Assay of duck eggs (*A. platyrhynchos*). A group of experimental ducks treated with 10 ug/ml, 50 ug/ml, and 100 ug/ml of *J. multifida* extracts, dexamethasone (positive control), PBS (negative control) and an untreated control were considered. Data gathered focused on the number of branching points, diameter of blood vessels, angular spectrum, and 3D image analysis. Results showed that in the 100 µg/ml treatment, 62.67% blood vessel inhibition was observed on the first day observation while 91.42% on the second day of observation. Image analysis using 3-D view of the CAM and angular spectrum revealed a parallel result with the % inhibition of blood vessels. Diameter of the blood vessels was directly proportional on the concentrations of the plant extract. Significant differences in the percent inhibition in the 50 µg/ml and 100 µg/ml treatments were observed compared to the negative and untreated controls. No significant differences were shown among the treatments in terms of diameter of the blood vessel. It can be concluded that *J. multifida* leaf crude extract has anti-angiogenic potential which can be further explored for medicinal purposes like in the inhibition of tumor metastasis..

Keywords: *Chorioallantoic membrane, Antiangiogenesis, Vascularization, Inhibition, Blood vessel diameter, Biology*

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Antifungal susceptibility and virulence of *Aspergillus fumigatus* environmental strains from a public tertiary hospital in Metro Manila, Philippines

Bungay, Alice Alma C., Ablola, Ferissa B.

The increase in the number of invasive *Aspergillus* infections has been observed among immunocompromised and hospitalized patients. In the Philippines to date, there is no published data that focused on the prevalence of *Aspergillus* species or any other thermotolerant fungal species in a hospital environment. This research served as a primary study to characterize the antifungal susceptibility of environmental strains of *Aspergillus fumigatus* from a hospital facility against three antifungal agents and to determine the virulence of these isolates on BALB/c mice using an animal survival assay.

Ten environmental strains of *A. fumigatus* were isolated from three air conditioned wards in a medical facility using Andersen Air Sampler. The antifungal susceptibility profile of the isolates were determined against voriconazole, amphotericin B and caspofungin. The virulence of these isolates were also tested on BALB/c mice using an animal survival assay. Moreover, the lung tissues of infected BALB/c mice were subjected to histopathological analyses using Gomori Methenamine Silver stain (GMS) and Hematoxylin & Eosin (H&E) stains.

Etest result for antifungal susceptibility testing showed that two of the ten isolates were resistant to amphotericin B (AF2-A and AF3-A); one isolate resistant to voriconazole (AF2-A) and an isolate that manifested nonsusceptibility to caspofungin m(AF2-A). Epidemiological cut-off values were determined for each antifungal following the M38-A2 CLSI guidelines. BALB/c mice median survival analysis revealed that the isolate with the highest Minimum Inhibitory Concentration (MIC= 4.89µg/ml) for voriconazole resulted to the most number of mortality with the least number of observation days. GMS AND H&E histopathology slides showed fungal elements embedded on left lung lobe of mice.

This study showed that there were strains of *Aspergillus fumigatus* from a hospital indoor air which were considered as resistant strains to voriconazole, amphotericin B and caspofungin (AF2-A and AF3-A). Lung tissues of infected mice showed characteristics of bronchopneumonia.

Keywords: antifungal susceptibility, survival analysis, environmental isolates, Etest, Gomori Methenamine Silver Stain, Biology

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(Filipiniana Analytics)

Bacterial community of laboratory scale anaerobic digestion of kitchen waste for biogas production

Reyes, Renato G. , Kalaw, Sofronio P. , Pineda, Rence Marrion M., Undan, Jerwin R.

This study aimed to isolate and identify bacteria from kitchen wastes integrated into a improvised laboratory scale anaerobic digestion. The anaerobic digestion process of each digester was characterized by determining the degradation rates, retention times and biogas production rates. Sampling of the slurry was made every three days along with measurement of pH, temperature and biogas production. Slurry samples were serially diluted and inoculated to Nutrient Agar and MacConkey Agar to obtain pure cultures of microorganisms. The bacterial isolates were molecularly identified using 16S rRNA (16S ribosomal RNA) and mcrA (methyl coenzyme-M reductase) gene sequencing. Thioglycollate broth test was conducted to evaluate the oxygen requirements of the pure cultures. The highest percentages of identified species belong to class Gammaproteobacteria (66.67%), order Enterobacterales (61.11%), family Enterobacteriaceae (50%) and genus Citrobacter (22.22%). The 18 identified microorganisms were *Bradyrhizobium* sp., *Lysinibacillus* sp., *Morganella morganii*, *Comamonas testosteroni*, *Burkholderia multivorans*, *Paenibacillus peoriae*, *Bacillus flexus*, *Proteus mirabilis*, *Shimwellia blattae*, *Citrobacter* sp., *Citrobacter freundii*, *Escherichia coli*, *Kosakonia sacchari*, *Citrobacter koseri*, *Klebsiella variicola*, *Acinetobacter pittii*, and *Citrobacter* sp.

Keywords: *Anaerobic digestion, Biogas, 16SrRNA gene, Biology*

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0072

Bacterial community profiling of waters from aquaculture and non-aquaculture sites within Taal Lake ecosystem through 16S rDNA analysis

Dalmacio, Leslie Michelle M. , Balolong, Marilen P. , Ramilo, Rachelle C. , Beza, John Harvey M. , Hallare, Arnold V.

Inland water microbial communities are key players in the biogeochemical processes. However, many inland waters become polluted due to various anthropogenic practices. To determine the impact of aquaculture on microbial diversity in a lake ecosystem, the study determined and compared the bacterial composition of waters in aquaculture and non-aquaculture sites in Taal Lake using molecular techniques. Microbial DNA was extracted using the cetyl trimethylammonium bromide (CTAB) method. The DNA isolates were used as template for the amplification of bacterial 16S rDNA through nested polymerase chain reaction (PCR). The amplified 16S rDNA hypervariable regions were subjected to denaturing gradient gel electrophoresis (DGGE) for bacterial community profiling. Excised DGGE bands were sequenced and identified through BLAST analysis. The generated Dice similarity coefficient of 18.20 indicated low bacterial community similarity between aquaculture and non-aquaculture waters. This implies that the change in physicochemical parameters in aquaculture waters may cause a shift in the bacterial community composition allowing different bacterial populations to dominate in one site relative to the other site. Taal Lake aquaculture waters were found to harbor bacteria under the Proteobacteria and Actinobacteria groups, while non-aquaculture waters contained bacteria that are members of Proteobacteria, Actinobacteria, and Firmicutes. The presence of clinically-associated bacterial strains in both aquaculture and non-aquaculture sites in Taal lake poses a risk to fish and human health.

Keywords: *Taal Lake, bacterial community, aquaculture, non-aquaculture, 16S rDNA, DGGE, Biology*

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0073

Bacterial community structure of aquaculture and non-aquaculture sediments of Taal Lake (Philippines) using PCR-DGGE of 16S rDNA

Cailao, Maria Victoria T. , Dalmacio, Leslie Michelle M. , Balolong, Marilen P. , Tria, Ma. Cecilia D. , Hallare, Arnold V.

Microorganisms, including bacteria, serve as major players in various processes affecting both the quality of aquatic sediment as well as the fate of pollutants released into such matrix. In this study, we evaluated the similarity in bacterial community structure between sediments collected from aquaculture and non-aquaculture sites of a tropical lake. Describing and comparing the bacterial community present in each site may provide clues on the impact of aquaculture practices on aquatic ecosystems.

Microbial DNA was extracted using PowerSoil® DNA Isolation Kit for all sediment samples. DNA isolates were used as template in the analysis of the hypervariable region of 16S rDNA through nested polymerase chain reaction (PCR) and denaturing gradient gel electrophoresis (DGGE). Excised representative 16S rDNA DGGE bands were sequenced and identified through BLAST analysis.

Based on the generated mean Dice similarity coefficient of 57.77%, the bacterial community structure between aquaculture and non-aquaculture sediments was highly similar but certain taxa were found unique for each site. Bacteria belonging to *Proteobacteria* and *Firmicutes* dominated the aquaculture sediments while *Proteobacteria*, *Firmicutes*, and *Chloroflexi* dominated the non-aquaculture sediments. Certain physicochemical parameters

operating in the two sites may have influenced the shift in representative microbes. *Shewanella baltica* and *Trichococcus* sp. were found only in aquaculture sediment owing to their ability to tolerate quantities of ammonia and high organic matter from their environment.

This study describes the applicability of 16S rDNA PCR-DGGE as a culture-independent technique for describing and comparing the similarity between bacterial communities in sediment. Based on the generated similarity index, the bacterial community between aquaculture and non-aquaculture sediments of Taal Lake was highly similar but interestingly, harbored unique bacterial populations as seen in the DGGE profiles. The shift in dominant taxa and unique representatives per site may have been influenced by certain differences between each site's physico-chemical parameters.

Keywords: *sediment bacterial community, aquaculture, 16S rDNA, Dice coefficient, Biology*

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0074

Bacteriological analysis of complementary sauces of street-vended food ***Sta. Cruz, Kristian T. , Mangaya, Demy Q. , Samia, Frances Rowena M., Sumbillo, Mark Lloyd A.***

Street-vended food, especially in the Philippines are being sold together with complementary sauces – either sweet or spicy based on the preference of the customers. Since food borne diseases are being linked to these types of products, this study aimed to detect the presence of fecal coliforms in complementary sauces of street-vended food. Specifically, the study aimed to identify the bacteria present in the samples and the possible harm they may cause. Standard tests were used in determining bacterial growth from tubes and plates and in identifying possible bacteria present. The microbial quantity of collected samples exceeded the standard MPN value of <1.1. The biochemical tests showed that the samples may contain coliform organisms like *Citrobacter* species, *Proteus vulgaris*, *Klebsiella*, *Providencia*, *Serratia*, *Enterobacter*, *Escherichia coli* and non-coliform organisms like *Salmonella* and *Shigella*, are present in the samples. It is suggested that the food handling practices of street vendors should be observed and further investigation should be conducted to possibly identify other sources of contamination.

Keywords: *Bacteria, Food borne diseases, Complementary sauces, Street-vended food, Contamination, Biology*

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0075

Biochemical investigations of some pelecypod mollusks along Manila Bay ***Kanapi, Carmen G., Manikis, Lucia A., Valencia, Emma, Estacio, Edith, Nuguid, Luzette***

Four species of pelecypod mollusks were taken from three stations along Manila Bay. Total lipids, carbohydrates and protein were highest for samples taken from Binakayan while samples from Bulacan had the lowest values. Total free amino acids and fatty acids likewise were highest in Binakayan samples and lowest in Bulacan. Among the free amino acids, only glycine was found to decrease in Navotas and Bulacan samples for all species investigated. Water analysis indicated that the environment in Bulacan is not favorable for its inhabitants mollusks. The biochemical responses exhibited by the mollusks apparently are adapted mechanisms to this stressful environment.

Keywords: *pelecypod mollusks, Mollusks , Water analysis, Manila Bay, Biology*

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1979 June,

Bioremediation of irrigation water and generation of bio-energy using enriched consortia in a dual-chambered microbial fuel cell

Undan, Jerwin R. , Pineda, Rence Marrion M. , Lorido, Marry Lorraine F. , Afable, Eriza M. , Natividad, Alessandra D., Gaban, Paula Blanca , Aquino, John Dave C.

Microbial Fuel Cells (MFCs) are gaining research interests due to bioenergy generation and wastewater remediation capacity at the same time. The present study developed a low-cost, eco-friendly and simplified dual-chamber MFC set-up mainly using recycled materials. The bio-electricity generation capacity of the constructed MFC template using irrigation water with naturally-inhabiting microbial consortia enriched with *Citrobacter koseri*, *Bacillus flexus*, *Shimwella blattae* and *Kosakonia sacchari* was investigated. Generated voltage (millivolts) and current (milliamperes) every 3 days in its 30-day operation were recorded using a digital multimeter. Power (watts), power density (W/m^2) and current density (A/m^2) were computed. Water pre/post analysis and phytotoxicity assay were also carried out. The profile generated by the MFC set-up enriched with *Citrobacter koseri* (Ck-MFC) clearly demonstrates its potential for stable and reliable voltage, current and power production at an average of 336 mV, 64 mA and 31 W in its 30-day operation which are within the MFC output thresholds (300-500 mV, 2 mA and 25 W). Ck-MFC also generated higher power and current densities at 130.15 W/m^2 and 0.27 A/m^2 , respectively, than *Shewanella putrefaciens* (positive control) while exhibiting 87% lead biosorption and no phytotoxicity. Overall, this study has shown that the constructed MFC set-up can serve as a potential bio-electricity generation system which could benefit electricity-deprived remote areas and financially-challenged households.

Keywords: Bio-electricity, Microbial fuel cell, *Citrobacter koseri*, Biology

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Biosorption of nickel by *Bacillus cereus* and *Stenotrophomonas maltophilia* isolated from Bayto River, Zambales

Ilagan, Yolanda A. , Baldomero, John Rex N.

Heavy metal contamination of water systems is a global environmental concern and biosorption of these heavy metals using bacteria offers a more potent and cost-effective solution compared to conventional methods. In this study, 139 nickel-resistant isolates were obtained from the water samples collected from Bayto river. The metal resistance profiles of the isolates were determined using the Kirby-Bauer disc diffusion method. Sixteen isolates were able to tolerate the highest concentration of nickel and were subjected to multimetal resistance assays. Out of the 16 most Ni-resistant isolates, only four were able to tolerate 7,500 parts per million (ppm) of copper, and 10,000 ppm chromium and lead. These isolates (S2Q1, S1I2, S3Z1, S2P1) were subjected to biosorption assay. Biosorption of nickel by these isolates was done by adding 10 mL of inoculated Nutrient broth (NB) (16-hour culture) to 90 mL of NB supplemented with 1,000 ppm nickel. The metal-microbe suspensions were incubated at room temperature in a rotary shaker at 150 rpm for 24 hours. Afterwards, the NB from each setup was centrifuged and the supernatants were analyzed using atomic absorption spectrophotometry (AAS). Furthermore, the four isolates were identified via 16S rRNA sequencing. The S1I2 exhibited the highest biosorption percentage at 92.27%, followed by S3Z1 (91.67%), then S2Q1 (91.36%) and S2P1 (89.78%). S2Q1 and S1I2 were identified as *Stenotrophomonas maltophilia* while S3Z1 and S2P1 as *Bacillus cereus*. S1I2 exhibited the highest biosorption percentage at 92.27%.

Keywords: Biosorption, Nickel, Heavy metals, *Bacillus cereus*, *Stenotrophomonas maltophilia*, Biology

0078

Body size, habitat, and diet of freshwater crabs *Isolapotamon mindanaoense* and *Sundathelphusa miguelito* (Crustacea: Brachyura) in the Municipality of Lake Sebu, South Cotabato, Philippines

Cañete, Rizza May P. , Metillo, Ephrime B. , Neri, Jemateo B. , Molina, Ziljih S.

Isolapotamon mindanaoense (Rathbun 1904) and *Sundathelphusa miguelito* Mendoza and Sy 2017 have narrow biogeographical distribution and are both regarded as endemic to Mindanao island. They are common and publicly consumed freshwater or semi-terrestrial crabs inhabiting vicinities near the waterfalls of Lake Sebu Municipality, South Cotabato in Mindanao, but both species are scarcely investigated. This study aimed to examine the body size, microhabitat and the feeding ecology of these freshwater crab species. Sex and carapace width and length of individuals were determined from specimens collected by hand at three waterfall sampling sites. Feeding and feeding niche overlap were respectively analyzed using the index of relative importance (IRI) of prey items from individual crab stomachs and the Schoener's R_o index. Food items ingested include fish fragments, insect body parts, fragments of aquatic vascular plants, freshwater algae, sand grains and amorphous materials, and these items were similar between species. However, the larger *I. mindanaoense* appeared to ingest more fish fragments and other animal prey items compared to *S. miguelito* which ingested more amorphous materials that are derived from benthic plants. However, the R_o value of 93% was high, suggesting very similar diet. The two species further partition niches, with *S. miguelito* being smaller in size and inhabiting sand and gravel substrate, while the larger *I. mindanaoense* inhabit areas with big boulders. Hence, the crabs can be categorized as omnivorous and detritivorous, and exhibit feeding and habitat niche partitioning that alleviate possible resource competition between the two species.

Keywords: Mindanao, Feeding ecology, IRI, Omnivory, Niche partitioning, Diet, Biology

0079

Characterization of Pili (*Canarium ovatum* Engl.) kernel shape variation using elliptic fourier analysis

Reaño, Consorcia E. , Lalusin, Antonio G. , Hay, Fiona R. , Endonela, Leah E. , Borromeo, Teresita H. , Altoveros, Nestor C. , Gentallan, Jr., Renerio, Yoshioka, Yosuke

Shape is often characterized through subjective means. This research attempts to systematically characterize pili kernel shape variation using elliptic Fourier analysis. Images of 53 pili accessions from the National Plant Genetic Resources Laboratory (NPGRL)- University of the Philippines Los Baños were acquired using VideometerLab 3. Shapes outlines were characterized using elliptic Fourier coefficients calculated from SHAPE software. Principal component analysis and cluster analysis were used to elucidate shape variations among accessions which was subsequently visualized through R's shape on r package. With the first component accounting for the 92.94% of the total variation, principal component analysis revealed that 98.62% of the total variance is explained by the first three components. The first principal component accounts for the variation in length to width ratio; whereas, the second and third principal components explains the variation in the location of the widest portion and the truncation of the apex and base of the kernel, respectively. Cluster analysis separated the different accessions into 6 distinct clusters at 0.04 Euclidian distance. Accessions belonging to cluster 3, 1 and 5 represent the elliptical series of shapes-narrowly elliptic, elliptic, and widely elliptic. Whereas, accessions belonging to cluster 2, 4 and 6 represent the ovate-shaped variants-ovate, obovate and lance-ovate. The systematic characterization can be used to objectively elucidate the shape variations of all parts of the plant of all crop species.

Keywords: *Canarium ovatum*, Kernel shape, Elliptic Fourier analysis, Image analysis, Phenotyping, Biology

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NP

0080

Characterization of plant growth promoting diazotrophic bacteria from cacao (*Theobroma cacao* L.) rhizosphere treated with bamboo biochar and mycorrhizal fungi
Aggangan, Nelly S. , Cortes, Angelbert D., Opulencia, Rina B.

Diazotrophic or nitrogen-fixing bacteria (NFB) are considered as plant growth-promoting rhizobacteria, which provide available nitrogen for plant nutrition. This study isolated, characterized, and identified putative diazotrophic bacteria from the cacao (*Theobroma cacao* L.) rhizosphere treated with arbuscular mycorrhizal fungi and bamboo biochar. Biochar serves as a refuge for colonizing bacteria such as those NFB and mycorrhizal fungi. Using a nitrogen-free malate medium, the recorded population count of NFB in the cacao rhizosphere was about 1.28×10^6 CFU g soil⁻¹. Of these, a total of 20 NFB isolates were selected based on unique cultural characteristics, such as color and shape. These isolates were subjected to acetylene reduction and phosphate solubilization aptitudes. Based on the results, all putative NFB isolates successfully reduced acetylene to ethylene gas ranging from 16.35 ± 1.68 to 60.71 ± 2.57 ppm. In addition, 19 out of 20 NFB isolates performed phosphate solubilization on Pikovskaya medium with solubilization index ranging from 1.11 ± 0.01 to 3.74 ± 0.16 mm. Analysis of the sequence of the 16S rRNA gene revealed that these diazotrophic bacterial isolates belonged to the genera *Bacillus*, *Burkholderia*, *Rhizobium*, *Ralstonia* and *Staphylococcus*. These plant growth-promoting rhizobacteria are promising natural biofertilizers to improve the growth and yield of cacao crops, especially in the Philippines.

Keywords: *Cacao rhizosphere, Biofertilizer, Diazotrophic bacteria, Plant growth promoting rhizobacteria, Biology*

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0081

Chelating effects of siderophore in reducing organ dysfunction caused by iron overload in ICR mice

Panelo, Isabella R. , Thucydides L. Salunga, , Cornista, Joel C.

Iron is an essential element that plays a vital role in a wide variety of cellular processes but when present in excess concentration in organs it may increase the risk for liver disease, heart failure, and diabetes. Recently, siderophores which are iron-chelating agents produced by microorganisms have attracted tremendous attention because of its strong binding and high selectivity to the ferric form of iron. Thus, the use of siderophore in sequestering excess iron in the body as a form of therapy is very attractive. This study determined the effects of commercially available siderophore in sequestering excess iron in organs such as liver, heart, and pancreas under excess iron conditions.

First, iron-overload was induced by injecting iron dextran (20mg) into male ICR mice for three consecutive days. The effects of iron to the liver, heart, and pancreas and the possible sequestration by siderophore were determined by scoring histological sections. The liver iron concentration was also assessed by atomic absorption spectroscopy (AAS).

The study showed that iron-overloaded mice exhibited skin hyperpigmentation and hemosiderosis in liver, heart, and pancreas. Significant changes in the liver include hepatomegaly and development of tumor. Iron-overloaded mice had 2,935% increase in liver iron content compared to the salinetreated mice. However, when iron-overloaded mice were treated with either 100 µg or 200 µg siderophore, there was a 77% and 84% decrease in liver iron content, respectively. Moreover, the treatment of ironoverloaded mice with siderophore prevented the

development of hemosiderosis, tumor, and structural changes in the tissues studied. The results showed that siderophore can effectively reduce excess iron and organ damage in iron-overloaded mice and can be potentially employed in chelation therapy of iron-overload diseases. Further studies on the possible mechanisms of siderophore aside from decreasing iron excess and lowering organ dysfunction are recommended.

Keywords: *siderophore, iron overload, iron chelating agents, hemosiderosis, hepatomagaly, hepatoprotection, Biology*

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0082

Chemopreventive properties of selected pigmented rice, fruits, and vegetables in the Philippines

Sagum, Rosario S., Ph.D.

Dietary patterns with higher intake of fruits, vegetables, and whole grains, which set apart the oriental diet from the Western diet, have been associated with lower risk of various cancers. Higher intakes of dietary phenolic compounds could lead to potential antioxidant activities and reduce the risk of certain chronic diseases. The study aimed to determine the antioxidant activity and polyphenol content of selected fruits, vegetables, and pigmented rice. They were also tested for *in vitro* cytotoxicity cell viability assay towards breast and lung cancer cell lines and normal cell lines. Selected fruits, vegetables, and types of pigmented rice were analyzed for antioxidant capacity, total polyphenol content, and *in vitro* cytotoxicity activity using the MTT cell viability assay. Samples with the highest amount of percentage inhibition of DPPH radical (%DPPH inhibition) are as follows: mangosteen peels (89.03 ± 0.32 %), okra (89.05 ± 0.24 %), and raw violet rice (79.07 ± 1.22 %). Samples with the highest FRAP content (g Trolox equiv./100g sample) are mangosteen peels (11.84 ± 0.12), saluyot (2.27 ± 0.05), and raw red rice (0.39 ± 0.01). Samples with the highest total phenolic content (g Gallic Acid eq./100g sample) are mangosteen peels (6.25 ± 0.11), swamp cabbage (2.58 ± 0.03) and raw red rice (1.25 ± 0.02). Out of all the samples analyzed for cytotoxicity assay, only the methanolic crude extract of soursop showed reactivity towards the breast cancer cell line and did not exhibit cytotoxic effects towards normal cell lines. Crude extracts of mangosteen peels exhibited reactivity towards both breast and lung cancer cell lines; however, it is cytotoxic to normal cell lines. All samples analyzed using spectrophotometric methods exhibited antioxidant capacities and total phenolic content. In the *in vitro* cytotoxicity assay, methanolic crude extracts of soursop are shown to suppress breast cancer cell lines without damaging normal cell lines. However, mangosteen peels extract showed reactivity towards cancer and normal cell lines, indicating that it may not be selective in targeting the cancer cells alone. Further studies are necessary to establish safe dosage, a better understanding of mechanisms, and genetic toxicity of the crude extract of mangosteen peels.

Keywords: *chemopreventive property, pigmented agricultural products, antioxidant activity, polyphenol content, cytotoxicity cell viability assay, in vitro, DOST-FNRI, Biology*

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2019,
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0083

A comprehensive analysis on the dynamics of biodiversity and Bitan-ag Creek watershed interactions: ecosystem approach for rehabilitation

Tulang, Rogel O. , Ascaño, II, Cordulo P. , Ansigbat, Vicenta V. , Lituañas, Chris Rey M. , Canencia, Oliva P. , Yañez, Sheryl S.

The study dealt with the dynamics of biodiversity and watershed interactions of Bitan-ag Creek in Cagayan de Oro City, Philippines mainly for rehabilitation. Specifically, this study assessed a) the diversity of agroforest species in the watershed and their ecological status and economic importance; b) the composition of

phytoplankton species diversity in the watershed as biological indicator for water pollution; and c) the condition of the soil in the upper and middle stream sections in the watershed. Standard protocols were followed in the methodology in measuring diversity of species, phytoplankton species composition and in performing soil tests.

General findings include identification of forty one floral species in the urban landscape and watershed of the Cagayan de Oro City, classified as economically important (e.g. *Crysophyllum cainito*, *Sandoricum koetjape*), endemic (e.g. *Muntingia calabura*, *Macaranga bicolor*), and rare species (e.g. *Lygodium circinnatum*, *Pneumatopteris nitidula*). The phytoplankton communities were dominated by genus *Nitzschia* and *Navicula* in the middle stream section, and *Microcystis aeruginosa* and *Nitzschia* species in the lower stream section. These species are pollution-tolerant and are known to release red-tide causing toxins which are major causes of fish kills. Soil tests showed a very good range of soil pH values (6.8 – 7.36), which are appropriate for agriculture and cash crops. For both the middle and upper stream sections, the Nitrogen Phosphorus Potassium (NPK) content was moderately high and appropriate for crops.

Keywords: *Biology, Biodiversity, Watershed interactions, Rehabilitation*

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2011,
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NP

0084

Coral reefs assessment within and outside the marine protected areas in Lanuza Bay *Seronay, Romell A. , Calagui, Laurence B., Masangcay, Shirlamaine Irina G.*

Currently, there are 19 marine protected areas (MPAs) that can be found in the five coastal municipalities (Carrascal, Cantilan, Cortes, Lanuza and Tandag) in Lanuza Bay. Increasing management effectiveness of MPAs and MPA Networks (MPAN) and enhancing fisheries management definitely contributes food security in Lanuza Bay. Thus, this study is very significant in assessing the conditions and effectivity of these MPAs based on their coral reefs. Coral reef within and outside MPAs were surveyed using the digital fixed photo-transect method where 50 photo frames consisted of five points of coral life-forms were identified using the standard coral life-form code. A total of three replicated transects with 50 m length were established per monitoring stations. Highest and lowest percentages of Hard Coral Cover (HCC) within and outside MPAs are present in Carrascal, with 65.59% and 73.32% in Adlay, 14.41% and 31.19% in Caglayag, respectively. Diverse coral reef benthic life-forms at different depths are present in Lanuza Bay such as massive, branching, foliose and soft corals. Most of the coral reefs in Lanuza Bay are in good to excellent conditions (14.41 - 73.32%), these are indications that proper and strict implementations and good managements on MPAs were observed. Threats such as siltation, natural disasters and other human activities have affected the coral reef conditions in Lanuza Bay.

Keywords: *Coral reefs, Marine Protected Areas, Biology*

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NP

0085

Cytotoxic and angiosuppressive potentials of *Zehneria japonica* (Thunb. ex Murray) **S.K. Chen (Cucurbitaceae) crude leaf extracts** *Castillo, Agnes , Tsai, Yun-Chieh , Chin, Ting-Yu , Roldan, Marri Jmelou, Villaflores, Oliver B.*

Zehneria japonica belongs to the Cucurbitaceae family which is one of the most important plant families. It is commonly known as "Pipinong-gubat," widely distributed in Central Luzon regions and in areas along streams and clearings at low and medium altitudes in the Philippines. This study aimed to evaluate the potential cytotoxic and angiosuppressive properties of *Zehneria japonica* (Thunb. ex Murray) S.K. Chen (Cucurbitaceae) leaf extracts.

The *Z. japonica* semi-crude extracts were obtained by sequential extraction using hexane, ethyl acetate, and n-butanol. A modified duck egg chorioallantoic membrane (CAM) assay was aided by AngioQuant, a digital imaging software used to evaluate angiogenic activity. Inhibition of angiogenesis was evaluated by percent increase or decrease in mean length of blood vessels, mean size of blood vessels, and total number of blood vessel junctions. Moreover, the cytotoxic effects of the extracts were determined through MTT Assay. Osteosarcoma (U2Os) and hepatocellular carcinoma (HepG2) cells were used as cancer representatives while human umbilical vein endothelial cells (HUVEC) were used as the normal cell control.

Analysis with AngioQuant revealed that treatment of the duck egg CAM with *Z. japonica* semi-crude extracts suppressed angiogenesis with IC₅₀ values of 1,810.00µg/mL, 192.50µg/mL, and 147.70µg/mL for hexane, ethyl acetate, and n-butanol, respectively, with Celecoxib (20µg/mL) as the positive control. For MTT assay, *Z. japonica* extracts exhibited strong cytotoxic effect against U2Os with an IC₅₀ values of 19.65µg/mL, 9.89µg/mL, and 31.04µg/mL for the hexane, ethyl acetate, and n-butanol extracts, and no cytotoxic effects against HepG2 with IC₅₀ values of 770.90µg/mL, 130.10µg/mL and 231.60µg/mL for the hexane, ethyl acetate, and n-butanol extracts. Doxorubicin (0.544µg/mL) was used as the positive control. The extracts also inhibited the growth of the normal cells, with IC₅₀ values of 69.46µg/mL, 42.23µg/mL and 63.44µg/mL for the hexane, ethyl acetate, and n-butanol extracts. There were no mortality and toxic symptoms observed for 14 days after the administration of the crude butanolic extract of *Z. japonica* in six female Sprague-Dawley rats.

Z. japonica crude leaf extracts exhibited angio-suppressive activity through CAM assay. In MTT assay, the extracts exhibited strong cytotoxicity in U2Os (IC₅₀ ≤20µg/mL), no cytotoxic effect in HepG2 (IC₅₀ >100µg/mL) cells, and mild cytotoxic effect in HUVEC (IC₅₀ 40-60µg/mL). Phytochemical screening through TLC revealed that the extracts contain alkaloids, anthrones, flavonoids, and sterols.

Keywords: *Zehneria japonica* (Thunb. ex Murray) S.K. Chen, Cucurbitaceae, cytotoxic, MTT assay, angiosuppressive, CAM assay, Biology

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0086

Cytotoxic and genotoxic potential of the money tree (*Pachira aquatica*) stem and leaf extracts

Silvestre, Maries Ann R. , Lorida, Mary Lorraine F. , Halili, Jordan Ferdin A., Gaudario, Melissa C. , Catacutan, Jane Nicole N. , Dulay, Rich Milton R.

There is a global demand for the discovery of anticancer drugs. This study was designed as an anticancer prescreening to evaluate the cytotoxic and genotoxic potential of stem and leaf extracts of Money Tree, *Pachira aquatica*, one of the plant species with limited scientific studies. Bioactivity of *P. aquatica* extracts was initially assessed using brine shrimp lethality assay (BSLA). Plant and animal models of cell proliferation were used to investigate cytostatic and cytotoxic effects. Onion root tip chromosomal aberration assay (ORTCAA) was conducted to examine antimutagenic and genotoxic activities. Embryotoxicity and teratogenicity were determined using zebrafish developmental toxicity assay (ZDTA). Using BSLA, the *P. aquatica* leaf extract had an estimated LC₅₀ value of 11.87 µg/mL, which indicated that it was bioactive and toxic. ORTCAA revealed that all stem extract concentrations reduced mitotic indices, which were comparable to 5 mg/L of maleic hydrazide (positive control) while all leaf extract concentrations induced mitotic block at prophase/metaphase boundary. Prominent chromosomal aberrations observed were bridges and stickiness suggesting genotoxicity of extracts. ZDTA showed 100% embryonic death at 20, 100 and 200 µg/mL of both extracts after 12-hour post-treatment application. Moreover, cytological abnormalities in onion cells and early zebrafish embryonic death implied the activation of apoptosis. Based on the results, Money Tree extracts have promising cytostatic (inhibition of growth, division and differentiation) and cytotoxic (lethal) effects, which are important qualities of an anticancer drug. The Money Tree is therefore a potential source of a nature-based chemotherapeutic compound.

Keywords: Anticancer prescreening, Brine shrimp, Cytotoxic, Genotoxic, *Pachira aquatica*, Zebrafish, Biology

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2019,

Detection of multidrug-resistant shiga toxin-producing *Escherichia coli* in Philippine native swine from Quezon Province, Philippines

Opulencia, Rina B. , Nagpala, Michael Joseph M.

The spread of antibiotic resistance among bacterial pathogens, such as the Shiga toxin-producing *Escherichia coli* (STEC), is a major public health concern worldwide. Swine are considered as reservoir of antibiotic-resistant STEC and multiple outbreaks of STEC have been attributed to both domestic swine and wild boar. Therefore, the introduction of Philippine native swine (PNS) to a large market should be coupled with pathogen detection to ensure public safety. Fecal samples from 57 Philippine native swine (PNS) housed in 29 farms located in ten municipalities of Quezon province were obtained for the isolation of *E. coli*. The isolates were confirmed to be STEC by amplifying the *stx* gene. Fifty-three (93%) of the fifty-seven PNS were found to be positive for the presence of STEC. Antibiotic resistance profiles were obtained by testing 12 antibiotic classes using the disc diffusion method. Relatively high resistance rates to tetracycline (73.58%), ampicillin (37.74%), trimethoprim/sulfamethoxazole (32.08%), streptomycin (32.08%), and chloramphenicol (22.64%) were found among the STEC isolates. Seventeen (32%) STEC isolates were found to have the multidrug resistance (MDR) phenotype. The detection of MDR-STEC in the study poses a public health risk, especially when the post-antibiotic era is nearing. Therefore, changes in farming practices that would minimize the persistence of the pathogen at the farm level were implemented.

Keywords: *Philippine native swine (PNS), Shiga toxin-producing Escherichia coli (STEC), Multidrug resistance (MDR), Biology*

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2019 July,
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NP

Detection of *Salmonella* spp. in fresh vegetables purchased from wet markets and supermarkets using real-time PCR

Cortez, Christine Eden T.

Fresh vegetables is regarded as second highly consumed food by Filipino community and at the same time, vehicle for transmission of human pathogens. These products become highest priority when it comes to commodities of concern in terms of microbiological hazards. *Salmonella* spp. is a major pathogen causing foodborne outbreaks such as Salmonellosis (gastroenteritis) and typhoid fever. In the Philippines, *Salmonella* related infection cases are less documented and mostly unreported. This study aims to detect *Salmonella* spp. in fresh leafy vegetables from various sampling sites (Wet markets & Supermarkets) using a validated real-time PCR method and to compare the incidence rates of *Salmonella* spp. between the two sampling categories. Fresh vegetable samples were collected from wet market and supermarket in different locations in Metro Manila and Cavite. Then, the samples were prepared for enrichment which will be used for DNA extraction and real-time PCR analysis. Positive samples were confirmed using microbiological assay. Results showed that 13 out of 123 tested positive for the presence of *Salmonella* which were collected from iceberg lettuce, green ice lettuce, pechay native, squash leaves, sweet potato top, malabar spinach. The occurrence of *Salmonella* contamination was due to environmental and human activities during the pre- and post-harvest. Commonly contamination is encountered when vegetables are eaten raw or blanched. Findings in this study proffered evidence that *Salmonella* contamination can be observed in all sampling categories. Likewise, results show that *Salmonella* incidence rates among wet markets and supermarkets are likely similar despite the differences of the two sampling categories. This suggests that there is a need to devise strategies that may mitigate any microbial contamination and to increase awareness of the consumers regarding food safety and security. Moreover, utilization of a validated Real-Time PCR method can rapidly and effectively detect *Salmonella* spp. due to its high sensitivity and specificity rates.

Keywords: *microbiology, Salmonella, wet market, supermarket, iceberg lettuce, green ice lettuce, pechay native, squash leaves, sweet potato tops, malabar spinach, real-time PCR, fastidious pathogen, food contamination, Biology*

44th FNRI Seminar Series, Volume No. Issue No. , 5
2018,
(Filipiniana Analytics)

0089

Disentangling multiple stressors and highlighting the importance of freshwater protected area in highly urbanized watersheds in the Philippines

Okuda, Noboru , Briones, Jonathan Carlo , Peralta, Elfrizson, Magbanua, Francis , Papa, Rey Donne S.

Urban lotic ecosystems are impacted by multiple environmental stressors due to social-economic activities in the catchment. To aid in mitigation, global expansion of protected areas aquatic environments was recently set based on the Convention of Biological Diversity Aichi Target 11. As such, this study aims to disentangle the overlaying effects of deforestation and nutrient pollution on benthic macroinvertebrate communities (BMC) and assess the recent protection efforts in the watersheds of Laguna de Bay. Study sites in Silang-Santa Rosa Subwatershed (13) and Marikina Watershed (16) were sampled for BMC and surveyed for environmental factors such as land use patterns, human population density (HPD), and physicochemistry. Multivariate and regression analyses on taxa assemblages and environmental variables efficiently delineated study sites according to the degree of human impact and status of protection. Canopy openness, HPD, dissolved oxygen, and total phosphorus appeared to be the most important variables in predicting BMC. Also, the recent establishment of Upper Marikina River Basin Protected Landscape inside Marikina Watershed was successfully used to timely show how freshwater protected areas are effective in combating stream habitat destruction and biodiversity loss.

Keywords: *Human population density, Freshwater protected area, Biology*

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0090

Distribution and diversity of *Gracilaria* spp. in the Philippines

Mondragon, Josefino S. , Nacido, Ma. Christi B. , Moises, Minerva T. , Gomez, Rosalie N. , Ferrer, Ma. Salvacion R.

Gracilaria is one of the economically important seaweeds in the world because of its “agar” content and varied applications. But the concern on proper identification must be addressed due to high variability in the morphology and rampant phenotypic plasticity in many species under this genus. DNA barcoding using cytochrome oxidase subunit I (COI) as marker was used to discriminate and determine the phylogenetic relationships of the samples analyzed. The *Gracilaria* samples were collected from 107 coastal barangays nationwide. A total 249 COI-5P sequences were verified and categorized into 16 different species under the two genera: *Gracilaria* and *Gracilariopsis*. The species considered dominant in terms of distribution are *Gracilaria edulis*, *G. salicornia*, and *Gracilariopsis heteroclada*. The species that were confirmed up to the species level with intraspecific divergence of 0-1.72% are *G. changii*, *G. eucheumatoides*, *G. fisheri*, *Gp. heteroclada*, *G. manilaensis*, and *G. salicornia*. Haplotype analysis revealed new records for seven species of the 16 species identified in this study.

Keywords: *DNA barcoding, COI-5P, Morphology, Phylogenetic tree, Distribution, Biology*

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NP

DNA barcoding of commercially cultivated *Coffea* species in the Philippines

Baltazara, Miriam D., Alejandro, Grecebio Jonathan D.

Accurate identification of the commercially cultivated *Coffea* species is necessary since the cup quality may be attributed to the kind of species. Morphological identification may lead to inconsistent data due to limited variation within species of the same genus and affected by the environment. To complement the traditional method, DNA barcoding using *nuclear ribosomal internal transcribed spacer (nrITS)* and *maturase K (matK)* regions was performed. Genomic DNA was extracted, amplified and purified from twenty-four *Coffea* samples cultivated in the Philippines. Both markers had 100% amplification and sequencing success rates. The Wilcoxon two sample test showed that the interspecific distances of *nrITS*, *matK*, and *ITS + matK* combination were significantly higher than their intraspecific distances, respectively. *MatK* had a higher percentage of resolved monophyletic taxa. The results showed that *matK* is an efficient barcode over *nrITS* for commercially cultivated *Coffea* species by generating the highest rate of both universality and discriminating power. The result of this study is essential baseline information to authenticate *Coffea* planting materials at juvenile stage. Identity of coffee seedlings being sold by nursery owners can be assessed using *matK* barcode. This method of authentication will benefit the coffee growers for large-scale plantations.

Keywords: *Coffea*, DNA barcoding, Nuclear ribosomal internal transcribe spacer (*nrITS*), Maturase K (*matK*), Biology

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Ecology of reptilian fauna in Andanan Watershed Forest Reserve, Caraga Region, Philippines

Cuadrado, Jerry T., Gamalinda, Eve V.

This study was carried out to assess the basic ecology of reptilian fauna in Andanan Watershed Forest Reserve, Caraga, Philippines employing the transect walk and extensive opportunistic sampling method. Environmental variables were gathered, and the association of reptiles between these variables was performed using Canonical Correspondence Analysis. Diet composition of *Eutropis multifasciata* and *Eutropis multicolorinata*, and the socio-economic importance of reptiles were also assessed. A total of 216 individuals of reptiles belonging to nine families, 23 genera and 27 species were recorded, of which 77.77% are considered least concern species. Eighteen significant record of Philippine and Mindanao endemics were also accounted in the area. Species richness was highest in Brgy. San Juan (S=19), and high species abundance was recorded in Brgy. Calaitan (N=73). Dietary compositions of *E. multifasciata* and *E. multicolorinata* were mainly insects particularly Orthopterans and Odonata. Platyhelminthes was the only endoparasite observed in the stomachs of *E. multifasciata*. Moreover, nine environmental variables were strongly associated with the abundance of reptiles. The reptilian fauna utilized aquatic, arboreal, and terrestrial microhabitat types and highly preferred forest habitats. However, reptiles are threatened not only because they are consumed, sold and used in traditional medicine, the destruction and degradation of the habitats in the area also elevated the threats to reptilian faunal diversity. Monitoring, protection and conservation of the forests of the Andanan Watershed are essential to safeguard the reptiles and other biodiversity of the watershed.

Keywords: Diet analysis, Microhabitat, Philippine endemic, Socio-economic importance, Threats, Biology

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NP

Effects of mycorrhizal inoculation and other soil amendments on growth, nutrient status, and rhizosphere microbes of *Acacia mangium* and *Eucalyptus urophylla*

Aggangan, Nelly S. , Victoria, Kristel S., Jomao-as, Joshua G.

Acacia mangium and *Eucalyptus urophylla* are popular species for forest plantation and both known for their rehabilitation capability on heavy metal sites. These species can survive in such environment due to their association with beneficial microbes like arbuscular mycorrhizal fungi (AMF) and nitrogen fixing bacteria (NFB). The experiment was conducted to determine the growth, nutrient status, and microbial population due to AMF and/or NFB and other soil amendments. Treated seedlings were raised at the screenhouse and planted in mine tailing site of Mogpog, Marinduque. The seedlings were inoculated with AMF from Surigao, Mindanao mine tailing (coded as Sur) and from marginal site (*Glomus macrocarpum*, coded as *G. macro*), with or without NFB. After one year, both species grew very well in the area with 96% survival. Mycorrhiza inoculated *A. mangium* grew healthy with green leaves and a meter taller than the control. On the other hand, stem diameter of *E. urophylla* increased by two times when inoculated with *Gmacro* alone. P concentration in the youngest fully expanded leaves of *A. mangium* was highest (1,504 ppm) when inoculated *Gmacro* alone, while N concentration was 2.5% in NFB inoculated plants. Lastly, the rhizosphere soil population of culturable fungi in *A. mangium* was highest in NFB+Surigao inoculated seedlings while the highest NFB and AMF spore count was observed in NFB and Sur inoculated counterpart, respectively. The lowest microbial count was observed in the control counterpart. The results can be used to encourage adoption of the technology for both species in mined-out areas. Microbial biofertilizers inoculated species can also be recommended in the rehabilitation of other mine tailing sites.

Keywords: Biofertilizer, *Glomus macrocarpum*, Nutrient accumulation, Mixed inoculant, Biology

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NP

Embryonic development of climbing perch (*Anabas testudineus*) in the Philippines

Choresca, Jr., Casiano , Casumpang, Jeremy , Paclibar, Abeizer , Danting, Ma. Jodecel , Pedroso, Fiona , Oculos, Ma. Theresa , Arcillo, Abdullaziz

Climbing perch (*Anabas testudineus*), locally known as 'Liwalo/Martiniko', is an edible freshwater fish, commonly found in swamps, rice paddies, and ponds of Southeast Asia. As a labyrinth fish, it can be sold in markets for extended period of time. This study is conducted to provide an insight on the embryonic development and artificial spawning of climbing perch. Sexually mature samples were collected from Nueva Ecija, Philippines, then induced to spawn using 30 µg/kg commercially available salmon gonadotropin releasing hormone analog (sGnRHa). Eggs were immediately collected right after spawning and embryonic development was monitored in water with average temperature of 27.2°C. Fertilized eggs ranged from 0.920 to 1.230 mm in diameter. First cleavage was observed one hour after spawning (HAS), epiboly started at 5 to 6 HAS. The first heartbeat was observed 16.5 HAS and hatching occurred 20 HAS; the newly hatched larvae's average length was 2.164 mm. This is the first recorded study on embryonic development of climbing perch in the Philippines and is very significant in developing culture techniques for future production. Successful culture of this species may help in sustainable food production in the country.

Keywords: *Anabas*, Climbing perch, Embryogenesis, Aquaculture, Biology

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2019 July,
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NP

Estimation of biomass and carbon sequestration by forest tree species in response to microbial biofertilizers in a mined-out area in Mogpog, Marinduque

Algabe, Iris Ashley C., Racelis, Ma. Elenita L., Aggangan, Nelly

Climate change is presently the most important issue facing our generation. Estimation of plant biomass is one of the developed methods to determine the amount of carbon stored and carbon dioxide (CO₂) that can be released into the atmosphere, which can help reduce environmental degradation and mitigate climate change. This study assessed the carbon sequestration and storage by three reforestation species: *Pterocarpus indicus*, *Acacia mangium*, and *Eucalyptus urophylla*, as influenced by microbial biofertilizers [mycorrhiza with or without nitrogen fixing bacteria (NFB)]. Inoculation was done during pricking while lime and compost were applied to all seedlings during field planting. Allometric equation developed by Martines-Yrizar et al. (1992) was used to determine biomass density using diameter at breast height (dbh) and total height of the tree. Representative trees were excavated 27 months after field planting. Results showed that *A. mangium* inoculated with mycorrhiza+NFB gave a 73.54% increase of accumulated biomass and CO₂ compared with its control counterpart. In *E. urophylla*, 70% biomass increase was observed by those inoculated with mycorrhiza alone. In *P. indicus*, mycorrhiza+NFB inoculated plants gave a 19.10% increase relative to the uninoculated ones. The results suggest that plant biomass and CO₂ sequestration due to microbial inoculation and other soil amendments vary depending on tree species. In conclusion, *A. mangium* generated higher plant biomass, that likewise, gave higher amount of stored or sequestered CO₂ than *E. urophylla* and the lowest was *P. indicus*. Studies should be conducted in other mined-out areas in the country to verify the results.

Keywords: Climate change, Inoculation, Allometry, Mycorrhiza, Biology

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(Filipiniana Analytics)
NP

Evaluation and characterization of α -glucosidase inhibitory activity of himbabao (*Broussonetia luzonica*)

de Leon, Marco P.

Alpha-glucosidase inhibitors sourced from several plant species have been studied for their potential in the modulation of carbohydrate metabolism specifically targeting the management of Type II diabetes mellitus. The objective of this research was to evaluate and characterize the α -glucosidase inhibitory activity of Himbabao. Air-dried leaves of Himbabao were extracted with methanol. The methanol extract were further partitioned to hexane (ML-H), chloroform (ML-C), ethyl acetate (ML-E) and n-butanol (ML-B) fractions. These fractions were subjected to in vitro α -glucosidase inhibitory activity assay. The active fraction which exhibited highest inhibitory activity was tested for toxicity and in vivo α -glucosidase inhibitory assay using normal and alloxan induced diabetic Balb/c mice. This active fraction was purified by assay guided technique and the active components were characterized by positive mode electron spray ionization (ESI-MS) mass spectrometry. The technique of solvent partitioning isolated four fractions; ML-H, ML-C, ML-E and ML-B. ML-H exhibited the highest α -glucosidase inhibition in an in vitro assay. LD50 was determined to be greater than 2000 mg/kgbw as no mortality was exhibited by the five mice given this dosage. The same fraction was tested in an in vivo assay using normal Balb/c and alloxan-induced diabetic mice models. Hypoglycemic activity was observed in both conditions with stronger glucose control effects in the hyperglycemic mice. The purification of ML-H fraction showed multiple components (i.e. 14 fractions) where 5 fractions exhibited α -glucosidase inhibitory activity. A final fraction (ML-H7G4) was isolated based on the consistently high α -glucosidase inhibitory activity after repeated sub-fractionation. The characterization of this fraction through LC-MS resulted to mass annotations of 3 mass groups. The results indicated polar lipids as components of ML-H7G4 through online metabolite library search. The hexane fraction from methanol extract of air-dried Himbabao leaves showed inhibition of glucose absorption in normal and alloxan-induced diabetes. Polar lipids were found to be present in the active fraction, however, further study on the structure and mechanism of the active compounds is suggested.

Keywords: *alpha-glucosidase, himbabao, Bruossonetia luzonica, Type II diabetes mellitus, in vitro, in vivo, DOST-FNRI, electron spray ionization, mass spectrometry, Biology*

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2015,
(Filipiniana Analytics)

0097

Evaluation of anti-angiogenic activity and biological safety of limonoids from selected Philippine citrus fruits

Vidallon, Mark Louis P. , Yu, Raymond Fernando B. , Rodriguez, Evelyn B.

Suha *Citrus maxima* (Burm.) Merr and kalamansi *Citrofortunella microcarpa* (Bunge) Wijnands are citrus fruits common to the Filipino diet and are found to contain bioactive phytochemicals, such as limonoids. Limonoids are triterpenoid bitter principles from Citrus fruits, predominantly found in the seeds of citrus fruits. Initially studied for their intrinsic bitterness, this group of phytochemicals was found to have a plethora of health-giving benefits including anti-microbial, anticarcinogenic, and hepatoprotective, among others. In this study, seed limonoids from suha and kalamansi, along with their major limonoids, limonin and nomilin, were evaluated for their angiogenic activities and biological safety. Limonoids were isolated and characterized from the seeds of suha and kalamansi along with their major limonoids, limonin, and nomilin. A modified duck egg chorioallantoic membrane (CAM) assay was aided by AngioQuant, a digital imaging software used to evaluate angiogenic activity. Inhibition of angiogenesis was evaluated by percent increase or decrease in mean length of blood vessels, mean size of blood vessels, and total number of blood vessel junctions. Zebrafish embryotoxicity assay was utilized to evaluate the toxicity of limonoids. Zebrafish embryos were exposed to the aforementioned limonoids at 100ppm [maximum concentration for a Category 5 (practically non-toxic) substance] and were observed for 96 hours for the four apical signs of zebrafish lethality. Analysis with AngioQuant revealed that treatment of the duck egg CAM with limonin, nomilin, and seed limonoid mixtures of suha and kalamansi showed a decrease in the percent mean length and size of blood vessels, and the total number of blood vessel junctions comparable to that of quercetin, a known antiangiogenic compound ($P < 0.0001$). Zebrafish exposed to the same phytochemicals at 100ppm did not show any of the four apical signs of zebrafish lethality 96 hpf. Limonin, nomilin, and the seed limonoid mixtures of suha and kalamansi inhibited angiogenesis in a dose-dependent manner, comparable to the anti-angiogenic effect of quercetin. These are bioactive, yet non-toxic phytochemicals.

Keywords: *limonoids, angiogenesis, duck egg chorioallantoic membrane assay, zebrafish embryotoxicity assay, Biology*

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0098

Evaluation of the presence of beta lactamase (BLA) gene in *E. coli* isolated and identified from cage-cultured tilapia (*Oreochromis Niloticus*) from Laguna Lake, Philippines

Awingan, Joan S. , Cayetano, Mylene G. , Carpio, Marinette Rose M. , Bathan, Kim Jana S. , Lacap, Karen L.

Inland fish and fisheries play important roles in ensuring global food security providing a critical source of animal protein for local communities in developing countries. Laguna Lake, the largest inland freshwater system in the Philippines is largely used for aquaculture purposes. However, its location at the center of domestic and industrial activities makes it vulnerable to pollution by human, animal and industrial wastes. This study aimed to: (a) investigate the presence of *E. coli* from the skin mucus, gills and gut of adult cage-cultured tilapia obtained from Pila and Biñan stations of Laguna Lake and (b) detect for the presence of Bla (beta-lactamase) genes in *E. coli* isolated from the fish samples. Tilapia were randomly sampled over a three-month period from January 2018 until March 2018. The skin mucus, gills and gut were sampled for bacterial isolation. All bacterial isolates were subjected to morphological and biochemical tests and were all found positive for the presence of *E. coli*.

Conventional Polymerase Chain Reaction (PCR) analyses showed that the samples were all negative for the presence of the *Bla* gene. However, the presence of *E. coli* in the fish samples is recognized as a reliable indicator of fecal contamination and therefore water pollution and may represent a risk to the consumers and therefore could be a basis for further study.

Keywords: *Bla* gene, PCR analysis, *E. coli*, Aquaculture, Fecal contamination, Biology

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NP

0099

Expression of the recombinant precursor and putative mature forms of human interleukin-37 isoform b (IL-37b) in *E. coli* expression system

Lim, Ciara Christianne Y. , Stacey, Martin

IL-37b is a cytokine that may exist in several forms including a full-length precursor protein and its putative mature forms (IL-37b cleaved at E21, V46, and K53, respectively). In recent years, the role of IL-37b has been associated with the regulation of inflammation and inflammatory diseases. Previous studies focused on the intracellular activity of the cytokine, while the bioactivities of its variants when introduced in the extracellular environment has been limited and require further investigation. To enable this, the study produced precursor and truncated forms of IL-37b in an *E. coli* expression system.

Recombinant proteins of the full-length (FL) and shorter forms (E21, V46, and K53) of IL-37b were produced in IPTG-induced *E. coli* BL21-CodonPlus(DE3)-RIPL strain and subsequently purified using Ni²⁺-NTA affinity, ion exchange, and size exclusion chromatography. The identity of the proteins was confirmed through western blotting and LC-MS.

Findings show that the masses of the expressed proteins correspond to their respective theoretical masses with 24,134.75 0.04 Da for FL, 21,919.63 0.80 Da for E21, 19,298.57 0.04 Da for V46, and 18,551.21 0.04 Da for K53 at 90-95% purity. This confirms that the correct proteins have been produced and at high purity. Further, the tendency of FL to homodimerize was observed in this study, which may have implications in the extracellular processing and bioactivity of FL.

This study describes the successful expression and purification of recombinant precursor and putative mature forms of IL-37b in *E. coli*, which can be utilized for downstream characterization.

Keywords: *interleukin-27, mature interleukin-37, IL-37b recombinant expression, Biology*

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2018/03,
(Filipiniana Analytics)

0100

Genetic diversity of the HSP70 gene in native chicken (*Gallus gallus domesticus* L.) breeds of the Philippines

Valdez, Jr., Marcos B. , Santiago, Rene C. , Thomas, Jr., Rey C. , Daljog, Charmaine S. , Romero, Rose Glendelyn T. , Castillo, Raymond Vincent F.

Heat stress leads to high mortality and low productivity in chicken livestock industry. This study elucidated the genetic diversity of the HSP70 gene in 7 native chicken breeds of the Philippines based on molecular techniques. The HSP70 gene was amplified using primers designed from red-jungle fowl HSP70 gene sequence (J02579). The 5'UTR and partial exon fragment was cloned in puc19 vector prior to DNA sequencing. A total of 39 single nucleotide polymorphisms (SNPs) were identified. There were 14 observed haplotypes; 9 are breed-specific and 5 are shared between chicken breeds. The native chickens are characterized by low nucleotide diversity (π =

0.003475) and high haplotype diversity ($h = 0.796$). Haplotype distribution indicates unique haplotypes prevalent in breeds from the Southern Philippines. Analysis of molecular variance showed strong yet statistically insignificant differentiation between breeds ($F_{st}=0.22738$, $p>0.05$). Lastly, the heat stress tolerant genotype A258A was detected in 4 out of 7 native chicken breeds of the Philippines. Thus, these native breeds might be a potential source population in developing heat stress tolerant chickens. Significantly, findings from this study will provide crucial baseline information regarding the molecular characteristics of the HSP70 gene of the Philippine native chickens.

Keywords: *Philippine native chicken, HSP70 gene, Single nucleotide polymorphism, Haplotype, Biology*

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NP

0101

GFL database system: a portal and repository of DNA barcode of marine wildlife stranding

Ventolero, Minerva Fatimae H. , Santos, Mudjekeewis D. , Dela Peña, John T. , Poniente, Jennifer A.

GFL database system is an online platform and repository specifically designed for DNA barcoding, aiding the storage of DNA barcode records of samples analyzed under Genetic Fingerprinting Laboratory. It was established in 2016 and provides an integrated environment for the assembly of DNA barcode data. It delivers an online database for the collection and management of specimen, distributional, and molecular data as well as the analytical sources and tools to support their validation. As of 2018, it included a library of over 91 identified species from over 541 specimens. Stranding of individual marine wildlife has been recorded in Genetic Fingerprinting Laboratory database, with different event patterns. Records of stranding of marine wildlife species were analyzed for patterns on species composition, temporal and spatial variations of stranding events, and stranding hotspots. A total of 6 stranding events were recorded and all of them were confirmed species of marine mammals in the Philippines, including the validation of the mysterious, hairy-looking sea creature washed ashore in the island of Dinagat in Surigao del Norte as *Physeter catodon* known as sperm whale; identification of the whale *Balaenoptera edeni* which was found dead in the bay of So. Guitan, Brgy. Sibaltan, El Nido, Palawan; the identification of dead shark *Carcharodon carcharias* commonly known as great white shark found in the coastal area of Brgy. Lobbot, Dipaculao, Aurora; the discovery of the identity of tissue samples from stranded marine species from Davao del Norte and Davao City as *Grampus griseus* known as Risso's dolphin, *Kogia breviceps* known as Pygmy sperm whale, and *Stenella longirostris* known as spinner dolphin. These strandings in general validate the diverse marine mammal assemblage in the Philippines and reveal the various environmental threats with which they deal.

Keywords: *GFL database, Stranding, Physeter catodon, Biology*

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NP

0102

Glycerol-3-phosphate dehydrogenase cDNA of pili (*Canarium ovatum* Engl.) exhibits high similarity with other dicot species

Mulig, Justine Christian H., Garcia, Roberta N.

Glycerol-3-phosphate dehydrogenase (GPDH) converts dihydroxyacetone phosphate (DHAP) and NADH (reduced form of nicotinamide adenine dinucleotide) into glycerol-3-phosphate (G3P) and NAD⁺ (oxidized form of nicotinamide adenine dinucleotide). G3P serves as the backbone for triacylglycerol synthesis. In this study, GPDH gene was isolated and characterized to investigate its role in designing modern biotechnology strategies

for pili pulp oil as an alternative fuel source. The gene sequence was generated by polymerase chain reaction using pulp complementary DNA (cDNA) followed by nucleotide sequencing. It was then analyzed using different bioinformatics tools. A 983 base pair *GPDH* cDNA was obtained which corresponded to a 327 amino acid-polypeptide that shows 95% homology with cytosolic GPDH sequences from *Citrus clementina*, *Citrus unshiu* and *Hevea brasiliensis*. The deduced protein was a homodimer consisting of the N-terminal NAD-binding domain and the C-terminal DHAP-binding domain that are both critical in the interconversion of DHAP and G3P. The two domains were connected by a short three-residue loop Asn219-Gly220-Asp221. Phylogenetic analysis revealed that the *C. ovatum* GPDH grouped with the cytosolic GPDH in dicots. This observation indicated that the isolated GPDH is homologous to the cytosolic isoform of the enzyme.

Keywords: *Glycerol-3-phosphate dehydrogenase, Triacylglycerol synthesis, Canarium ovatum, Complementary DNA, Biology*

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NP

0103

Health risk assessment: total mercury in canned tuna and in yellowfin and frigate tuna caught from Leyte Gulf and Philippine Sea *Yap-Dejeto, Leni G. , Pacoma, Arvin U.*

The total mercury (tHg) concentrations in commercially available canned tuna and in yellowfin tuna (*Thunnus albacores*) and frigate tuna (*Auxis thazard*) caught from the waters of Eastern Visayas, Philippines were determined by Inductively Coupled Plasma Optical Emission Spectrometry. The average total mercury concentrations measured from nine frigate tuna, three yellowfin tuna, and four canned tuna were 0.024 ug/g, 0.002 ug/g, and 0.07 ug/g, respectively. Values of estimated daily intake for locally caught tuna for different age groups and sex were calculated. Calculated daily dose for all locally caught tuna in the study were well below the allowed concentration of mercury in fish consumed per day regardless of age and sex, and thus may not pose a health risk to consumers. The same calculations were done for canned tuna with results further explained in the paper.

Keywords: *Canned tuna, Mercury, Auxis thazard, Thunnus albacores, Biology*

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2019,
(Filipiniana Analytics)
NP

0104

Heavy metals absorption by three reforestation species inoculated with microbial biofertilizers in a mined-out area in Mogpog, Marinduque *Aggangan, Nelly S. , Morong, Lea Joy M.*

Heavy metals are defined as metallic elements with relatively high density and are toxic at low concentrations. Such substances, although naturally present in soil, in mined-out areas, concentrations are harmful to all living organisms including human. The use of both microorganisms and plants as a bioremediation method to treat heavy metal contaminated soils is of high interest since it is cost effective. The experiment was conducted to demonstrate the effect of microbial inoculation on the absorption of heavy metals by narra (*Pterocarpus indicus*), *Acacia mangium* and *Eucalyptus urophylla*. Four month old treated seedlings were outplanted in June 2016 in a mine tailing in Barangay Capayang, Mogpog, Marinduque following RCBD and treatment means were compared using Tukey's. Twenty-seven months after field planting, the accumulation of elements in the tissues of all three forest species has been in the following order: Cu>Pb>Cd. In all three species, roots contained the highest amount of Cd and Cu while the stem highly accrued Pb. Narra inoculated with mycorrhizal fungi and nitrogen fixing bacteria (NFB)

absorbed significantly higher amounts of Cd and Cu (3.34 ppm and 2,799 ppm, respectively) among the three species. *E. urophylla* inoculated with mycorrhiza alone accumulated greater amount of Pb than *A. mangium* (9.66 ppm and 12.49 ppm, respectively). In conclusion, the amount of heavy metals absorbed by plants varied depending on the tree species and microbes used. Mycorrhiza+NFB inoculated narra absorbed the highest Cu and Cd while *E. urophylla* inoculated with mycorrhiza alone absorbed the highest Pb. Tree species studied can be used to clean up Cd, Cu and Pb laden soils.

Keywords: *Acacia mangium*, *Eucalyptus urophylla*, Narra, *Pterocarpus indicus*, Biology

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NP

0105

Identification of actin beta-tubulin housekeeping genes in the *Moringa oleifera* Lam. leaves

Asuncion, Jessica G., Pobre, Kathrina M. , Panes, Vivian A.

Moringa oleifera is a high valued plant. Its multi - purpose uses and numerous health benefits have attracted the attention of farmers and researchers since time immemorial. However, there are limited studies and information about its genome. Thus, the study was conducted to extract, amplify and sequence the actin and beta - tubulin housekeeping genes from *M. oleifera* leaf. DNA was extracted using the DNAzol plant DNA extraction kit. Then, DNA quantity and quality were checked using spectrophotometry. The housekeeping genes were amplified using PCR. PCR products were run in agarose gel electrophoresis. Results revealed that beta-tubulin gene size is 275 bp while actin is 79 bp. The consensus sequence and phylogenetic analysis using Chromas and Bioedit, and NCBI BLAST and MEGA respectively showed that beta tubulin housekeeping gene from *M. oleifera* is closely related to the same housekeeping gene from *Cucumis sativus* and *Cucurbita maxima* having a bootstrap value of 56. Based on their taxonomic details, *M. oleifera*, *C. sativus* and *C. maxima* are species all belonging to the same subclass *Dileniidae*. The sequence analysis has proven that the housekeeping gene isolated from *M. oleifera* is indeed a beta tubulin gene. Our results will provide a valuable reference for future studies on extraction, amplification and sequence analysis of important functional genes.

Keywords: *Moringa oleifera*, Housekeeping genes, Beta-tubulin, Actin, Biology

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(Filipiniana Analytics)
NP

0106

Importin-β proteins expression modulation in embryonic stem cells and embryonic fibroblasts of mouse

Sangel, Percival P.

Importin-β proteins are transport proteins important in the shuttling of cargo proteins by binding to either nuclear localization signal (NLS) or nuclear export signal (NES). This study investigated the *in vitro* expression modulation of selected importin-βs. Specifically, this study characterized the culture behavior of mouse embryonic stem cells after knockdown of selected importin-β proteins like *Cse1L*, *IPO7*, *KPNB1*, *RanBP16*, *RanBP17*, or *XPO4*. Also, this study assessed the effects of overexpressing *RanBP17* or *IPO7* during cellular reprogramming of mouse embryonic fibroblasts (MEFs). Results showed that *Cse1L* and *KPNB1* are essential for the viability of mouse embryonic stem cells since knockdown of either one of these proteins resulted in the death of mouse embryonic stem cells. Meanwhile, the growth characteristics of *RanBP17*, *XPO4*, *IPO7*, or *RanBP16* knockdown mouse embryonic stem cells were comparable with the control. Aside from round colonies, the appearance of flat cells and spreading growth characteristics in some colonies were observed, which indicated

early signs of differentiation. On the other hand, the number of colonies with overexpressed Oct4, Sox2, Klf4, cMYC (OSKM) + RanBP17, or OSKM+ IPO7 was comparable to OSKM+Flag or OSKM (controls). This suggests that *RanBP17* or *IPO7* has limited application in the generation of induced pluripotent stem cells.

Keywords: Cellular reprogramming, Importin- β 946 proteins, Knockdown, Biology

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2020 March,
(Filipiniana Analytics)
NP

0107

In vitro mammalian alpha-glucosidase inhibitor screening of selected plant materials from Siba-o, Calabanga, Camarines Sur

Pidlaon, Switzale M. , Nicolas, Marilou G. , Quiming, Noel S. , Solidum, Judilynn S. , Kamantigue, Edmark C.

Diabetes mellitus type 2 (DM2) remains a health threat to Filipinos. According to the International Diabetes Federation 2014, the Philippines is one of the emerging DM2 hotspots with an estimated prevalence rate of around 3.2 million cases (5.9%) between 20 to 79 years old. In line with the acceptance of Filipino patients with the utilization of herbal medicine as an effective alternative for treatment of their ailments, some of the selected plant materials from Siba-o, Calabanga, Camarines Sur were explored for mammalian intestinal alpha-glucosidase inhibition *in vitro* to develop new herbal drug candidates that are effective, safe, and more affordable. Exhaustive maceration using absolute ethanol was performed to extract the phytoconstituents from the plant matrix. In vitro alpha-glucosidase inhibition assay using spectroscopic method (96 well plates) was carried out to analyze the mammalian α -glucosidase inhibition of the different plant samples, IC_{50} was determined from the generated linear regression extrapolated from concentrations-% inhibitions plot. Thin Layer Chromatography (TLC) bioautography was employed to identify the presence of flavonoids, tannins, essential oil, reducing sugar, coumarin, anthraquinones, anthrones, steroids, alkaloids, and peptides. From the 98 crude plant samples extracted, the ethanolic extracts of *Melothria* sp. stem with leaves showed a concentration-dependent inhibition activity towards mammalian α -glucosidase from rat intestine acetone powder with IC_{50} values of 49.24ppm. Tannins, flavonoids, essential oils, and indoles were detected from TLC bioautography that may be responsible for the bioactivity. The results demonstrated the potential utilization of some plant samples as an alternative herbal drug. However, only *Melothria* sp. crude leaves and stem extract (SB32LS) showed a concentration-dependent activity and further studies must be done to isolate the metabolites responsible for the activity through activity-guided isolation.

Keywords: Type 2 diabetes mellitus, mammalian alpha-glucosidase inhibition, *Melothria* sp., Siba-o, Calabanga, Camarines Sur, Biology

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2017/09,
(Filipiniana Analytics)

0108

Influence of antemortem and slaughtering practices on the pH of pork and chicken meats

Manalo, Monica R., Gabriel, Alonzo

This study aimed to document and determine the effects of antemortem and slaughtering practices on the post-mortem pH of pork and chicken meats. Assessment of selected hog slaughterhouses (SHs) and poultry dressing plants (PDPs) located in Valenzuela City, Philippines was conducted to gather basic information regarding the practices of each plant. The post-mortem pH at 45 min and 24 h for pork ($n = 39$) and post-mortem pH at 20 min and 24 h for chicken ($n = 24$) meats produced on the visited plants were determined. Measured pH values were used as the basis for classifying meat quality as pale, soft, and exudative (PSE); dark, firm, and dry (DFD); and acceptable meat. Early post-mortem temperature was also determined in both types of meat. Ocular plant

inspection revealed that the average age of pigs and chickens slaughtered were 4 mo and 40–45 d old, respectively. Animals were transported from farm to slaughterhouse in a forward open cab vehicle with a partition at a distance that ranged from 45–60 km for pigs and 65–172 km for chicken with a travel time of 1–3 h. The resting period of pigs prior to slaughter was 1.5–8 h and 2–4 h for chicken. Generally, a higher percentage of suspected DFD (38.46% vs. 30.30%) and PSE (17.95% vs. 6.06%) in pork meat was observed at early post-mortem pH in comparison to ultimate pH. The majority of the PSE-like meat came from pigs slaughtered using electric stunner while DFD incidence occurred from pigs with a short resting period prior to slaughter (1.5–2 h). For chicken meat, 29% of the samples were suspected PSE based on ultimate pH while the remaining 71% were meat with suspected acceptable quality. PSE-like meat was recorded from chicken transported from farm to abattoir with a longer travel period (3 h).

Keywords: *Chicken, DFD, pH, Pork, PSE, Biology*

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 NP

0109

The influence of vegetation and insect abundance on insectivorous bat activity during dusk emergence in an urban space in Metro Manila, Philippines

Fidelino, Jay S., Gan, Jelaine L.

Because of their importance in the maintenance of ecological processes and sensitivity to multiple stressors, bat activity is increasingly being used to study habitat associations, including the effects of urbanization and other landuse changes. However, to be effectively used as a bioindicator, baseline information on bat activity patterns must first be established. In this study, we aimed to determine patterns of insectivorous bat activity, richness, and assemblage within an urban green space in the Philippines' capital region in relation to habitat type, insect abundance, and environmental conditions, with particular focus on activity at dusk emergence. Bat activity was measured as the number of bat passes per minute using a portable bat recorder at five time intervals from 5:30 PM to 7:30 PM, and compared between 10 open and 10 forested sites. Bat calls were classified into sonotypes based on five call variables. There was no difference in bat activity between forested and open sites, but more sonotypes were recorded in open sites. Both bat activity and sonotype richness peaked between 6:00 PM and 6:30 PM, representing a short foraging bout upon dusk emergence. However, we did not observe significant relationships between bat activity and insect abundance, air temperature, and relative humidity. Our study found considerable bat activity and diversity in an urban ecosystem, a poorly explored field of research in the Philippines. Additional studies are necessary to understand the impact of landuse changes on Philippine bats, and to inform their conservation and management in anthropogenically altered habitats.

Keywords: *Bioacoustic monitoring, Urban ecosystems, Insectivorous bats, Biology*

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 2019,
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 NP

0110

Integrated vulnerable assessment of water-energy-food security nexus in Waras-lalo Subwatershed, Bicol River Basin, Philippines

Rodriguez, Mary Grace dP.

The usual vulnerability assessment is often sectoral- and hazard-specific approach. With the nexus approach on water, energy and food (WEF), it is recognized that these three sectors have interactions and synergies/trade-offs in their activities. *Security* has five dimensions namely: availability, accessibility, affordability, accessibility, quality and sustainability. This paper discusses how a developed conceptual framework on *integrated*

vulnerability assessment (IVA) and methodology of WEF security nexus was applied to a watershed. The framework considered the watershed with three systems of ecological, energy and food, interacting with water as the common element. The same concept of vulnerability assessment was used for IVA, a function of exposure, sensitivity and adaptive capacity. IVA was done by identifying parameters among WEF and inclusion of sectoral variables related to the various dimensions of security. The overall concept is to attain sustainable development if recommended measures will be done. Based on the identified relationships and parameters, IVA of WEF nexus was applied to the Waras-Lalo Subwatershed. The results show that the parameters were responsive to the assessment. Furthermore, the IVA of the study area had a result of being highly vulnerable to climate change related factors such as typhoons, rainfall change, drought and temperature rise. The recommendations for the study are: 1. Indicator responsiveness – the indicators used were responsive and replicating these to other sites can be recommended; 2. Data improvement - indicators used in this study were not strictly to be used in IVA of WEF nexus security in other study sites, there can be some data that can still be included if available; 3. Framework recommendation - concept of IVA is highly relevant not only for the study area but for the whole country with increasing population consuming water, energy and food. The developed IVA framework for WEF nexus security can be recommended in other study sites for a holistic and comprehensive assessment of the limited resources on water, energy and food.

Keywords: *Sustainability, Watershed, Climate change, Biology*

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 (Filipiniana Analytics)
 NP

0111

Intertidal seagrass distribution and soil structure in the protected seascape of Sarangani Bay, Philippines

Afon, Anna Mae R., Jumawan, Jess H.

Seagrasses are unique angiosperms that thrive in marine environments. Transect-quadrat sampling was conducted in the intertidal zones of protected seascape of Sarangani Bay (Maasim, Alabel and Maasim provinces). In each site, there were 10 quadrats per transect with a total of 6 transects (100 meters apart) installed perpendicularly from the shoreline. A total of 11 species were accounted in the intertidal zone with two species noted outside the sampling transects. Species richness, abundance, percent cover and Shannon diversity was highest at Maasim site, dominance index at Alabel site and evenness at Glan site. Two way ANOVA revealed highly significant difference in vegetation-soil factors ($p < 0.0001$), significant ($p = 0.0448$) in sites factor and highly significant ($p < 0.0001$) for the interaction of factors. Post hoc analysis revealed significant difference between Alabel and Maasim sites ($p < 0.05$) while no significant difference in Maasim vs Glan and Alabel vs Glan sites. This pattern was similarly depicted in non-metric multidimensional scaling (stress value < 0.05). Soil structure in the 3 sites was composed largely of silt to medium sand. Principal component analysis gave 89.66% variances of two principal components with abundance, dominance and medium sand influencing PC1 while species richness, silt and very coarse sand in PC2. The analysis revealed that abundance and species richness is correlated by silt and medium sand while biodiversity attributes gets lower indices as soil structure becomes coarse sand, very coarse sand and gravel. This insight would be helpful for management of intertidal seagrass in protected seascape in Sarangani Bay, Philippines.

Keywords: *Intertidal seagrass, Principal component analysis, Sarangani Bay, Non-metric multidimensional scaling, Biology*

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 (Filipiniana Analytics)
 NP

Isolation and molecular characterization of the coconut (*Cocos nucifera* L.) 7s globulin cDNA

Sarmiento, Jasper A., Garcia, Roberta

Coconut (*Cocos nucifera* L.) is a widely used seed crop known for its coconut oil and water. Storage proteins also accumulate in the coconut endosperm during seed development and offer novel coconut-based products that could find applications in the food and non-food systems. This study focused on the isolation and characterization of the complementary DNA (cDNA) sequence of coconut 7S globulin, the second most abundant globulin in the endosperm. Total RNA from the solid endosperm of a 6-7 month old coconut was isolated and subjected to cDNA synthesis. Degenerate primers were designed to amplify approximately 1 kb size of the gene. The 7S globulin cDNA consisted of 982 base pairs and the deduced amino acid sequence had 325 residues with a molecular weight of 36871.7 kDa and pI of 9.79. BLAST analysis revealed that it is most similar to its homologues, *Elaeis guineensis* and *Phoenix dactylifera*, which have identities of 94% and 89%, respectively. Arginine was the most abundant amino acid at 10.8% of the total amino acid residues. The deduced amino acid sequence has two cupin domains. The coconut 7S globulin was also found homologous to the Pis v3 and Ses i3 allergens from *Pistacia vera* and *Sesamum indicum*, respectively.

Keywords: Coconut, 7S globulin, Storage protein, Molecular characterization, Biology

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(Filipiniana Analytics)
NP

Isolation of fungi in indoor air environment of selected air-conditioned and non- air-conditioned wards in a public tertiary hospital in Metro Manila, Philippines

Bungay, Alice Alma C. , Ablola, Ferissa B.

The hospital as health care facility has also become a source of infection that provides a place for different microbiological agents such as fungi. Exposure to these organisms is specifically detrimental to highly immunocompromised in-house patients. This study aimed to 1) detect the presence of fungi in a public tertiary hospital in Metro Manila; 2) determine the dominating fungal organism; and 3) describe the environmental conditions and physical factors affecting the proliferation of fungal organisms.

Eight sampling sites were selected for this study. The hospital main lobby was the comparison site for the three non-air-conditioned surgery wards (NACWs) while the fourth level nurse station is the comparison site for the air-conditioned wards (ACWs). Meteorologic conditions such as environmental temperature and relative humidity were also determined. Andersen air sampler was utilized to conduct the environmental indoor air sampling. A total of 98 malt extract agar supplemented with chloramphenicol (0.01%) plates were utilized for the duplicate sampling in eight sites. After three to five days of incubation at 37°C, the isolated fungal organisms were culturally and morphologically characterized.

Seven fungal organisms were isolated from the indoor air sampling conducted namely: *Aspergillus fumigatus*, *Aspergillus flavus*, *Aspergillus niger*, *Curvularia* sp., *Penicillium* sp., *Alternaria* sp. and *Rhizopus* sp.). The most dominant fungal species among the NACWs was *A. niger*. On the other hand, *A. fumigatus* was the most observed isolate among the ACWs. The air-conditioned wards showed a higher number of fungal isolates. In particular, *A. fumigatus* and *A. flavus* colonies in the ACWs were evidently higher than in the NACWs.

The ubiquitous nature of the *Aspergillus* species and slow settling rate due to small spore size make it the most dominant fungal organism retrieved in the air sampling conducted. No strict numerical guidelines were available for the spore counts of *Aspergillus* species to assess contamination rate. However, according to the Health Protection Surveillance Centre, 2018, the values of CFU/m³ of most of the isolates not only by *Aspergillus* species showed non-compliance with the threshold level documented.

Keywords: indoor air sampling, ventilation type, nosocomial, Andersen air sampler, relative humidity, temperature, Biology

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2020/03,
(Filipiniana Analytics)

0114

Larvicidal activity of *Calophyllum inophyllum* (Bitao) leaf extract against dengue vector *Aedes aegypti*

Santos, Irmalyn V. , Elazegui, Erwin P. , Buag, Judy Ann M. , Oquina, Julius R.

Insecticides of botanical origin have been reported as useful for control of mosquitoes since synthetic insecticides have caused adverse environmental effects and high operational cost. This study aimed to determine the larvicidal activity of *Calophyllum inophyllum* (Bitao) leaf extract against dengue vector *Aedes aegypti*.

The Bitao plant extract was subjected to phytochemical analysis and results indicated the presence of alkaloids, tannins, saponins, terpenoids, flavonoids, phenols and sterols. For the larvicidal bioassay, the 3rd instar larvae were tested by different concentrations (0.25%, 0.5%, 1%, 2%, 3%, 4% and 5%). The mean percentage of larval mortality was 68% for 0.25% v/v and 97% after 24 h. After 48 hours of treatment, the lowest concentration was 85.2% and the highest shows 100% mortality. Positive control (mosquito pellets) showed 35.56% and 74.07% mortality percentage after 24 hours and 48 hours respectively. The negative control (methanol) showed 0% mortality both after 24 and 48 hours. The LC 50 and LC 90 after 24 hours were 0.1407 and 1.8387, while after 48 hours, LC 50 and LC 90 were 0.0055 and 0.4232. Results showed that Bitao leaf extract was found effective in controlling *Aedes aegypti* larvae under laboratory conditions.

Keywords: Larvicidal activity, Bitao plant, Phytochemical analysis, LC 50, LC 90, Biology

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0115

The lizards (Squamata: Scincidae: Gekkonidae: Agamidae) in selected areas of Andanan Watershed Forest Reserve, Bayugan City, Philippines

Japitana, Rowena A. , Fernandez- Gamalinda, Eve V. , Salde, Kathyleen , Sularte, Rainer P.

Lizards are highly diverse with high percentage of endemism in the Philippines particularly in the island of Mindanao. However, there is few existing account documenting the lizard communities of this unique forest reserve area. The study aimed to assess the distribution of Lizards (Squamata: Scincidae: Gekkonidae: Agamidae) in selected areas of Andanan Watershed Forest Reserve using line transect and intensive opportunistic sampling method. Specimens were identified *in situ* and were recorded by photographic documentation. Ten species of lizards belonging to one order and three families were captured and recorded in the sampling sites. Five were categorized as Philippine endemic, two Mindanao Faunal Region endemic and three of least concern lizards. Endemicity in lower elevations reached 80% for lizards communities. Two lizard species have been considered as socio-economically important species by the local villagers. On-going threats (conversion to agricultural land, wildlife hunting, slash and burn, and increasing population) were observed in the area. Finally, the Andanan watershed forest reserve is home to five Philippine endemic and two Mindanao faunal region endemic lizard species. Thus, it is important that this reserve should have better management and protection.

Keywords: Andanan watershed, Endemism, Reptiles, Squamates Biological Sciences, Biology

Marine microbes and plastic debris: research status and opportunities in the Philippines

Viernes, Alvin Claine A. , Perez, Jose Nickolo O. , Calpito, Jahannah Victoria M. , Bitalac, Justine Marey S. , Tolentino, Mark Paulo S. , Purganan, Daniel John E. , Gomez, Norchel Corcia F. , Onda, Deo Florence L.

Marine plastics have been shown to affect all organisms across the trophic levels including the microbial communities, influencing their community assembly, composition, metabolic processes, and ecosystem functions. Thus, studying plastic-microbe interactions in the marine environment is important in understanding its implications alongside the growing issue of plastic pollution. The Philippines, despite being suggested as the third-largest contributor to marine plastic debris, currently does not have any existing national research programs on basic plastics research, resulting in our limited understanding of the extent and implications in the country. This paper then reviews the current status and knowledge of the plastic-microbe association focusing on how plastic surfaces serve as a new environment for marine microbes, how this system could become dispersal mechanisms of unwanted microorganisms, and how microbes possibly contribute to the biodegradation of plastics in the marine environment. These also translate to possible research opportunities for Filipino scientists to work on the topic.

Keywords: *Biodegradation, Dangerous hitchhikers, Microbes, Microbial succession, Plastic pollution, Plastics, Biology*

Mechanistic model of macroparasite accumulation in hosts leading to aggregation

Gokhale, Chaitanya , Anzia, Elizabeth , Rabajante, Jomar F.

Parasite aggregation is considered one of the “laws” in parasite ecology because it is a recurring pattern in macroparasite infections. Some factors, such as heterogeneous exposures, infection rates and susceptibility of host individuals, are observed to produce aggregated distributions of parasites. This pattern has been widely studied using phenomenological models, such as by using the negative binomial distribution. However, if we desire to infer the mechanisms of aggregation, a mechanistic model is essential. Here we formulate a mechanistic model of aggregation based on parasite accumulation in hosts without initially assuming a negative binomial distribution. Our results show that a homogeneous pattern of parasite accumulation still arrives at an aggregated pattern as shown by the derived mean and variance of the parasite distribution. By incorporating the derived mean and variance to the host-parasite interaction, we can predict how aggregation affects the population dynamics of the hosts and parasites through time. Our model design can be used in determining the conditions that give rise to parasite aggregation which can be used in designing statistical sampling procedures, and in inferring the reasons that could strengthen the claim that aggregation can indeed occur in a wide-range of scenarios in nature.

Keywords: *Macroparasite, Aggregation, Negative binomial, Mechanistic model, Host-parasite interaction, Biology*

Melanin production of *Streptomyces* Sp. isolated from Meycauayan River sediments: potential industrial applications

Obusan, Marie Christine, Verdera, Aroin, Velarde, Michael C.

Melanin is a brown or black pigment that functions as protective agent against UV damage and as antioxidant. It is formed from L-tyrosine via tyrosinase activity followed by non-enzymatic reactions. This study reports the melanin production of a *Streptomyces* sp. (H28) isolated from the sediments of the Meycauayan tributary of the Meycauayan-Marilao-Obando River system (MMORS), one of the top 30 dirtiest rivers in the world. The melanin produced by the isolate was characterized in terms of quantity, response to metal ions, solubility, precipitation, heat stability, photooxidation, and antioxidant activity. Pigment production is induced by and increases with the presence of Cu^{2+} ions. The extracted melanin has absorbance at the expected UV-vis spectrum (200 – 700 nm), with peaks at around 230 – 260 nm that gradually decreases as it approaches the infrared region. The melanin produced is soluble in NaOH and precipitates in the presence of Cu^{2+} , Fe^{2+} , Mg^{2+} , and Mn^{2+} ions. It is also heat stable but subject to bleaching due to oxidation, reduction, and UV exposure. The synthesized melanin exhibited 65.09% free radical inhibition in DPPH assay. The tyrosinase activity of the isolate increased after six days in response to Cu^{2+} , however, incubation periods of nine and twelve days showed no increase in tyrosinase activity. *Streptomyces* sp. (H28) is a candidate for further studies involving enzyme activity and melanin synthesis.

Keywords: *Streptomyces, Melanin, Tyrosinase, Sediments, Meycauayan River, Biology*

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Metabolic profile and composition of endogeic earthworm *Pontoscolex corethrurus* gut bacterial community collected from Mt. Makiling, Laguna, Philippines

Simbahan, Jessica F., Supnet, Sarah Jean

Earthworm gut microflora is known to perform important functional traits related to the decomposition of organic matter in soil. However, studies on the composition and function of the earthworm gut bacterial community in the Philippines is very limited. *Pontoscolex corethrurus*, an endogeic earthworm species belonging to Family Glossoscolecidae (subclass Oligochaeta), is commonly found in tropical soils under undisturbed native vegetation. This study highlights the functional diversity of microbial communities found in the gut of *P. corethrurus* collected from Mt. Makiling in Los Baños, Laguna, Philippines. Microbial response or catabolic potential index of 0.986 was assessed using Average Well Color Development (AWCD). Richness (R) value of 69 was determined as the number of oxidized carbon substrates, and Shannon–Weaver index (H) value of 0.361 as richness and evenness of response was identified. These indices were calculated, following the community level physiological profiling (CLPP) using Biolog EcoPlate™. Analysis of variance (ANOVA) and principal component analysis (PCA) were used to demonstrate the differences of the bacterial functional diversity. Wells with positive substrate utilization were run in denaturing gradient gel electrophoresis (DGGE) and extracted for molecular identification of the bacteria with the highest substrate utilization. CLPP analysis, ANOVA and PCA indicated the functional diversity of earthworm gut bacterial community. DGGE analysis further confirmed the structure and composition of these bacterial communities that positively utilized different substrates.

Keywords: *Earthworm gut, Pontoscolex corethrurus, Biolog EcoPlate™, DGGE, Microbial community, Biology*

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Mineralization, biodegradation, and antagonistic activities of gut-associated bacteria and fungi of African nightcrawler, *Eudrilus eugeniae* (Kinberg, 1867)

Obusan, Marie Christine M. , Mapile, Maria Reynalen F.

Earthworms and their interactions with microorganisms offer beneficial effects that can improve organic matter decomposition, enhance nutrient availability, and suppress pathogens in the soil. In this study, microorganisms from the gut of *Eudrilus eugeniae* (Kinberg, 1867), commonly known as African nightcrawler or ANC, were isolated through pour plate method and screened for their activities using assays to confirm nitrogen fixation, phosphate solubilization, polyethylene utilization, and antagonistic potential. The identifications of eight bacterial and six fungal isolates were confirmed based on nearest phylogenetic affiliations. Fungal isolates *Aspergillus aculeatus*, *Aspergillus japonicus*, *Fomitopsis* sp., and *Penicillium citrinum* exhibited antagonistic activity against *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. Bacterial isolates *Aeromonas caviae* and *Bacillus xiamenensis* utilized low- and high-density polyethylene as carbon sources. These isolates were also found to have high phosphate solubilization index (2.55-2.67) with high amount of phosphate solubilized (*A. caviae*: 0.799; *B. xiamenensis*: 0.778) at decreasing pH (i.e. pH 7.0 to 4.0). *A. caviae* and *B. xiamenensis* also showed nitrogen-fixing activity which is supported by the detection of nifH gene (>300 bp) and high nitrogen content (50kg/ha NO₃-N) of vermicasts. The activities of these gut-associated bacteria and fungi must be further explored to optimize the use of ANC's casts and compost for agricultural, medical, and other applications.

Keywords: *Antagonistic activity, Earthworm, Microorganisms, Nitrogen fixation, Phosphate solubilization, Polyethylene utilization, Biology*

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First molecular evidence for bat betacoronavirus in Mindanao

Onggo, Lowela Siarot , Murao, Lyre Anni E. , Achondo, Marion John Michael M. , Valila, Agape Shelley D. , Burgos, Sammer C. , Bacus, Michael G. , Libre, Jr., Kemuel , Malbog, Kameela Monique A. , Rabaya, Ysabela Marie C. , Tampon, Nikki Vanesa T.

Coronaviruses (CoVs) are common agents of respiratory and gastrointestinal tract infections but are also considered as important emerging infectious disease (EID) agents that have led to global epidemics of severe respiratory disease. Human CoV EIDs have been proposed to have originated from bat CoVs (BtCoV). This study reports the detection of CoV in bats from the University of the Philippines (UP) Mindanao, Davao City using an optimized reverse transcription nested polymerase chain reaction (RT-nPCR) for bat CoV RNA-dependent RNA polymerase (RdRp) gene. Out of 49 bats, only one was positive for the virus (2.04% detection rate). Phylogenetic analysis demonstrated the genetic relatedness of the CoV, which was detected in the fruit bat *Macroglossus minimus*, to other bat and mammalian CoVs of betacoronavirus under sub-group 2d. The CoV also exhibited 94.55% identity and close genetic relationship with BtCoV 2265/Philippines/2010 from Luzon, Philippines, suggesting a common lineage of these viruses that may have pre-existed prior to biogeographic movements of bats in the country. This is the first reported detection of CoV in bats from Mindanao, hence further surveillance of circulating viruses in wildlife is recommended to expand the understanding of BtCoV evolution and potential for zoonosis. These findings also emphasize the need to limit potential zoonotic transmissions through bat-animal or human interactions by preserving natural habitats.

Keywords: *Bat coronaviruses, Betacoronavirus, Macroglossus minimus, Biology*

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Molecular identification of bacteria in *Siganus vermiculatus* (Valenciennes, 1835) collected from selected sites in Currimao, Ilocos Norte

Madigal James Paul T. , Pangan, Gerome C.

The study aimed to isolate, characterize, and identify bacteria associated with the mouth, gills and stomach of *Siganus vermiculatus* collected from Maglaoi Norte (Site 1) and Gaang River (Site 2) Currimao, Ilocos Norte. Bacterial flora between wild and cultured siganids samples were compared, and result showed that fish collected from wild contains a higher bacterial numbers (CFU ml⁻¹ of 5.33×10^3) compared to fish collected from cultured site (CFU ml⁻¹ = 2.85×10^2). There were 11 bacteria isolated, six (6) isolates from cultured and five (5) from wild siganids with different cultural characteristics. Gram staining affinity showed 90% of the bacterial isolates classified as Gram negative. Biochemical tests (sugar tolerance test) reveals two (2) among the 11 isolates tolerated 2.5% and 5% sugar concentrations. These two isolates were subjected to DNA extraction, PCR amplification and sequenced using their 16S rRNA region. After sequencing the v4/v6 16S Rna, BLAST and phylogenetic analyses, one (1) isolate showed 100% similarity to various strains of *Bacillus* spp. namely; *B. aryabhattai* strain B8W22; *B. flexus* strains SBMP3 and NBRC 15718 and the other isolate shared 99% identity to various *Proteus* spp. strains (*Proteus mirabilis* strains JCM 1669 and ATTC 29906 and one strain of *Proteus cibarius* JS9). Further verification with full 26S rRNA sequencing, isolation, and purification of the isolates and other physiological and biochemical tests should be done.

Keywords: *Molecular identification, 16S rRNA, Phylogenetic analysis, Bacterial flora, Gram staining affinity, Biology*

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Molecular identification of fake drugs: an example from *Antidesma buniis* (bignay) products in the Philippine market

Alejandro, Grecebio Jonathan D. , Alfeche, Niña Kathryn G. , Binag, Sam Dominic A. , Sayarot, Mark J. S. , Rodriguez, Gabriel D. A. , Estrella, Paul J. , Catamio, Marc E. L. , Baay, Lord M. S.

Years of research and quality control procedures of herbal medicinal products (HMPs) have revealed that adulteration, contamination and substitution are indeed present in the global market. Authenticity and the process of authentication remain to be a concern, especially as these products are utilized by consumers even before seeking proper medical care. In the Philippines, the HMP market is flourishing due to the abundance of pharmacologically important species, and the high level of ethnomedicinal knowledge is still widely accepted by the public. As such, herbal products from the *Antidesma buniis* (L.) Spreng, locally known as Bignay, are popular as medicine for various ailments of the circulatory and digestive systems. Though efficacy is guaranteed, the authenticity of the marketed products are still in question as several other herbal plants can provide the said benefits. The authenticity of the marketed HMPs was established by means of molecular techniques that made use of genetic data analyzed using the (1) Basic Local Alignment Search Tool (BLASTn) and (2) Standard Reference Material (SRM) Herbal barcode library for *Antidesma* spp. To establish the reliability of these methods, wild *Antidesma* spp. were also subjected to the protocol. The molecular analyses revealed that of the eleven (11) HMPs tested, only four (4) products were confirmed to be *Antidesma* sp. while the other seven (7) products were proven to be of different species. These results indicate that product safety should be reinforced with complete HMP authentication by the use of traditional methods supported by molecular data.

Keywords: *Antidesma buniis, DNA barcoding, Herbal medicinal products, Medicinal plants, Biology*

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Morphological characterization, meiotic behavior and pollen fertility of *Canna* (*Canna* x *generalis* LH Bailey and EZ Bailey)

Magdalita, Pablito M. , Mendiolo, Merlyn S. , Ondoy, Juar

The morphology, meiotic behavior and pollen fertility of selected 'Bandera Española' or *Canna* (*Canna* x *generalis* LH Bailey & EZ Bailey) were characterized. *Canna* 'Percy Lancaster' is a medium sized cultivar with branching habit, green and oval-shaped foliage with white margin and the stem is round and green. The panicles of flowers are open, yellow and heavily spotted with red, while the staminodes are large, edges are ruffled, and petals are yellow. *Canna* 'Yellow King Humbert' is also medium sized, has upright growth habit, and tillering is prolific with green and oblong shaped foliage. The flowers are cupped, yellow and the throat has red spots on yellow. *Canna* 'Wintzer's Colossal' is tall, tillering is average with branching habit, has green, ovoid shaped foliage. The flowers are open, red, staminodes are large, and rhizomes are thick, up to 3cm in diameter and purple. On the other hand, the meiotic behavior of hybrid 3 (light yellow x red orange) ($2n=18$) in metaphase I and metaphase II showed that some chromosomes aligned normally at the equatorial plate but laggards which are the bivalents that arrived late at the equatorial plate were also observed. The meiotic behavior of 'Percy Lancaster' ($2n=18$), in metaphase I showed that their chromosomes behaved mostly as univalent resulting from reduced chiasmata formation and abnormal behavior like laggards formation during metaphase I. Pairings observed were quadrivalents, trivalents and bivalents. Among the hybrids characterized, hybrid 3 (H3R1) has the highest percentage of fertile pollen grains at 96% while hybrid 4 (H4R2) has the lowest pollen fertility at 67%.

Keywords: *Canna*, Chromosome number, Meiosis, Morphology, Pollen fertility, Biology

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Morphological observations on the floral variations of niyog-niyogan (*Combretum indicum* (L.) DeFilipps)

Timog, Emmanuel Bonifacio S. , Gentallan, Renerio P. , Cejalvo, Reneliza D. , Endonela, Leah E. ,
Altoveros, Nestor C. , Borromeo, Teresita H. , Bartolome, Michael Cedric B.

Niyog-niyogan (*Combretum indicum* (L.) DeFilipps) is important both as a medicinal plant and an ornamental plant. The utilization of its mature fruit as vermifuge is recommended by Department of Health. In the Philippines, different floral types can be observed both in natural and cultivated settings; however, reports on the distinction among the floral types are limited. A study of the variations in floral structure of *C. indicum* was carried out. Seven variants of single and double flowers were classified on the basis of quantitative (petal length and width, hypanthium length, stigma length) and qualitative (petal shape, style type, relative length of stamens, relative length of stamen with the perianth) traits. Fruit set was noted in both floral types. Two single flower types were observed and were differentiated only by petal size (11 x 5 mm; 20 x 8 mm) and hypanthium length (50 mm; 90 mm). The double flower types, all of which were found in cultivation, were distinguished through qualitative attributes as (a) pin type, without stamens, (b) pin type, with exerted stamens, (c) pin type, with included stamens, (d) thrum type, with exerted stamens, and (e) tristylous type, with exerted stamens. This study to characterize *C. indicum* variants in the Philippines is relevant in elucidating the mechanisms of its pollination in order to formulate ways to increase fruit set and select variants for higher fruit set.

Keywords: *Combretum indicum*, Floral type, Single flower, Double flower, Biology

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Nematode endoparasites of invasive alien species (IAS) of amphibians in Paoay Lake, Ilocos Norte Province

Diesmos, Arvin C. , Diesmos, Mae Lowe L. , Endozo, Maria Crisselda A. , del Prado, Yñigo Luis C. , Pili, Arman N. , Sanchez, Kenneth Xavier O., Briones, Jonathan Carlo A.

Parasitism associated with invasive alien species (IAS) plays a huge role in emergence of wildlife diseases, even in zoonotic diseases. Unfortunately, the identity of alien parasites in the Philippines is yet to be known. The presence of exotic parasite species has dire implications on the health of Philippine native fauna. Frog hosts were retrieved in Paoay Lake on November 2018 and were examined for internal helminth infections. The study collected metazoan endoparasites found in the alimentary canal of three major invasive species in the Philippines namely the Giant Cane Toad *Rhinella marina* (Linnaeus 1758), Chinese Bullfrog *Hoplobatrachus rugulosus* (Wiegmann 1834) and Asian Painted Frog *Kaloula pulchra* Gray 1831; along with quantitative measures. The nematodes were initially identified as cosmocercids (Nematoda, Family Cosmocercidae). Among 33 inspected individuals, the study found *Kaloula pulchra* had highest prevalence of nematode infection (88%; 7 of 8 individuals infected), followed by *Hoplobatrachus rugulosus* (29%; 2 of 7) and *Rhinella marina* (17%; 3 of 18). Mean worm burdens of 3, 11 and 76 worms (accounting for 2 hyper-parasitized individuals) were found for the three IAS frogs, respectively. The parasitological assessment contributes the baseline information for IAS parasites currently present for the Northern Philippine region.

Keywords: *Endoparasites, Invasive species, Lake Paoay, Ilocos Norte,, Biodiversity, Biology*

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Nitrogen fixation and phosphate solubilization activities of gut-associated bacteria isolated from African night crawler (*Eudrilus Eugeniae* Kinberg, 1867)

Obusan, Marie Christine , Mapile, Maria Reynalen F.

Recognized as “ecosystem engineers,” earthworms play an important role in soil nutrient cycling. With the benefits offered by their decomposition activities and microbial interactions, it is of significance to explore the nutrient mineralization potential of their gut-associated microorganisms in relation to the nutrient content of their vermicasts. In this study, adult individuals of *Eudrilus eugeniae* Kinberg, 1867 or African night crawler were collected from the vermicompost facility of University of the Philippines Diliman, starved to accumulate their vermicasts, and dissected to obtain their gut samples for microbial isolation. Two bacterial isolates showed solubilization of inorganic phosphate on Pikovskaya medium with solubilization index (SI) ranging from 2.55 to 2.67. High phosphate availability (56-73 kg/ha) was measured in the vermicasts. Interestingly, all phosphate solubilizing isolates were also able to fix nitrogen on nitrogen-free malate medium. Nitrate nitrogen (NO₃-N) content of vermicasts (50 kg/ha) was found to be more than twice compared with the adjacent soil (20 kg/ha). 16S rRNA sequencing confirmed the genotypic identifications of the isolates showing highest homology (99%) to *Aeromonas* and *Bacillus* species previously reported for nitrogen fixation and phosphate solubilization activities. The gut-associated bacteria from *E. eugeniae* Kinberg, 1867 exhibit promising nitrogen-fixing and phosphate solubilizing activities that need to be further explored for various agricultural applications.

Keywords: *Gut-associated bacteria, Vermicasts, Nitrogen fixation, Phosphate solubilization, Eudrilus eugeniae, Biology*

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Optimization of a method to dry "tamilok" (*Teredo navalis*) soft tissue, extending the shelf life and increasing protein digestibility using U.V. irradiation

Dela Pena, Eve Rosary, Sugang, Raymond

A method for drying the soft tissues of wood worms or "tamilok" (*Teredo navalis*) was optimized employing a series of procedures for "salting out" soluble proteins using saturated solutions of potassium aluminum sulfate and potassium hydrogen tartrate. The dried material was then irradiated with ultra violet, u.v., to prolong the shelf life and make the proteins more digestible. Proximate analyses (wet, and ash-free dry mass, C, N, P as a percentage of wet and dry mass) were made on: (a.) wet tissues; (b.) dried (u.v.)- light irradiated soft tissues; and (c.) dried non-irradiated tissues. Results showed that there was no significant difference between the protein contents of wet/raw (30 ± 5 g /100 g), dried ultra violet (u.v.)- light irradiated soft tissues (28 ± 5), and dried non-irradiated tissues (29 ± 3). Drying extended the shelf life (prevented microbial decomposition and growth of molds) of raw/wet tissues up to seven (7) months while U.V. irradiation extended the shelf life of the dried tissues up to more than 7 months. U.V. irradiation improved protein availability in a fecal digestibility test of the dried tissues (0.82) compared to digestibility of the un-irradiated tissues (0.65) in growing rats. The study will have great applications in the nutritional supplements, food additives, pharmaceutical and cosmetics industry considering that woodworms were found to be attractive sources of edible proteins.

Keywords: *Tamilok, U.V. irradiation, Fecal digestibility, Proximate analysis, Biology*

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Pathogen screening of food products developed by some local government units in Ilocos Norte

Franco, Prima Fe R., Gaoat, Cecile

There are Local Government Units (LGUs) in Ilocos Norte that focus on the development of food products to augment the income of their constituents. Production of such food products is assisted by the Department of Science and Technology and the Department of Trade and Industry. To ensure the safety of their products, a study was conducted to determine microbial load and to detect pathogens on the developed food items. Pathogen screening is crucial to ensure safety of the products as well as the consumers. Using the traditional detection method, detection of the following was done: *Listeria monocytogenes*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Salmonella* and *Campylobacter*. The water used by the manufacturers was also tested for the presence of *E. coli*. Moreover, water activity using the water activity meter was measured to determine the probable shelf life of the products. Results show that pathogens are detected during the first round of testing. However, after discussing the results with the food handlers and after inculcating the importance of safety measures to eliminate pathogens and the danger of food contamination, products tested tremendously improved during the succeeding screening.

Keywords: *Pathogen, Microbial load, Food products, Food safety and detection, Biology*

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A PCR-based assay for the detection of *Schistosoma japonicum* from human samples
Obleopas, Romula A. , Schwem, Brian E. , del Rosario, Joanne Marie M. , Santos, Joy Ann P. , Pelovello, Marvin V. , Belizario, Vicente Y. Jr. , Destura, Raul V.

Schistosoma japonicum is the causative agent of schistosomiasis in the Philippines. Current diagnostics suffer from low sensitivity and accuracy, hence an accurate and reliable diagnosis of schistosomiasis is essential for its prevention and control. In this study, a PCR-based assay for the detection of *Schistosoma japonicum* for patient stool and serum samples was developed.

Three candidate primer sets targeting mitochondrial genes COX3, NAD4, and NAD5 were assessed. COX3 primer pair was used for the rest of the study for sensitivity, specificity, and performance testing. Lastly, the assay using COX3 primer pair was compared to Kato-Katz and circumoval precipitin test (COPT).

COX3 and NAD5 primers showed to be suitable for the assay as sequencing analyses gave high similarities of 96-98% for *S. japonicum*, while NAD4 showed no similarity to any organisms. The PCR-assay was shown to have a detection limit of 4ng/ul DNA and is specific only to *S. japonicum*. The assay detected seven out of ten *S. japonicum*-spiked stool samples and ten out of ten *S. japonicum*-spiked serum samples. Comparative performance testing with Kato-Katz and COPT showed high specificity of 100% for both samples, but low sensitivity for formalin-fixed stool samples and stored serum samples.

This study developed a sensitive and specific PCR-based assay to detect *S. japonicum* from human samples. Our results suggest that this PCR assay could be useful for the detection of *S. japonicum* in fresh clinical samples and can be further improved to be used as a reference to improve other diagnostic assays for schistosomiasis.

Keywords: *Schistosoma japonicum*, schistosomiasis, PCR, COX3, Biology

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Phenological assessment of selected indigenous timber species in Ilocos Norte
Ayson, Roseller , Garma, Sergia , Rosario, Joselito , Samsam, Charito

Seed shortage is oftentimes the limiting factors in scaling-up the rehabilitation of denuded areas. This is due to the unpredictable fruiting seasons of most trees and short viability of recalcitrant seeds. Hence, this study was conducted to provide information on the phenology of superior mother trees of selected indigenous timber species (ITS) to develop a seed calendar that could facilitate seed collection and planning of nursery operation and timely production of quantity planting stocks. The study was carried out in selected areas in Ilocos Norte where the superior mother trees of premium ITS are found. Six indigenous timber species namely: *Anisoptera thurifera*, *Vitex parviflora*, *Sindora supa*, *Dracontomelon dao*, *Intsia bijuga*, and *Wrightia pubescens* were evaluated. The vegetation profile, soil variables and agroclimatic factors were determined. Individual trees with diameter breast height greater than 20 cm were considered. Leafing, flowering, fruit development and maturation were observed once a month for 3 years. Results revealed that peak of flower bud inception of *V. parviflora*, *D. dao*, *W. pubescens* and *A. thurifera* starts after leaf flush during the first rain in May while flowering activity of *S. supa* and *I. bijuga* comes earlier during mid-summer. However, the flowering activity of *V. parviflora* continuously occurs towards the early dry months in January followed by fruit development and maturation. Fruit development and maturation had the longest phenophase of 8-9 months in *A. thurifera* and *W. pubescens*, 3-4 months in *V. parviflora*, 4-5 months in *I. bijuga* and 2-3 months in *D. dao* and *S. supa*. Timing of flowering and fruiting remains unchanged in almost all the timber species. Thus, the ideal time of collecting seed or fruit of *D. dao* is August – September, *V. parviflora* is September- October, *S. supa* is May – June, *I. bijuga* is October-November, and *A. thurifera* is April – May.

Keywords: Phenology, Indigenous timber species, Seed shortage, Phenophase, Seed calendar, Biology

Phytochemical analysis and toxicological screening of crude aqueous extract from the roots of *Derris elliptica* Benth. (Tubli) used as a piscicide to *Oreochromis niloticus*

Apduhan, Jucil Coleen D., Jumawan, Joycelyn C.

Tubli plant *Derris elliptica* root crude aqueous extract is indigenously used as a piscicide in many freshwater bodies. However, the mechanism of its toxic effect is largely unknown. Six classified treatments (distilled water), 0.04, 0.05, 0.07, 0.14, 0.21, 0.28 mg/L of *D. elliptica* root powder solutions were utilized as test treatments to arrive at set concentration with 50% fish mortality (0.13 mg/L). Phytochemical screening revealed the presence of flavonoids, saponin, steroids and alkaloids in crude aqueous extract of *D. elliptica* roots. Mature tilapia were eventually exposed to 0.13 mg/L of crude aqueous extracts of *D. elliptica* for 24 hours to examine for acute toxicity under laboratory conditions. Toxic response exhibited by the fish includes erratic swimming, slow opercular movement, gulping for air, loss of reflex and settling at the bottom of the tank. Hematological indices were assessed (RBC, WBC, and Platelets). Monocyte, eosinophils, and platelets counts were highly significant in treated fishes whereas erythrocyte counts were significantly low. Treated fish experienced lymphopenia, hemorrhagic anemia, and blood clotting. Hypertrophy and hyperplasia of the gill epithelium and mucous cells, synechia, aneurysm, necrosis and cell degeneration and leukocyte infiltration were observed whereas the liver exhibited inflammation, necrosis, clogged vein and hyaline droplet degeneration in the hepatic tissue. The kidney showed a reduction of Bowman's space, cellular rupture, necrosis, tubular, granular and nuclear degeneration and changes in renal tissue. The results show that tubli root extract exposure lowered RBCs and hemoglobin and caused irreparable alterations in the vital organs of *O. niloticus* causing immediate death to fishes exposed to acute conditions.

Keywords: *Indigenous piscicide, Tubli, Rotenone, Biology*

Phytoplankton diversity and abundance during a *Pyrodinium* bloom in Irong-Irong Bay, Western Samar, Philippines (September-December 2017)

Yap-Dejeto, Leni G., Folio, Fatima Mae P.

One of the most persistent red tide event caused by the dinoflagellate *Pyrodinium bahamense* happened in Irong-Irong Bay. This started in 2015 and lasted for more than two years as of this writing (2018). Irong-Irong Bay, despite having mariculture sites has very few data with regards to this point of concern. Field sampling was done monthly from September to December 2017. Physico-chemical parameters such as temperature, pH, salinity, depth, turbidity, current velocity, light intensity, and total suspended solids as well as nitrate, phosphate, and chlorophyll-a were recorded. A 20 µm mesh size plankton net with 30 cm diameter and 1 m length, and a bucket yielded 65 phytoplankton species. Lowest and highest cell density was recorded during the month of November (3.1×10^4 cells/L) and December (37×10^4 cells/L), respectively. *Pyrodinium bahamense* dominated during the months of September (3.1×10^4 cells/L) and November (0.43×10^4 cells/L) while *Skeletonema* dominated during the months of October (9.9×10^4 cells/L) and December (29×10^4 cells/L). *P. bahamense* was present in all sampling months with a total average cell density of 0.080×10^4 cells/L. It is lower compared to the 2016 study with a total average cell density of 0.77×10^4 cells/L. *Noctiluca scintillans*, which is a potential predator of *P. bahamense*, was also present in all sampling months. This species might have largely affected the abundance of *P. bahamense* in the area. It reached its peak during the month of November with an average cell density of 0.32×10^4 cells/L.

Keywords: *Pyrodinium bahamense, Noctiluca scintillans, Skeletonema, Irong-Irong Bay, Philippines, Biology*

Population parameters of Japanese threadfin bream (*Nemipterus japonicus*, Bloch 1791) in Manila Bay, Philippines

Lopez, Grace DV. , Diddiquin, Noimie Rose B., Torres, Francisco SB. , Santos, Mudjekeewis D.

Japanese threadfin bream (*Nemipterus japonicus*, Bloch 1791) formed about 89% of nemipterid catches in Manila Bay landed catch from January 2012 to December 2015. The growth and mortality parameters, exploitation ratio and annual recruitment pattern for this species were estimated from raised length-frequency data collected in four (4) years. Monthly data collection reported the regular appearance of this species in the landed catch. Results of the length frequency analysis are summarized. The growth parameters of this species from 2012-2015 changes per year as follows, 2012 ($L_{\infty} = 27.50$ cm, $k = 0.57$ yr⁻¹); 2013 ($L_{\infty} = 25.96$ cm; $k = 0.62$ yr⁻¹); 2014 ($L_{\infty} = 26.88$ cm; $k = 0.78$ yr⁻¹); and 2015 ($L_{\infty} = 28.31$ cm; $k = 0.72$ yr⁻¹) though results showed insignificant difference from published studies in Manila Bay. For the mortality parameters, L_{50} and E -values results also showed a slight increase in values compared to previous studies. The E -values of this threadfin bream nearly exceeded its optimum exploitation value of $E=0.5$ in 2013 and 2014 but exceeded in 2012 and 2015. This indicates that overharvesting is already happening and needs reduction in the fishing effort. This study is the first estimation of growth and mortality parameters of *Nemipterus japonicus* in the Manila Bay. Results obtained can be helpful for the sustainable management of this species in the bay.

Keywords: *Nemipterus japonicus*, *Nemipterids*, *Growth and mortality parameters*, *Exploitation rate*, *Biology*

Populations structure of black mussel (*Mytella Charruana*) in Lingayes Gulf, Philippines

Valdez, Jr., Marcos B. , Thomas, Jr., Rey C. , Pabello, Rhaiza P. , Guiang, Pamela E. , Gonzales, Ivan Moses M.

The proliferation of exotic mussels was recently reported in Manila Bay and Lingayen Gulf. This particular invasive mussel is outcompeting other species present in these waters. Previous studies indicated that the exotic mussels are *Mytella charruana*. However, it remains unclear whether the Lingayen Gulf populations are panmictic. Thus, this study explored the morphology, reproductive biology and population genetic structure of *M. charruana* from the Lingayen Gulf. These exotic mussels are found to be longer by 2 cm compared to *charru* mussels found in their native habitat. Likewise, examination of gonads indicated a female-dominated population, consisting of up to 89% of the total population. Lastly, mitochondrial *COI* gene sequences showed that majority of the Philippine *M. charruana* shares the same haplotype with those found from the coasts of Brazil, South America. Moreover, the *COI* gene sequences data showed a cryptic male mitochondrial DNA haplotype. Taken together, findings from this study can provide crucial information regarding the population structure of this potential invasive species. Such information might provide insights for fisheries managers in curbing the population growth of this exotic mussel species in the Philippine waters.

Keywords: *Mytella charruana*, *Lingayen Gulf*, *Invasive species*, *Population structure*, *Biology*

Predicting mangrove suitable areas using GIS weighted suitability analysis in Oriental Mindoro, Philippines: a decision support tool in management of critical resource

Macandog, Damasa M. , Jumawan, Jess H.

A weighted suitability analysis was conducted in predicting suitable areas for mangrove rehabilitation in Oriental Mindoro, Philippines. There were six thematic maps used, projected in PCS zone 51N, rasterized and reclassified. Weighted overlay technique was implemented using a straightforward score class ranging from 1-3. Weight influences were assigned to mangrove areas (30%), land cover (20%), rivers (15%), roads (15%), soil types (10%) and slope (10%). The workflow was made to run in ModelBuilder feature of the ArcMap. Mangrove suitability map was generated in three suitability classes. The area covered by each suitability class was extracted using the zonal geometry tool of the spatial analyst extension. There were 10 out of 15 municipalities in the province detected with effective suitable areas. The predicted suitable areas had a total of 75,433.20 km². The municipality of Mansalay gave the highest in low suitability (13,549.26 km²), Calapan City for mid suitability (15,321.13 km²), and Naujan (891.11 km²) for high suitability areas. Overall, Calapan City has the highest computed suitability areas (19,847.28 km²) regardless of the categories. The generated data could be efficiently utilized in planning and management of mangrove resources. The study demonstrated the applicability of GIS framework as decision support tool for potential mangrove rehabilitation initiatives.

Keywords: *GIS, Weighted Suitability, Mangroves, Oriental Mindoro, Biology*

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Predicting potential distribution of zooplankton species in Philippine freshwater ecosystems utilizing species distribution modeling

Lopez, Mark Louie D., Papa, Rey Donne S. , Tuanmu, Mao-Ning

Species distribution modeling (SDM) is a widely used method to predict possible species distribution range by using known occurrence data with environmental conditions in a certain geographic region. This method has been comprehensively used in terrestrial organisms but rarely utilized for aquatic species. In this study, SDM for seven Philippine freshwater zooplankton species, including the invasive species, *Arctodiaptomus dorsalis* were constructed in MaxEnt to define species distribution, and for non-invasive species, facilitate conservation and protection of their habitats. The models were then evaluated using three methods: AUC, Cohen's Kappa, and True Skill Statistics (TSS). Of the species tested, all models achieved acceptable evaluation results (AUC > 0.70; Kappa and TSS > 0.50), except for *Moina micrura* and *Mesocyclops varicans*. Moreover, flow regime, topographic slope, and soil organic content around aquatic bodies have a significant contribution to the constructed SDM for most species. This study shows the potential use of SDM methods like MaxEnt in predicting the possible distribution of zooplankton species across river and lake networks in the Philippines, especially in determining the extent of distribution of some invasive taxa. This inferential capacity of SDM in freshwater zooplankton opens doors to different predictive analyses that can be used in drafting sound conservation and management policies.

Keywords: *Species distribution modeling, Zooplankton, Copepoda, Cladocera, Freshwater ecosystem, Biology*

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Presence of pathogenic bacteria in drinking waters of selected public elementary schools of Iligan City, Philippines

Yu, Irene G. , Opena, Edward Laurence L. , Baguio, Mirasol L. , Nagba, Mitchell Ameen Rey M., Palangan, Nikki Karr Mei C.

This study reports the presence of pathogenic bacteria in the drinking water of Iligan City Central School and Iligan City North 1 Central School. After the inoculation and identification, the bacteria found in drinking water sample from Iligan City Central School were identified as *Klebsiella pneumonia*, *Enterobacter aerogenes*, *Escherichia coli*, *Klebsiella oxytoca* and *Salmonella sp.* While in Iligan City North 1 Central School sample, *E. coli*, *Salmonella sp.* and *Shigella sp.* were found. In the body, these microorganisms can be pathogenic and has the ability to cause diseases if the immune system is low. A regular sanitation team from the local water district, non-government organizations and other private sectors must conduct evaluation in the public drinking water system of the said locality.

Keywords: *Drinking water, Public school, Pathogenic bacteria, Biology*

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Production, purification, and characterization of β -mannanase from *Aspergillus niger*

Ledesma, Carlene Rome , Rosal, Reuben James, Cambiador, Christian Jay , Reyes, Jhon Lloyd

β -Mannanases are endo-acting hydrolases that attack the internal glycosidic bonds of the mannan backbone chain, which in the recent years, have gained interest due to its various industrial applications in food and feed technology, coffee extraction, oil drilling, and detergent industry. As a result, fungal sources have been used for their ability to produce sizable amounts of extracellular enzymes. In this study, β -mannanase from *Aspergillus niger* was produced via solid-state fermentation and purified by ammonium sulfate precipitation, exhibiting a specific activity of 19.27-U/mg protein. The SDS-PAGE of the purified enzyme showed a single protein band and an estimated molecular weight of 64 kDa. The β -mannanase was optimally active at pH 4.0 and 30 °C. It was thermostable and retained 62 % activity after 3 hours at 30 °C. The enzyme was stable over a broad pH range of 3.0 to 10.0.

Keywords: *B-mannanase, Aspergillus niger, Solid-state fermentation, Enzyme purification, Enzyme characterization, Biology*

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Proliferative activities of Benguet legume cultivars on a breast epithelial cell line

Versoza, Dhennis T. , Nicolas, Marilou G. , Quiming, Noel S. , Dela Cruz, John Carlo F. , Velarde, Michael C. , Carag, Harold M. , Chong, Conrad Allan C. , Diaz, Leomir A. , Marquez, Cielo Mae D.

Legumes are extensively cultivated around the globe for human consumption and may contain potential estrogenic activities that interfere with normal physiology and pathophysiology. However, different cultivars grown in different regions of the world have different activities that may provide different nutritional value. Hence, in this study, legume cultivars from Benguet, a major source of legumes and other highland vegetables in Northern Philippines, were evaluated for their proliferative effects in the breast epithelial cancer cell line MCF7. Ethyl

acetate extracts from *Phaseolus vulgaris* L. and *Vigna unguiculata* (L.) Walp., but not from *Tamarindus indica* L. and *Pisum sativum* L., induced slight proliferative effects on MCF7 cells at a low dose but reduced cell number at a higher dose. The proliferative effect of the extracts is likely estrogen receptor (ER)-dependent, as the same legume extracts only displayed inhibitory effects in the ER-negative MDA-MB-231 cells. Similar proliferative effects of *P. vulgaris* and *V. unguiculata* ethyl acetate extracts were reflected in their similar HPLC profiles, which is distinct from the HPLC profile of the *T. indica* ethyl acetate extract. Overall, our findings show that certain legumes from Benguet have slight proliferative activities in MCF7 cells, implying their potential estrogenic activities.

Keywords: Beans, Extracts, Peas, Philippine plants, Seeds, Biology

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0141

Rapid detection of tilapia lake virus (TiLV) by loop-mediated isothermal amplification (LAMP)

Samora, Vanessa , Genavia, Shana , Herrera, Paula , Geronimo, Marielle , De Vera, Essl , Go, Marielle, Choresca, Jr., Casiano , Maningas, Mary Beth B.

Tilapia Lake Virus (TiLV) is a novel orthomyxo-like pathogen associated with tilapia aquaculture disease outbreaks. Loop-Mediated Isothermal Amplification (LAMP), is an emerging, rapid and cost effective diagnostic method proven to be as sensitive and specific as conventional PCR. This study aims to develop a LAMP based diagnostic method with gene specific primers that can be utilized by fish farmers and small-scale laboratories in the Philippines. LAMP assay was optimized at 60°C for TiLV detection using the designed primers (F3, B3, FIP, BIP), targeting segment 3 of the TiLV genome. PCR results were notably consistent with LAMP results. The expected band size of 415 bp and smearing pattern of the amplified Philippine TiLV isolate were produced in the PCR and LAMP assay, respectively. Fluorescence was also detected under both UV and black light, confirming positive results. PCR assay indicated a detection limit of 2.86×10^{-5} µg/mL, but this detection limit was significantly surpassed by LAMP assay. Comparative genetic analysis revealed genetic variations of the Philippine strain to the prototype Israel strain, sharing 94% nucleotide identity. To conclude, LAMP provides a better alternative for TiLV detection as compared to PCR, providing field based or point of care diagnostics. This is also the first report of the use of LAMP for TiLV detection in the world.

Keywords: Tilapia, Tilapia lake virus, Loop-mediated isothermal amplification, Diagnostic, Biology

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0142

Reinforcing infrageneric classification of Philippine *Ophiorrhiza* L. (Rubiaceae): establishing species delineation using morphology and DNA data

Alfeche, Niña Kathryn G. , Sunga, Allanice Lizzette S. , Santos, Julia L. , Omaña, Trisha Mae G. , Odulio, Eiana Joshier A., Alejandro, Grecebio Jonathan D.

The identification and classification of species remain the stepping stone in the exploration of scientific possibilities in all living organisms, especially in the plant sciences. The questionable status and uncertain species delineation confine the mastery and further utilization of these species. In the extensive field survey for interesting Philippine rubiaceous species, two endemic *Ophiorrhiza* L. species from Agusan, Mindanao (*O. caespitulos* Elmer and *O. curtiflora* Elmer) and one endemic from Negros Oriental, Visayas (*O. biflora* Elmer) were collected.

Morphological examination was conducted to determine both identity and comprehensive characteristics of the species. All samples were subjected to molecular analysis utilizing the nuclear ITS and chloroplast *rbcL* and *rps16* regions to infer phylogenetic placement within the Philippine *Ophiorrhiza*. The recollection of these species provided additional morphological and geographical distribution data. The combined morphological and molecular data also supported the delineation of the Philippine *Ophiorrhiza* into two major subclades defined by the position of the inflorescences, persistence of the stipules and pubescence of the floral parts. The larger, suffrutescent *O. caespitulos* and *O. curtiflora* of Agusan, with its pseudo-axillary inflorescences, deciduous stipules and glabrous stems showed affinity to species of the same morphological traits (subclade A) while *O. biflora* of Negros was more closely related to the species with opposite traits (subclade B). Ultimately, proper identification and classification will render these species useful for further studies in ethno-medicine and drug discovery.

Keywords: *Delineation, Endemic, Molecular phylogeny, Ophiorrhiza L., Biology*

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0143

The rice lesion mimic mutant (*Lms*) with enhanced resistance to drought
Yaegashi, Hiroki , Takagi, Hiroki , Fekih, Rym , Tamiru, Muluneh , Abe, Akira , Undan, Jerwin R., Terauchi, Ryohei

Although a substantial number of mutants that show spontaneous cell death or necrotic lesions in the absence of pathogens and abiotic stresses, commonly called lesion mimic mutants (LMMs), have been identified in multiple crop species, only a few of the genes associated with the LMM phenotypes are characterized so far. Based on the identity of these genes, it has been suggested that most lesion mimic phenotypes are caused by physiological alterations that affect the plants response to biotic and abiotic stress. Some LMMs are also known to confer resistance to multiple isolates of rice blast and bacterial blight, and are thus associated with defense responses. Here we report the identification of a rice *lesion mimic and senescence (lms)* mutant, the isolation of the corresponding LMS gene harboring the mutations responsible for the abnormal mutant phenotypes, as well as show that the *lms* mutant exhibits an enhanced tolerance to drought.

Keywords: *Lesion mimic, Necrotic, LMS gene, Cell death, Biology*

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0144

Screening of bacteriophages against different genotypes of extended-spectrum β -lactamase (ESBL)-producing *Klebsiella pneumoniae* isolated from five hospitals in Cavite and Metro Manila, Philippines
Balolong, Marilen P. , Monzales, Janine M. , Martin, Janine L. , Cornista, Joel C.

Extended-spectrum β -lactamase (ESBL) *K. pneumoniae* infections are emerging health problem in the Philippines. Recently, bacteriophages have been explored to target several antibiotic resistant bacteria as a potential alternative therapeutic option to conventional antibiotics.

This study isolated extended-spectrum β -lactamase (ESBL) producing *K. pneumoniae* harboring different β -lactamase genes to evaluate the host range specificity of an isolated bacteriophages.

K. pneumoniae were isolated from five selected hospitals in Cavite and Metro Manila, Philippines and its ESBL-production was determined through the Phenotypic Confirmatory Disc Diffusion Test (PCDDT). The identity of

the isolates was then confirmed by amplification and sequencing of the 16 rRNA gene. The type of β -lactamase genes carried by the *K. pneumoniae* ESBL-positive strains was detected by amplification of the bla

Keywords: ESBL, beta-lactamase genes, *K. pneumoniae*, bacteriophage, phage therapy, Biology

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0145

Solanum melongena* (eggplant) crude anthocyanin extract and delphinidin-3-glucoside protects *Caenorhabditis elegans* against *Staphylococcus aureus* and *Klebsiella pneumoniae

Ching, Angela C. , Rentutar, Juleen A. , Kim, Jillen P. , Gamit, Andrei Luis P. , Acero, Romina Roan G. , Roxas, Chelsea Kaye F. , John Sylvester B. Nas,, Saludaes, Alaica Q.

During infection, ROS signaling is activated to protect the cells from invading microorganisms. However, high level of ROS may also damage the host tissue. The anthocyanin delphinidin is known to have a strong antioxidant activity which protects cells from oxidative damage. We explored the potential of crude anthocyanin extract from the fruit of *Solanum melongena* (Eggplant) and Delphinidin-3- glucoside in enhancing the innate immunity in *Caenorhabditis elegans* against *Staphylococcus aureus* and *Klebsiella pneumoniae*.

We used *Caenorhabditis elegans* to study innate immune response because it lacks adaptive immunity. First, we determined the sublethal concentration of *S. melongena* crude anthocyanin extract (SMCAE) and Delphinidin-3-glucoside (D3G) in *C. elegans*. We used the sublethal concentration of SMCAE and D3G to supplement the nematodes during its exposure to *S. aureus* and *K. pneumoniae*. We then observed its survival rate until day five post-L4. We also tested SMCAE and D3G for probable antimicrobial activity against *Staphylococcus aureus* and *Klebsiella pneumoniae*.

We found out that both SMCAE and D3G showed no inhibitory effect on the growth of the bacteria. However, both SMCAE and D3G enhanced the survival of the nematode when exposed to *S. aureus* and *K. pneumoniae*. Overall, we speculate that the anthocyanin delphinidin in *S. melongena* crude extract protected the *C. elegans* against *S. aureus* and *K. pneumoniae* infection through its antioxidant activity.

Keywords: Anthocyanin, delphinidin, innate immunity, *Caenorhabditis elegans*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, Biology

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0146

Species composition of the macrofouling community in South Harbor Manila Bay during the northeast monsoon period

Valenzuela, Rafael Lorenzo , Ocampo, Melody Anne , Trinidad, Claire, Vallejo, Jr., Benjamin

Manila Bay is one of the most important bodies of water in the Philippines. Within it is the Port of Manila which facilitates international logistics via its South Harbor. International vessels carry macrofoulers from foreign waters. When an introduced fouling organism is transported and established into a native fouling community, it may become invasive. This study assessed the species composition of the macrofouling community in South Harbor, Manila Bay during the northeast monsoon period. Nine fouler collectors adapted from the North Pacific Marine Sciences Organization (PICES) were submerged in five sampling points in Manila Bay on Oct 2017 until Feb 2018. Identification was done via morphological and CO1 gene analyses. A total of 18,830 organisms were classified into 17 families. For the first two months, *Amphibalanus* sp. was most abundant; in succeeding months, polychaetes became most abundant. This shift is attributed to intraspecific competition within barnacles and the reproductive pattern of polychaetes. Diversity and richness values across sites increased, a common trend in

primary succession events. New macrofoulers were reported: *Barbatia* sp., *Membranipora* sp., a Stylochid flatworm, a Venerid clam, and Hesionid, Phyllodocid and Cirratulid polychaetes. Non-indigenous species were observed: *Mytilopsis* sp., *Mytella* sp., *Brachidontes* sp., *Hydroides* sp. and Family Spionidae. These species are potentially invasive and may alter the ecosystem. Hence continuous monitoring is being done.

Keywords: Fouling, Manila Bay, Species Composition, DNA Barcoding, Biology

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0147

Species diversity and endemism of herpetofauna in Basilisa and Loreto near mines sites, Province of Dinagat Islands, Caraga Region, Philippines

Boucher, Shawn Joshua P. , Abellano, Christine Joy B. , Fernandez-Gamalinda, Eve V.

Herpetofauna is ecologically significant in maintaining the balance of many ecosystems in the Province of Dinagat Islands, Mindanao, Philippines. With the aim to contribute to the very few scientific studies on the assessment and monitoring studies in the diversity, abundance, distribution, and endemism of herpetofauna in the selected sites of the Province of the Dinagat Islands, this study was conducted. The actual assessment was done in the selected sites of Loreto and Basilisa in the months of November 2017, April and June 2018 using the transect method, pitfall traps, and extensive opportunistic sampling. A total of 38 significant herpetofaunal species belonging to 15 families and 33 genera were identified and recorded with high endemism of 76%. The most abundant species observed in the sampling sites were *Limnonectes magnus* (N=246, 36%) and *Pulchrana grandocula* (N=234, 34%). Basilisa had the highest species diversity with $H' = 2.27$ and 25 Philippine endemic species (66%). The presence of endemic, near threatened, vulnerable, and endangered species indicates that the sampling sites are essential habitats for reptilian fauna. However, some of the habitats were observed to be disturbed by some anthropogenic activities that will cause the decline of the reptilian population in the area, which requires immediate attention and conservation.

Keywords: Species richness, Abundance, Mining, Endemism, Vulnerable, Anthropogenic activities, Biology

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0148

Study on aflatoxin production of *Aspergillus* species isolated from Philippine dried fish products using LC-MS/MS

Dacuya, Aaron C. , Dela Cruz, Jeane A. , Dela Cruz, Thomas Edison E. , Ebarvia, Madeline L.

Mycotoxin contamination due to toxigenic fungi occurs frequently in various food commodities. These can have serious human and animal health risks. In the Philippines, dried fish is still widely considered as an important commodity due to its availability in the market and ease of processing. Testing of these food products in the market ensures its safety. This study entails the evaluation of aflatoxin-producing *Aspergillus* from Philippine dried fish products. Thirty-one samples of eleven types of dried fish products from nine local markets were collected for the isolation of toxigenic fungi. A total of 115 *Aspergillus* isolates were recorded from all the dried fish products. Morphological characterization grouped the isolates into nine morphospecies. Identification of these fungi using sequence analysis of the ITS genes and morphocultural characterization confirmed their identities as *Aspergillus alliaceus*, *A. clavatus*, *A. flavus*, *A. niger*, *A. ochraceus*, *A. oryzae*, *A. steynii*, *A. tamarii* var. 1, and *A. tamarii* var. 2. The nine morphospecies were cultured on Malt Extract Broth for 14 days for the detection of aflatoxin. Determination of aflatoxin was done using LC-MS/MS. Results showed that all of the *Aspergillus* cultures were positive for aflatoxin production. Different levels of aflatoxin were detected but still need further

confirmation and quantification. *Aspergillus* species isolated on the dried fish products are capable of aflatoxin production after the 14-day incubation period.

Keywords: *Aflatoxin, Aspergillus, Dried fish products, Mycotoxin, Biology*

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0149

Toxicity and anti-diabetic activity of serpentina (*Andrographis paniculata* Burm F.) leaf crude extract in induced - hyperglycemic swiss mice (*Mus musculus* L.)

Macni, Kristel Joy J., Blanco, Ma. Tereza A.

One of the leading causes of mortality in the Philippines is diabetes mellitus (DM) because most diabetic patients rely on “out-of-pocket” expenses for a daily medication. Thus, this study aimed to evaluate the potential of serpentina (*Andrographis paniculata* Burm F.) in lowering blood glucose of induced diabetic swiss mice (*Mus musculus* L.). Specifically, it aimed to (1) assess the level of toxicity of serpentina leaf crude extract (SLCE) using Brine Shrimp Test; (2) determine the blood glucose level of white mice before and after treatment application; and (3) determine the effect of SLCE in lowering the blood glucose as compared to commercially available anti diabetic drugs. The protocols used in the study were reviewed and approved by Institutional Animal Care Facility Unit (IACUC) and Bureau of Animal Industry. The effects of the SLCE on the lethality of brine shrimps were reported in terms of LD50 and results showed that SLCE is toxic to the brine shrimp at a concentration of 1,000 µg/ml and could be taken at 188.41 mg/kg of body weight. After a week of inducing diabetes and two weeks of treating the mice, the potential of SLE in lowering the blood glucose level at a dose of 200 mg/kg was observed. The weight of the mice dramatically increased after induction and after three days of treatment. The study revealed that serpentina leaf crude extract possesses anti diabetic activity.

Keywords: *Toxicity, Anti-diabetic, Brine-shrimp, Hyperglycemic, Biology*

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2019 July,
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NP

0150

Tracing the source of the non-native Philippine population of the greenhouse frog *Eleutherodactylus planirostris* (Cope, 1862) through DNA barcodes

Sy, Emerson Y. , Ong, Perry S. , Fontanilla, Ian Kendrick C. , Que, Gerard Clinton L.

Eleutherodactylus planirostris (Cope 1862), commonly called the Greenhouse Frog, is an insectivorous, direct-developing frog native to the Caribbean. It has been widely introduced outside of its native range and has been known to reach population densities of about 12,500 frogs per hectare, posing a potential ecological threat in areas of its introduction, especially to local insect populations. Recently, the species has been detected on several islands throughout the Philippines. Samples for this study were obtained from two locations in Quezon City (Luzon Island) and one location in Bacolod City (Negros Island). DNA barcoding using three genes (*Cytochrome b*, 16S rDNA, and *Cytochrome Oxidase subunit 1*) was performed with the objective of identifying the source population of Philippine *E. planirostris*. Our results indicate that *E. planirostris* samples in the Philippines are identical genetically to populations in Hawai'i and Florida, USA and are closely related to an individual from Matanzas, Cuba. A haplotype network built using the Fitch algorithm also supports the Cuban origin of the Philippine samples. Moreover, the Philippine specimens have nearly identical sequences for all three genes, which may have implications on its success as an introduced species.

Keywords: *DNA Barcoding, Eleutherodactylus planirostris, cytb, 16S, cox1, Cuba, Biology*

**Transcript and genomic analysis of OSBADH1 in CLSU aromatic rice (*Oryza sativa* L.)
accessions under saline condition**

Undan, Jerwin R. , Javier, Starlene M. , Aquino, John Dave C. , Lapuz, Resean R.

The relation of BADH1 to aroma and salinity stress was investigated through stress evaluation, sequence and gene expression analysis using the selected aromatic rice accessions from Central Luzon State University. Polymorphisms including SNPs, insertion and deletion were observed in genomic analysis between the tolerant accessions during saline condition. On the other hand, OsBADH1 transcript level in tolerant varieties revealed that during salt treatment, the salt tolerant check Pokkali and moderately salt tolerant accession Leyte Special have increased transcript level compared to non-treated saline condition relative to housekeeping gene actin. The downstream investigation of the OsBADH1 using genomic and transcriptomic approach is important information to elucidate the molecular mechanism of fragrance development among aromatic rice in CLSU and its response to abiotic stresses.

Keywords: *OsBADH1, Polymorphism, Aroma, Genomics, Transcriptomics, Biology*

**Tree species diversity and stand structure of the forest patch in Baganihan, Marilog
Forest Reserve, Southern Philippines**

Amoroso, Victor B. , Acma, Florfe M. , Salolog, Mary Cor S. , Coritico, Fulgent P.

Tree diversity, stand structure and composition were conducted in the forest patch of Barangay Baganihan, Marilog forest reserve, Davao City. Sixteen 20 x 20 m plots (at 1,224-1,240 m asl) were established in the area. A total of 215 individuals of 25 families, 24 genera, and 32 tree species were recorded. Analyses of the data showed that the forest in the area can be categorized as montane forest based on forest structure (average diameter, height, canopy cover) and species composition. *Palaquium philippense*, *Syzygium tula*, and *Astronia ferruginea* has the highest species importance values. Shannon-Weiner index (H') is relatively high when compared to the other mountain ecosystems in Mindanao with $H' = 1.38$. Three threatened species were noted viz., *Agathis philippinensis*, *Palaquium philippinense* as vulnerable, while *Cinnamomum mercadoi* as other threatened species. Eight (8) endemic species were documented, viz., *Alstonia parvifolia*, *Dillenia megalantha*, *Lithocarpus submonticolus*, *Cinnamomum mercadoi*, *Litsea segregata*, *Syzygium tula*, *Aidia pulcherrima* and *Palaquium philippense*. At present, the biodiversity in the area is under threat due to the different disturbances. The present study has helped the indigenous peoples of Marilog District in deciding the tree species for the Assisted Natural Regeneration (ANR) activity in Marilog forest reserve.

Keywords: *Species richness, Forest structure, Tree profile, Mindanao, Biology*

Utilization of natural local dyes in loop-mediated isothermal amplification (LAMP) products for the colorimetric nucleic acid detection of various pathogens in shrimp

Villaflores, Oliver B. , Genavia, Shana , Malabuyoc, Julianne Marie A. , Rasul, Janel Zahra P. , Besid, Krister Paul A. , De Ocampo, Joshua Mari D., Maningas, Mary Beth B.

Outbreaks of lethal diseases such as White Spot Syndrome Virus (WSSV) and *Vibrio parahaemolyticus* in shrimp farms increased mortality rate and induced a decline in the Philippine shrimp production. Early detection using the Loop-Mediated Isothermal Amplification (LAMP) technique is the best option to mitigate the effects of virulent infection. Utilizing local dye sources through colorimetric nucleic acid detection can optimize farmer accessibility and cost-efficiency. Through this method, selected local plants' pigments were screened to observe their potential as an alternative visual dye to commercial dyes used in LAMP today. Extracted dyes from Turmeric and Annatto showed significant differences in results between both positive and negative controls when tested on both pathogens. The distinct color reaction of the aforementioned natural dyes proves efficiency in their function as a nucleic acid stain as well as their capability as a visual dye in detection. Therefore, the utilization of natural, local dyes as an alternative holds great promise, which allows rapid detection of pathogens with resources more readily at reach, especially in times of critical urgency.

Keywords: *WSSV, Vibrio parahaemolyticus, Lamp, Colorimetric nucleic acid detection, Natural dyes, Biology*

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NP

Visual census surveys of reef fishes in marine protected areas of Lanuza Bay, Surigao del Sur

Seronay, Romell A. , Masangcay, Shirlamaine Irina G., Calagui, Laurence B.

Reef fishes are important food sources and act as key indicators because they are highly affected by any change in an ecosystem. Assessment parameters such as species richness, density and biomass allow us to measure the condition of the reef ecosystem. To determine the status of reef fishes in Lanuza Bay, nineteen Marine Protected Areas (MPAs) from Cantilan, Carrascal, Lanuza, Cortes and Tandag, Surigao del Sur were assessed from September 2018 to November 2018 by evaluating fish groups (coral indicators, major and commercially important species) both inside and outside MPAs. In each site, fish visual census was conducted using three 50 m transect lines with 10 m wide in the shallow depths (~10 m) of the coral reef area. Species richness and density was highest in Lanuza MPA with 137 species/1,000 m² and 1,399 ind/1000 m², respectively and lowest in San Pedro MPA with 40 species/1,000 m² and 125 ind/1,000 m², respectively. Difference between species richness and density can be noted between inside and outside zones in all sites which were highly represented by major species. In terms of biomass (MT/km²), all MPA sites in Cortes reveal high to very high conditions influenced by the commercially important species. Years of strict and proper management of MPAs in the area have reaped great results with excellent fish biomass such as in Lanuza and Cortes MPAs that highly support the fishery industry in Lanuza Bay. Low levels of the measured parameters in some sites may be influenced by threats including natural disasters, human activities and siltation. This study serves as supplementary information to enhance management of MPAs and regulate fisheries in the said bay.

Keywords: *Coral reef fish, Species richness, Density, Biomass, Fish visual census, Biology*

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Year round pollen sources of the Italian honeybees (*Apis mellifera* L.) in the Philippines I. Los Baños area

Payawal, P. C., Tilde, A. C., Manimtim, A. I.

The year round pollen sources for the Italian honeybees (*Apis mellifera* L.) in the Los Baños area were determined by regular collection and analysis of the pollen loads of honeybees in the area. A total of 57 plant species from 35 families were found providing pollen for the bees throughout the year. The major pollen sources of the area were: *Mimosa pudica* L., *Mimosa invisa* Mart., *Hydnocarpus alcalae* C. DC., *Leucaena leucocephala* (Lam.) de Wit., *Cocos nucifera* L., *Apouteria campechiana* (H. B. K.) Baehni, *Centella asiatica* (L.) Urban, and *Casuarina equisetifolia* J. R. and Forst. Statistical analysis of the data revealed the presence of two distinct pollen seasons in a year. One season called the "Mimosa Season" is characterized by the predominance of *Mimosa* (about 83% of the total pollen count comes from *Mimosa* spp.); the other season, designated the "Mixed Season", is characterized by the presence of two or more major pollen sources. The "Mimosa Season" is from October to March while the "Mixed Season" is from June to September.

Keywords: Italian honeybees, Apiculture, Pollen sources, Mimosa Season, Biology

The Philippine Agriculturist, Volume No. 69 Issue No. 2, 217-225
1986 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Zooplankton as indicators of water quality in Manila Bay Gatdula, Norvida C., Borja, Valeriano M., Furio, Elsa F., Jose, Ellaine C.

Zooplankton abundances correspond to environmental fluctuations. They are more critical and dynamic in coastal areas because of combined land and marine influences. Hydrobiological survey was done every other month in Manila Bay in 2017. Physico-chemical parameters like temperature, salinity, dissolved oxygen and chlorophyll-a concentration were measured using SBE CTD 19 Plus. Zooplankton samples were subjected to microscopy. Redundancy analysis showed that there are significant correlations between zooplankton abundances and environmental parameters. *Microsetella norvegica* were most abundant showed inverse correlation with dissolved oxygen. *Euterpina acutifrons* was found to be aggregating in stations with high temperature and high nitrate concentrations. The inverse relationship of *Paracalanus* sp. and *Oithona* spp. with salinity was notably visible in the months of January, September and November. Dominance of *Oithona* spp. was observed in coastal areas of the bay. The 23% variance in zooplankton composition and abundance were explained by the following parameters: temperature, dissolved oxygen, salinity and nitrate concentrations.

Keywords: Zooplankton assemblages, Environmental parameters, Redundancy analysis, Zooplankton diversity, Biology

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NP

Biological control of root-knot nematodes attacking tomato plants through the use of mycorrhiza and nematophagous fungi

Orolfo, Estela B. , Davide, R. G.

Effects of two species of nematophagous fungi, i.e. *Arthrobotrys cladodes* Dresch. and *Paecilomyces lilacinus* (Thom.) Samson, and three species of vesicular arbuscular mycorrhizae, i.e. *Glomus fasciculatus* (Thax.) Gerd. & Trappe, *Glomus mosseae* Nicol & Cerd., and *Glomus macrocarpus* Gerd. & Trappe on the control of root-knot nematodes *Meloidogyne incognita* Chit. were evaluated under greenhouse and field conditions. Mycorrhizal colonization of the tomato roots increased the tolerance of the plants to infection by the nematodes. On the other hand, the nematophagous fungi controlled the nematode population in the roots. Of the three mycorrhizal species, *G. fasciculatus* was the most promising while *P. lilacinus* gave better results than *A. cladodes*. Results were variable when the nematophagous fungi and mycorrhiza were combined. Generally, however, the plants inoculated with *P. lilacinus* and the mycorrhiza gave better control of the nematodes resulting in more vigorous plants and better yield than inoculation with either the fungus or the mycorrhiza alone.

Keywords: *Root-knot nematodes, Tomato plants, Mycorrhiza, Nematophagous fungi , Botany*

The Philippine Agriculturist, Volume No. 69 Issue No. 3, 307-315
1986 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Effect of abscisic acid and indole acetic acid on nitrogen fixation and anthocyanin formation in *Azolla pinnata* (R. Brown)

Cadiz, Nina M. , Alejar, A. A.

Stress-induced anthocyanin production caused by phosphorus deficiency (greenhouse culture) or high light intensity (field culture) resulted in significant reduction in total tissue nitrogen accumulation, nitrogenase activity and chlorophyll content in *Azolla pinnata*.

In greenhouse cultures of *Azolla pinnata*, nitrogen fixation by symbiosis with *Anabaena azollae* was enhanced by addition of abscisic acid (ABA) or indole acetic acid (IAA) in a nitrogen-free nutrient culture. In the absence of phosphorus, however, only ABA proved to be equally effective but IAA appears to be promising in minimizing anthocyanin formation.

Keywords: *Anthocyanin , Phosphorus deficiency, Indole acetic acid, Greenhouse culture, Nitrogen fixation, Abscisic acid, Azolla pinnata, Botany*

The Philippine Agriculturist, Volume No. 69 Issue No. 2, 207-215
1986 April-June,
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Fil(S) S19 P53

Flower development of winged bean [*Psophocarpus tetragonolobus* (L.)D.C.] under non-inductive daylength after exposure to inductive daylength

Klib-Ngern, Pramote , Bautista, Ofelia K.

The non-inductive photoperiod following an inductive photoperiod was significant in floral bud initiation and the subsequent growth and development of *Psophocarpus tetragonolobus* (L.) D.C 'Pangasinan long.' Exposure to 10 to 20 short day cycles (SDC) and later to a long day 15 hr effected 100% flower initiation and development and resulted in significantly fewer and smaller flowers. On the other hand, a continuous short day treatment resulted in more flowering, earlier flower initiation and faster development. A continuous short day is therefore not necessary for flower initiation and development but for continuous flower initiation and development.

Keywords: *Winged bean, Photoperiods , Flower initiation, Floral buds, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 27-33
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(Filipiniana Analytics)

Flower initiation and development of winged bean [*Psophocarpus tetragonolobus* (L.) D.C.] under different photoperiods and photoinductive cycles

Klib-Ngern, Pramote , Bautista, Ofelia K.

The effect of photoperiod on flower initiation and development of winged bean [*Psophocarpus tetragonolobus* (L.)D.C.] 'UPS 22,' 'Batangas medium' and 'Pangasinan long' were studied. Under short day condition of 9 hr light, 100% flowering of the three varieties was observed. None flowered under long day of 15 hr light. However, under an average daylength of 12.89 hr, 28% of 'UPS 22' plants initiated 1 to 2 floral buds per plant, but they abscised before anthesis. Under 12.75 hr daylength 'UPS 22,' 'Batangas medium' and 'Pangasinan long' required 5, 7 and 11 short day cycles, respectively, for floral buds were initiated but eventually abscised.

Keywords: *Winged bean, Photoperiods , Photoinductive cycles , Flower initiation, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 17-26
1982 January-March,
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Gamma-aminobutyric acid (GABA) content of some of local and agricultural plant materials

Engr. Garcia, Rosemarie G.

Gamma-aminobutyric acid or GABA is a non-proteinogenic amino acid neurotransmitter that serves inhibitory functions in the nervous system. It is gaining popularity and is recently being introduced into the global market because of its many health benefits. The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) evaluated the gamma-aminobutyric acid content of locally-sourced agricultural plant materials by processing them into powders and using them in different food applications. The general objective of the study is to screen potential local sources of gamma-amino butyric acid (GABA). Specifically, it aimed to (1) determine GABA content of different locally-available plant materials; (2) characterize the GABA-enriched materials in terms of physico-chemical and nutritional properties and (3) determine potential food applications of GABA material/powder. Mature green tomatoes (GT) and orange sweet potatoes (SP) were processed into powders using low-temperature low-humidity Dryer (LTLH) at 50°C and with relative humidity of 30-35 % at and forced-draft oven (FDO) dryer at 50°C. Free γ -amino-n-butyric acid content of sample powders were analyzed

using amino acid analyzer method. Physico- chemical, chemical and microbiological properties were analyzed. Trial formulations using GABA powders were also conducted. GT powder processed using LTLH obtained the highest amount of GABA (1,230 mg/100g) followed by GT powder processed using FDO (512 mg/100g). SP powder dried using FDO have the lowest amount of GABA (111mg GABA per 100g). The pH of GT powders ranged are 4.22 and 4.39 from FDO and LTLH drying, respectively, while pH of FDO-dried SP powder falls within slightly acidic food at 5.91. All powdered samples have a water activity of below 0.60. Moisture content of powdered samples were 3.69, 16.65, and 16.03 for FDO-dried SP powder, LTLH-dried GT powder and FDO-dried GT powder, respectively. SP powder has lower moisture content compared to GT powder, however, all samples have Aw of less than 0.60. GT powder dried using FDO have darker color compared to those dried using LTLH dryer. All powdered samples were found to contain below the microbiological limits set by FDA for *E.coli* in dried vegetables. GT powders were added to several savory meals usually containing tomatoes in their recipes. Aside from the distinct tomato flavor, panelists detected herby taste and aroma, more prominently in dishes using LTLH-dried GT powder. Due to inherent sweetness of SP, the powders were added to desserts such as pancakes, other pastries, as well as beverages. Since the FDO-dried SP powder was made from raw sweet potatoes, rehydration was needed in certain recipes to improve textural characteristics. Mature green tomatoes and orange sweet potatoes were found to contain significant amount of GABA regardless of the processing method used. Higher temperature used in FDO drying might have affected the GABA content of the sample compared to the LTLH. Chemical analysis have shown that LTLH-dried GT powder and FDO-dried SP powder are high sources of dietary fiber, while FDO-dried mature green tomatoes are a source of dietary fiber (CAC/GL 23-1997). All powders did not give any undesirable tastes or odors when added to desserts, beverages, and savory meals. It is recommended to evaluate other local plant materials, particularly those which are underutilized, as sources of GABA. Other processing methods may also be explored to optimize the amount of GABA in agricultural plant materials.

Keywords: *gamma-aminobutyric acid, agricultural plant materials, tomatoes, sweet potato, physico-chemical properties, amino acid, DOST-FNRI, Botany*

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2020,
(Filipiniana Analytics)

0162

Growth and yield of sweet potato grown from basal vine cuttings, treated with indolebutyric acid and planted at varying densities

Nzima, M.D.S. , Del Rosario, Dafrosa A.

A study was conducted to investigate possible ways of improving the yield of sweet potato cv. BNAS 51 grown from basal cuttings.

Under field conditions, 50 ppm indole-3-butyric acid (IBA) significantly increased the total yield (69.54 t/ha) and the marketable tuberous root yield (67.77 t/ha) more than the untreated basal cuttings (49.84 and 48.38 t/ha, respectively). The treatment also increased net assimilation rate (NAR), crop growth rate (CGR) and harvest index (HI). Differences in plant population densities of 30, 40, 50, and 60 thousand plants/ha did not affect yield but increased leaf area index (LAI) and NAR, while CGR and HI were decreased. The interaction between IBA treatment and population densities did not affect the total and marketable tuberous root yields of cv. BNAS 51.

Keywords: *Sweet potato, Basal vine cuttings, Indolebutyric acid, Planting density, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 339-351
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

Loss of ascorbic acid in fresh leafy vegetables subjected to light and different wind velocities

Data, E. S. , Pantastico, Er B.

Chinese cabbage (*Brassica campestris* L., Pekinensis group) cv. Tropicana, mustard (*Brassica juncea* L.) and pechay (*Brassica campestris* L., Chinensis group) cv. Black Behi were grown in the greenhouse and allowed to wilt 9 hr after harvest by subjecting them to two light conditions and to various simulated wind velocities. Conditions favorable to wilting resulted in more rapid loss of vitamin C. Chinese cabbage lost more moisture rapidly than pechay when exposed to light and wind, resulting to a greater decrease in vitamin C. Mustard was greatly affected by wind velocity. After 9 hr at a wind velocity of 24 km/hr, 92% of its ascorbic acid was lost.

Keywords: *Ascorbic acid, Leafy vegetables, Wind velocities , Chinese cabbage, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 75-80
1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

Note: Root uptake, translocation and accumulation of benomyl in clusterbean [*Cyamopsis tetragonoloba* (Linn.) Taub.]

Lukose, Claramma , Singh, R.D.

The absorption, translocation and accumulation of benomyl in clusterbean [*Cyamopsis tetragonoloba* (Linn.) Taub.] seedlings were affected by temperature, light, plant age, treatment time and fungicide concentration. The fungicide absorbed by the roots was retained in the plant even after 15 days treatment as indicated by bioassay with *Colletotrichum gloeosporioides* which causes leaf spot on clusterbean.

Keywords: *Clusterbean , Fungicide, Benomyl, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 4, 403-408
1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

Physiochemical changes in leafy vegetables as related to wilting after harvest

Data, E. S. , Pantastico, Er B.

Chinese cabbage (*Brassica campestris* L., Pekinensis group) cv. Tropicana, mustard (*Brassica juncea* L.) and pechay (*Brassica campestris* L., Chinensis group) cv. Black Behi were grown in the greenhouse and allowed to wilt 9 hr after harvest at 22 C and 60% RH room. Wilting resulted in an increase in total sugars and free proline level and a decrease in percent protein and starch content. Protein significantly decreased in Chinese cabbage. Water loss and the amount of total sugars and free proline in leafy vegetables were positively correlated, while protein and starch were negatively correlated with water loss.

Keywords: *Leafy vegetables, Chinese cabbage, Mustard , Pechay , Water loss, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 1, 81-92
1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

Plant nematode populations and tomato (*Lycopersicon esculentum* Mill.) yield in fields plots treated with chicken dung, sawdust urea

Karmacharya, B.B. , Castillo, M. B.

An experiment was conducted in a farmers field during the dry season to determine the effect of separate and combined applications (in furrow, a day before transplanting) of two rates of each chicken dung (2.5 and 5 t/ha), sawdust (2.5 and 5 t/ha) and urea (112 and 224 kg/ha). Only chicken dung, either alone or in combination with either rate of sawdust, urea or both, generally controlled the nematodes. *Rotylenchulus reniformis* and *Meloidogyne incognita* and increased soil nitrogen level and economic return. Basal area application either alone or in combination with the nematicide phenamiphos (5kg ai/ha) or sawdust (both rates) resulted in phytotoxicity. The best treatment were high rate of chicken dung in combination with low rate of sawdust and high rate of urea, and high rate of chicken dung, alone, respectively. Comparable nematode control of 79%, 95%, and 68%, respectively, and higher added returns, of 15, 502.00, 14,020.00 and 13,943.00/ha (based on a minimal tomato price of 1.00/kg) were obtained from the above.

Keywords: *Plant nematode, Tomato, Chicken dung, Sawdust, Urea, Botany*

The Philippine Agriculturist, Volume No. 69 Issue No. 3, 289-305
1986 July-Sep,
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Fil(S) S19 P53

Screening for cowpea [*Vigna unguiculata* (L.) Walp.] genotypes low in lipoxygenase

Van Den, Truong , Laguren, Laarni B. , Abilay, Remedios M. , Mendoza, Evelyn Mae T.

Ninety-nine cowpea cultivars were assayed for lipoxygenase (linoleate: oxygen oxidoreductase EC 1.13.11.12) by spectrophotometric assay based on conjugated diene formation at 234 nm. Two accessions, TVu-356 and PI-293455, were observed to have very low lipoxygenase-specific activity (36 and 30 units/mg protein, respectively) compared to 397 units/mg protein for TVu-373-1-1. Some agronomic data of selected cultivars are given.

Keywords: *Cowpea , Lipoxygenase , Spectrophotometric assay, Diene formation, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 153-158
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Some unreported fungal genera and species in the Philippines

Quimio, Tricita H., Abilay, Leovica E.

Five species of fungi are reported and described for the first time in the Philippines. These are *Gliocephalotrichum bulbilium* Ellis and Hesseltine from rambutan fruits, *Trichothecium roseum* (Pers.) Link ex Fries from apples, *Helicospira* sp. from grape leaves, *Pithomyces maydis* (Sacc.) Ellis from peanut leaves, and *Choanephora cucurbitarum* (Berk. and Rav.) Thaxter from jackfruit fruitlets. Except for *Helicospira* sp., all have been confirmed to be causing a disease on their respective hosts.

Keywords: *Fungi , Plant diseases, Pathogenicity tests, Botany*

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 253-258
1982 July-September,
(Filipiniana Analytics)

CHEMISTRY

0169

Acute dermal toxicity and antibacterial activity screening of combined leaf extracts of makahiya (*Mimosa pudica*) and bayabas (*Psidium guajava*)

Santander, Dorothy O. , Sardido, Sharmaine B. , Carmen, Edilene Jane E. , Bantilan, Maria Elaine Therese A. , Nogodula, Judee N. , Bersabal, Kathleen G.

Alternative medicine from herbal plants is an option for treatment by people in the middle and marginalized sectors. With this, the study focuses on the determination of acute dermal toxicity and antibacterial activity of the combined leaf extracts of Makahiya (*Mimosa pudica*) and Bayabas (*Psidium guajava*) against *Staphylococcus aureus* and *Pseudomonas aeruginosa*. Specifically, Acute Dermal Toxicity was conducted at doses of 1000 mg/kg and 2000 mg/kg of the combined extracts for the sighting study and 2000 mg/kg for the main study. Results show no positive signs of skin toxicity. The antibacterial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa* was determined through disk diffusion assay. Findings reveal that the extracts have a weak antibacterial activity against *P. aeruginosa* and moderate antibacterial activity against *S. aureus*.

Keywords: *Acute dermal toxicity, Mimosa pudica, Psidium guajava, Staphylococcus aureus, Pseudomonas aeruginosa, Chemistry*

Root Gatherers, Volume No. 7 Issue No. 1, 91
2014,
(Filipiniana Analytics)
NP

0170

Analgesic activity of formulated syrup of cashew (*Anacardium occidentale*) crude leaf extract on albino rats

Parreñas, Charmaine Grace M. , Orendain, Sarah Ruth A. , Jarrell, Krista Kate P. , Cabural, Regine C. , Paramo, Orcheliza L. , Morales, Sonia S.

The study determined the analgesic activity of the formulated syrup of Cashew (*Anacardium occidentale*) crude leaf extract on albino rats. Preliminary tests were employed such as phytochemical screening that detected positive with alkaloids using Mayer's and Dragendoff's tests and Fourier Transformed Infrared Spectroscopy (FTIR) identified the functional groups as alcohol, amines, amine salts, heterocyclic amine, phosphorous containing organic molecule, aldehydes, ether and ester. The acute oral toxicity of leaf extract showed no signs of toxic reaction hence, classified under category 5 based on the OECD 423 guidelines. Approximate Effective Dose (AED) crude extract was 630.98 mg/kg that showed the lowest number of seconds the rats spent in biting and licking the paw. These were the bases of formulating the crude extract into syrup. Bioassay of the syrup was done using female rats by showing the biting and licking of the paw. Three groups such as positive control (Ibuprofen), test drug and negative control (Plain syrup) were compared. Analysis of Variance interpreted that it has significant different between Ibuprofen and test drug. Post hoc multiple comparison test showed that the ibuprofen has the highest activity than the cashew leaf syrup.

Keywords: *Anaardium occidentale, Analgesic, Formalin-Induced Paw Licking Test, Alkaloid, Ibuprofen, Chemistry*

Root Gatherers, Volume No. 6 Issue No. 1, 1-18
2014,
(Filipiniana Analytics)
NP

Anti-angiogenic and antioxidant activity of sayote (*Sechium edule*) ethanolic leaf extract in duck embryo (*Anas luzonica*)

Navasca, Apple Grace Charish B. , Ronquill, Rosecell Ann G. , Desabille, Jade Bianca S. , Dapitan, Jennalyn L. , Muaña, Cherie G. , Bersabal, Kathleen G. , Sorongon, Kristin Micah B.

The study evaluated the anti-angiogenic and antioxidant properties of Sayote (*Sechium edule*) ethanolic leaf extract. Quantitative phytochemical analysis was done by estimating the total phenolic content by gallic acid in Sayote ethanolic leaf extract. To determine the anti-angiogenic property of the extract, Duck Chorioallantoic Membrane (CAM) Assay was employed. Results of the experiment showed that the ethanolic leaf extract has no median lethal concentration (LC₅₀) since not more than 50% of the population of brine shrimp eggs died. It was found out that there is a significant difference between the antiangiogenic effects of the different concentrations of the leaf extract and that of the 95% ethanol as negative control in 11-day chick embryo chorioallantoic membrane. The formation of the branches of blood vessels is dependent on the treatment concentration: 5% concentration exhibited the least anti-angiogenic property while 15% showed the highest. In the antioxidant property, 2,2-diphenyl-1-picrylhydrazyl hydrate (DPPH) assay was performed and result showed a significant difference between the antioxidant property leaf extract concentration and ascorbic acid (positive control). Results of the assay clearly indicated that the inhibition of free radical formation is directly proportional to the concentration of extract. The 0.5% of Sayote exhibited the highest antioxidant property.

Keywords: *Sayote (Sechium edule), Anti-angiogenic, Antioxidant, Duck Chorioallantoic Membrane (CAM) Assay, Brine Shrimp Assay, Chemistry*

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NP

Anti-angiogenic property of bignay (*Antidesma bunius*) ethanolic leaf extract in duck (*Anas luzonica*) embryo using chorioallantoic membrane (CAM) assay

Ibut, Meshelyn A. , Guinto, Cynthia Claire F. , Tracy Honorio, Ann A. , De Leon, Ruby Marie D. , Comiso, Jovelle L. , Muaña, Cherie G. , San Juan, Ma. Eva C. , Zanoria, Sharmaine A.

Cancer or malignant tumor is a group of diseases involving abnormal cell growth with the potential to invade or spread other parts of the body. According to World Health Organization 2012, cancer comprises 63% of annual global mortalities, claiming the lives of 7.6 million people each year. In search for anticancer drugs, a study about the angiogenic activity of Bignay (*Antidesma bunius*) dried leaf extract was further examined and studied. This study focuses on Bignay's content of polyphenols and its anti-angiogenic role against cancer. To determine the total amount of phenolic acid present, quantitative phytochemical analysis was performed using Folin-Ciocalteu reagent. The result shows 0.65 mg/g being expressed in Gallic Acid Equivalent/g. The median lethal concentration (LC₅₀) as antiangiogenic agent was at 53.71%. Duck Chorioallantoic Membrane (CAM) Assay was conducted to determine the anti-angiogenic property having 10%, 20%, 30%, 40% and 50% concentrations were used for comparison. Result shows that 40% concentration had the greatest anti-angiogenic activity in terms of the decrease number of blood vessels developed against positive control, Bevacizumab. It found out that there was no significant difference between the antiangiogenic effect in high concentration and Bevacizumab as positive control in 3-day old duck chorioallantoic membrane.

Keywords: *Antiangiogenesis, Antidesma bunius, Chorioallantoic membrane assay, Chemistry*

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Antibacterial activity of the combined leaf extracts of *Moringa oleifera* and *Momordica charantia*

Pua, Christianne Dolor A. , Mendoza, Sheena Loraine P. , Amiscua, Inah Patricia F. , Albienda, Jesselle Marie D. , Paramo, Orcheliza L. , Nogodula, Judee N.

Many infectious diseases are untreatable and uncontrollable due to increasing antibiotic resistance and thus considered a serious problem in health. This spurred the researchers to conduct this study focusing on the determination of the combined antimicrobial property of *Moringa oleifera* Lam. (Malunggay) and *Momordica charantia* Linn. (Ampalaya). *M. oleifera* leaf has been tested for its saponins and alkaloids while *M. charantia* has saponins only. Investigation of the functional group via Fourier Transform Infrared Spectroscopy showed that *M. oleifera* Lam. contained amines, amides, alcohol, phenol and carboxylic acid while *M. charantia* Linn possesses amine, amides, aromatic rings, heterocyclic amine, and unsaturated chain. Antimicrobial property was evaluated against *Bacillus cereus*, *Escherichia coli*, Methicillin-Resistant *Staphylococcus aureus* and *Pseudomonas aeruginosa* using disk diffusion method. Results show that the three concentrations were strong (>17mm) against *B. cereus* while combined extract of malunggay and ampalaya (1A:1M) and pure malunggay showed inhibitory activity of moderate (12-16mm) and weak (7-11 mm), respectively. In *S. aureus*, it inhibited moderately in pure ampalaya and (3A:1M) while weak inhibition in the remaining concentrations. MRSA showed strong inhibition in pure ampalaya, weak in pure malunggay and moderate in all combined concentrations. *E. coli* and *P. aeruginosa* showed weak inhibitory activity in all concentrations. One-Way (ANOVA) showed that there was an existing significant difference ($p < 0.05$) on the mean zone of inhibitions among *B. cereus*, *S. aureus* and MRSA. Post Hoc test determined that pure ampalaya significantly differ at concentration 1A:3M against *B. cereus*, 1A:1M and 1A:3M towards MRSA and all remaining extracts do not differ significantly. The pure extract of malunggay significantly differs in all concentrations against *B. cereus* and MRSA only. Minimum inhibitory concentration of combined plant extracts, *M. oleifera* and *M. charantia* (1:1) and (1:3) was at 25,000µg/ ml of (1A:1M) plant concentration.

Keywords: *Moringa oleifera* Lam., *Momordica charantia* Linn., *Bacillus cereus*, *Escherichia coli*, Methicillin-Resistant , *Staphylococcus aureus* , *Pseudomonas aeruginosa*, *E. coli*, Chemistry

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Antioxidative capacities of phytochemicals in selected fruit peels

Palmes, Nenita D. , Del Rosario, Romeo M.

Fruit by-products in the form of peels are generally considered as wastes but they may contain significant amounts of antioxidants which can serve as basis for the alternative uses. The peels of a total of 36 kinds of fruits were subjected to rapid screening for their antioxidative capacities using a revised version of the thiocyanate method. From the results of the rapid screening, the 10 best performing kinds of fruits were selected for further assay of their peels using different extraction solvents (methanol or diethyl ether) and different peel conditions (fresh or dry). The antioxidative capacities are expressed in terms of the Oxidation Protection Efficiency (OPE). The extracts with methanol showed superior OPEs, in general, compared to those with ether indicating the dominant chemical nature of the antioxidants. Drying, on the other hand, generally led to decreases in the OPEs. Topping the list with their very high OPEs are: *Garcinia mangostana* (mangosteen), *Nephelium lappaceum* (rambutan), *Diospyros blancoi* (mabolo), *Mangifera indica* (mango), and *Ananas comosus* (pineapple). Their OPEs ranged from almost 100% down to 80%.

Keywords: Antioxidant, Antioxidative Capacity, Fruit peel, Oxidation protection efficiency, Chemistry

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2012,

Antiproliferative and antiplasmodial investigation of *Alphitonia excelsa* and *Arcangelesia flava*

Kingston, David G. I. , Cassera, Maria B. , Valenciano, Ana L. , Fuentes, Rolly G.

Alphitonia excelsa (Rhamnaceae) and *Arcangelesia flava* (Menispermaceae) are utilized by locals in Samar island for medicinal purposes. Extracts from twigs of *A. excelsa* exhibited antiproliferative activity against the A2780 human ovarian cancer cell line, while a stem extract of *A. flava* had potent activity in an antimalarial screen against the drug-resistant *Plasmodium falciparum* Dd2 strain. Extracts of *A. excelsa* and *A. flava* were subjected to activity-guided isolation using column chromatography (silica gel and ODS) and HPLC. *A. excelsa* yielded betulinic acid (1) as its antiproliferative component, while *A. flava* gave palmatine (2) and jatrorrhizine (3) as its antiplasmodial components. These compounds were identified based on the comparison of their spectral data [nuclear magnetic resonance (NMR) and mass spectroscopy (MS)] with literature values. The IC₅₀ value of betulinic acid against A2780 cells was determined to be 20.6 µM. Both palmatine and jatrorrhizine had strong growth inhibitory activity against *P. falciparum* Dd2, with IC₅₀ values of 0.41 µM and 0.43 µM, respectively.

Keywords: *Antiplasmodial alkaloids, Betulinic acid, Medicinal plants, Chemistry*

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NP

β-carotene determination of processed fruits and vegetables using reversed-phase ultra high pressure liquid chromatography

Castro, Joan M.

β-carotene is used by consumers as coloring agent, anti-oxidant and provitamin source. It is the most important provitamin A carotenoid found in dark-green leafy vegetables, carrots, and various fruits. Use of small-scale method provides a safe, cost-effective, efficient and environment-friendly analysis. The study aimed to analyze processed fruits and vegetables using validated small-scale β-carotene method by Ultra High Pressure Liquid Chromatography (UHPLC) and participate in Proficiency Testing for the assessment of the performance of the method, analyst and the laboratory. Method performance characteristics were measured and evaluated using Standard Reference Material 2385 Slurried Spinach and malunggay tea sample. The laboratory participated in the Proficiency Testing to assess its competence to conduct the analysis. β-carotene content of samples were also determined. About 85% of the analysis time and amount of solvents used were saved using the small-scale method. There was a linear relationship ($r=0.9996$) between the concentration of β-carotene and its response using the UHPLC. The instrument can detect and quantify β-carotene above 0.0962 µg/mL and 0.3206 µg/mL, respectively. The method is accurate (15% mean bias) and precise (HorRatR 0.69; HorRatR 0.92). A total of 113 different processed fruit and vegetable products were purchased in the local supermarkets from North and South of Manila. Unsoaked malunggay tea (14,866 µg/100g) had the highest β-carotene content followed by carrot-flavored baby food (8,487 µg/100g), canned peas and carrots (2,550 µg/100g), carrot-flavored juice (1,266 µg/100g), and dried mangoes (1,262 µg/100g). The laboratory got satisfactory PT participation for Soup (z-score = -1.33) and Dietary Supplement (z-score = -1.21). Results of validation showed that small-scale method of β-carotene analysis is fit for its intended purpose. Fruits and vegetables are good sources of β-carotene. It is recommended to explore the possibilities of quantifying the carotenoid profile of fruit and vegetable products because of their nutritional benefits.

Keywords: *beta-carotene, fruits, vegetables, ultra high pressure liquid chromatography, proficiency testing, DOST-FNRI, Chemistry*

Biochemical decomposition of organic matter

Banzon, J.A., Calapardo, M.

The biochemical decomposition of organic matter in the form of banana corm, bracts and peelings; coconut meal (sapal); rice straw, rice hull; bagasse, corn husk; coconut coir dust; chicken manure; hog manure; was undertaken in this study. An inoculum was developed from chicken manure. The degree of decomposition of organic matter was determined in 2 ways: by volume of gases involved and by reduction in weight of organic matter (defined as dry matter minus mineral matter). Of the substrates from plant origin, the coconut meal (sapal) and banana peelings decomposed very fast, comparable to the well-known speed of animal manure in 26 days and by 60% in 34 days. Banana peelings reached maximum decomposition in 6 days evolving 316 gas per kg organic matter per day. The decomposition of hog dung resulted in production of dry matter from 100 to 64 units, hence the apparent increase in protein from 16/100 to 14.4/64 (16% to 22.4%). Fibrous materials decomposed slowly and the slowest was coconut coir dust.

Keywords: *Biochemical decomposition, Organic matter , Organic waste, Chemistry*

NRCP Research Bulletin, Volume No. 36 Issue No. 2, 221-242
1981 June,
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Fil(S) Q179.9 N38

Bitan-ag Creek water: its physical, chemical, and biochemical characteristics

Palmes, Nenita D. , Del Rosario, Romeo M.

This is almost a one-year study of the quality status of the water of Bitan-ag Creek in Cagayan de Oro City. It mainly covers the characterization of the creek's water quality. It also includes an ocular inspection of a major stretch of the creek from upstream to the sea. The whole endeavor was part of the big objective of rehabilitating the creek as initiated by a task force composed of the local barangays through which the creek winds itself as it travels towards the sea. A number of physico-chemical parameters were included: color, appearance, temperature, pH, conductivity, nitrate, phosphate, suspended solids, dissolved oxygen (DO), chemical oxygen demand (COD), and biochemical oxygen demand (BOD). To complement this information, biochemical tests on kangkong test plants were also carried out: chlorophylls, carotenoids, total phenolics, and electrolyte leakage. Bioassays were also done in terms of kangkong (*Ipomoea reptans*) wilting and bulb onion (*Allium cepa*) root growth inhibition. The results point to the sad state of the Bitan-ag Creek. It is an appalling dumpsite of all sorts of solid wastes and other wastes. The impacts of these indiscriminate disposals were also revealed by the physico-chemical test results that describe a substantial level of pollution. Further, the bioassays and biochemical tests have indicated highly stressful conditions for aquatic organisms and a worrisome level of general toxicity.

Keywords: *Physico-chemical, Bioassay, Characterization, Biochemical test, Chemistry*

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2010,
(Filipiniana Analytics)
NP

Capacitive characteristics of 1-alkyl-3-methylimidazolium adipate ionic liquids as electrolytes for carbon-based supercapacitors

Yap, Gillian Kathryn B., Patricio, Jonathan N. , Arco, Susan D.

Ionic liquids (ILs) are ideal electrolytes for supercapacitors due to their large electrochemical window (EW), and their chemical and thermal stability. They are also highly tunable and can easily be modified by changing the cation or the anion. A problem that has presented in studies involving ILs as supercapacitor electrolytes is their low conductivity due to high viscosity. Carboxyl groups are known to decrease the viscosity index of ILs. In this study, 1-alkyl-3-methylimidazolium (C₂MIM, C₄MIM) adipate ILs were synthesized via halide-to-anion exchange method and were characterized using FT-IR, ¹H-NMR, and ¹³C-NMR spectroscopy. Conductivity measurements were also done and it was found that the ionic conductivity is inversely proportional to chain length of the cation with 473.5 μS/cm and 444.4 μS/cm for C₂MIM adipate and C₄MIM adipate, respectively. Furthermore, the EWs were found to be 2.08 V for C₂MIM adipate and 2.24 V for C₄MIM adipate as determined using cyclic voltammetry recorded at a scan rate of 20 mV/s at a working potential of -4V to 4V. These considerable results showed that adipate-containing imidazolium-based ILs offers promising electrochemical properties for next-generation energy storage devices. It is recommended that different cations be explored in future studies.

Keywords: *Ionic liquids, Imidazolium, Adipate, Electrolytes, Supercapacitors, Chemistry*

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NP

Catalytic asymmetric dearomatizations of furan and benzene as key routes for the enantioselective synthesis of lignans and Geissman-Waiss lactones

Kreuzer, Andreas , Macabeo, Allan Patrick G., Mohd Ali, Mohd Tajudin , Reiser, Oliver

Forwarding efforts to create new chemical entities is one of the most appealing facet of synthetic organic chemistry. It is also the corner stone why the advancement of chemistry is relevant for the sustainable development of human society. In this study, the emerging catalytic asymmetric dearomatization was utilized to streamline the enantioselective total synthesis of biologically active enterolactones and important synthetic intermediate such as the Geissman-Waiss lactone. Asymmetric cyclopropanation of furans and two step asymmetric desymmetrization of benzene-derived epoxide afforded the key enantiomeric intermediates in modest yields and good to excellent enantioselectivity after iterative crystallizations. Further transformations of the chiral intermediates furnished the enterolactones, (7'R)-hydroxyenterolactone and (7'R)-parabenzlactone with modest overall yields and high enantioinduction. Our developed methodologies thus feature a practical, short approach for the enantioselective synthesis of important synthetic intermediates and bioactive entities.

Keywords: *Asymmetric dearomatization, Total synthesis, Enantioselective, Enterolactone, Geissman-Waiss lacton, Chemistry*

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Characterization and antioxidant determination of gabi (*Colocasia esculenta*) extracts

Garcia, Yra S. , Ferrer, Jovie Ann D. , Dayag, Jirehjoy L. , Canlog, Archie Glen G. , Ribo, Annabelle A., Velario, Romuald L.

Antioxidants are very promising in the combat against diseases. Their ability to sequester free radicals is a potential mechanism in protecting the human cell from further degradation. Gabi (*Colocasia esculenta*) is a promising natural resource abundant in the Philippines. With this study, characterization of the different functional groups responsible for its antioxidant property was determined. The ethanolic extract of leaf, stalk and tuber were characterized by Fourier Transform Infrared (FTIR) spectroscopy. The antioxidant activity was assessed by the use of 1,1-Diphenyl-2-picrylhydrazyl (DPPH) assay and ascorbic acid content. Results show that various functional groups are present from alcohols, phenols, phenyl ring with mono substitution, alkyl halides, aromatics, amide, heterocyclic amine, alkynes, ester and ether. Statistical analysis showed that phenol content varies significantly among the parts tested ($p < 0.05$). Ascorbic acid content was also shown to vary in content significantly ($p < 0.05$).

Keywords: *Colocasia esculenta*, 1,1-Diphenyl-2-picrylhydrazyl (DPPH) Assay, Antioxidant, FTIR, Phenolic content, Chemistry

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2014,
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NP

Characterization and stability study of reduced L-glutathione-loaded niosomes

Corpus, Mary Jho-Anne , Osi, Marina , Santos, Joshua , Villaflores, Oliver B.

Glutathione is a major antioxidant in the body that serves as a substrate for conjugation reactions and regulates cell proliferation. Low levels of glutathione have been linked to cancer, liver problems and other chronic diseases. Studies have shown that oral supplementation is not effective in increasing the glutathione level in the body.

The purpose of the study was to prepare a niosomal formulation of glutathione and to characterize the niosomal formulation. Furthermore, the study compared the effect of the charge inducer in the formulation.

The method was divided to the preparation, characterization and stability study of the niosomal formulation. The niosomal formulation was produced by thin film hydration with varying Span 60 (Sorbitan monostearate) and cholesterol ratios. Niosomal formulation with highest entrapment efficiency was further characterized for mean particle size, surface morphology, and *in vitro* drug release.

Formulation A entrapped 98.21% of the glutathione. Addition of charge inducer increased its entrapment efficiency to 98.91%. Furthermore, both niosomal formulations released glutathione at pH 7.4 in 1.0M phosphate buffer saline (PBS). The mean vesicular size obtained was $1,242.97 \pm 40.52$ nm. Differential Scanning Calorimetry revealed compatibility between glutathione and its excipients. Both formulations do not cause cytotoxicity in human dermal fibroblast. The stability study also revealed that it was stable at 5°C and 40°C for 3 months.

Results of this study suggested the potential use of niosomes in the targeted delivery of glutathione. This is the first report on the use of niosomal preparations through thin film hydration technique in the delivery of reduced L-glutathione.

Keywords: *glutathione, niosome, drug delivery, formulation, bioavailability, cytotoxicity and stability, Chemistry*

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(Filipiniana Analytics)

Characterization of phenolic composition and antioxidant activity of the leaf and stem extracts of water spinach (*Ipomoea aquatic* Forsk.)

Plaza, Ma. Krizia E. , Sare, Merrill T. , Gania, Mershen B. , Ribo, Annabelle A., Villafuerte, Joanne Clarisse C.

Antioxidants are chemicals that deactivate cell-destructive free radicals. Polyphenols, a class of compounds that exhibit antioxidants properties, can be found in the leaves and stem of some plants. *Ipomoea aquatic* Forsk. (Water spinach) contains polyphenols that exhibit antioxidants activity. Based from the earlier studies of water spinach, it contains phenolic compounds that are responsible to the overall antioxidant activity. Most phenolic compounds can be found in leaves and stem of water spinach. This study aims to identify the presence of functional groups using Fourier Transform Infrared Spectrometer and to determine the total phenolic content of leaf and stem extracts of water spinach. Infrared spectroscopic analysis showed that the crude extract of water spinach leaf has alcohol, amines, and cyclic amines based on the broad peak found between 3,500 to 3,000 cm⁻¹. The stem extract shows the presence of phenolic compounds based on the peaks from 2,950 to 2,800 cm⁻¹. This denotes that it has antioxidant activity. The total phenolic composition of the stem extract is higher having the mean of 82.3 GAE/mL (Gallic acid equivalent/milliliter) while leaf extract has 64.75 GAE/mL. In free radical scavenging activity with DPPH, the stem has a greater antioxidant action ranging from 3.03 to 58.82% while the leaf extract has 9.72 to 20% scavenging effect. Statistical testing showed that there is no significant difference in the percentage of free radical scavenging activity.

Keywords: *Ipomoea aquatic* Forsk., Phenolics, Antioxidant, Phenolic composition, Chemistry

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NP

Chitosan curcumin film as a sensor for detection of o-nitrophenol and fluoride ion using fluoresce quenching technique

Chakraborty, Soma, Ilagan, Andrea Paola D.

Curcumin was immobilized in chitosan films fabricated by solvent casting method. The amount of curcumin immobilization was more when methanol was used as a solvent to dissolve curcumin than the butanol solvent. The maximum amount of curcumin immobilized per gram of chitosan film was 0.023 g. Immobilized curcumin was not released back in water even after prolong contact of the films with water. Fluorescence intensity of the films got quenched when these films were in contact with an aqueous solution of o-nitrophenol (ONP) and sodium fluoride (NaF). The extent of quenching depended on the concentration of these attributes. Fluorescence intensity was highly pronounced even when the concentration of ONP and fluoride (FL) was as low as 2.0×10^{-6} M and 2.5×10^{-5} M, respectively. UV-vis spectroscopy could not detect 2.5×10^{-6} M ONP; similarly, ion chromatography was not sensitive towards 2.5×10^{-5} M FL. Since the extent of quenching varies linearly with the concentration of ONP and FL in aqueous solution, the Stern-Volmer equation can be used for quantification of these.

Keywords: Chitosan, Curcumin, Fluoride, Immobilization, o-nitrophenol, Sensor, Chemistry

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Comparative surface characterization of bare zinc oxide versus poly(acrylic acid) - encapsulated zinc oxide nanoparticles synthesized through sol-gel technique

Payawan, Jr., Leon M. , Buenviaje, Jr., Salvador C. , Legaspi, Enrico D.

Zinc oxide nanoparticles (ZnO NPs) have various uses in multiple industries. However, a major drawback is their tendency to agglomerate in aqueous environments which results in the loss of many desirable properties. Polymers can be used to encapsulate ZnO NPs and stabilize them through steric repulsion. In this study, ZnO NPs were prepared using a sol-gel synthesis technique using zinc acetate and sodium hydroxide as precursors. Poly(acrylic acid sodium salt) was added to the solution under UV radiation to encapsulate the ZnO NPs. The samples were characterized using zeta potentiometry, dynamic light scattering (DLS), UV-visible spectroscopy, powder X-ray diffraction (XRD), atomic force microscopy (AFM), and scanning electron microscopy (SEM). The PAA-coated NPs were found to have higher zeta potential values and were more stable in solution. DLS measurements showed that the particle sizes were 3300 nm and 87 nm for the bare and coated ZnO NPs respectively. UV-vis spectroscopy determined the band gap of the encapsulated ZnO NPs was lower than that of the bare ZnO. The diffraction pattern obtained through powder XRD analysis confirmed that the desired hexagonal wurtzite form of zinc oxide was synthesized. AFM showed that the PAA-coated particles possessed a larger surface area and increased roughness as compared to the bare ZnO. SEM imaging showed the agglomeration of bare ZnO particles and coated disc-shaped nanostructures which confirmed the formation of PAA-encapsulated particles. Thus, ZnO NPs were successfully synthesized and stabilized in an aqueous environment through encapsulation in PAA.

Keywords: Zinc oxide, Polymer encapsulation, Nanoparticles, Sol-gel synthesis, Chemistry

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NP

Computational studies on the enhancement of thermostability and activity of yacon sucrose: sucrose 1-fructosyltransferase

Ortiza, Christopher Llynard D. , Matelab, Hosea D.L. , Nellas, Ricky B. , Rimana, Kui-Dong

Fructans in Yacon (*Smallanthus sonchifolius*) are synthesized by two enzymes - sucrose: sucrose 1-fructosyltransferase (1-SST, EC 2.4.1.99) and fructan: fructan 1-fructosyltransferase (1-FFT, EC 2.4.1.100). The initial fructosyl transfer between two sucrose molecules is catalyzed by the enzyme sucrose: sucrose 1-fructosyltransferase (1-SST) and the subsequent chain elongation is catalyzed by other types of fructosyltransferases such as 1-FFT, 6G-FFT and 6-SFT. The computational study presented here aims to determine mutations, generated by introducing single and double two-point cysteines, that would improve the stability and activity of Yacon 1-SST. Both wild type and mutant 1-SST in water systems were subjected to Martini Coarse-grained Molecular Dynamics (CGMD) simulations and biophysical analyses. Moreover, molecular docking was exploited to further determine the activity of these mutants towards sucrose. Our results showed that the twelve single-disulfide mutants (A2C-P488C, T9C-P10C, S44C-T553C, T49C-V53C, A367C-P371C, A418C-A424C, S438C-L624C, A470C-A618C, A489C-S493C, C490C-C538C, C490C-C538C) have enhanced activities and thermostabilities relative to the wild type. The highest melting temperature achieved was 64C on mutation S438C-L624C located at the non-catalytic domain while the highest activity improvement is on mutation A367C-P371C located on the loops between the catalytic and non-catalytic domain. Furthermore, on the additional double-disulfide mutations, thermostability enhancement was observed for mutants A367C-P371C/S438C-L624C, A470C-A618C/C490C-C538C, and C490C-C538C/A418C-A424C but with compromised activity as compared to their respective single-disulfide parent mutants. results suggest that the disulfide bridge in specific domains of Yacon 1-SST is a valuable strategy to tailor-design the thermostability and activity of this enzyme.

Keywords: Yacon, Disulfide bridge, 1-sst, Thermostability, cgmd, *Smallanthus sonchifolius*, Chemistry

Deciphering the calculated QSAR properties of polyaryl compounds that influence their xanthine oxidase inhibition using discriminant analysis

Billones, Liza T. , Billones, Junie B.

Hyperuricemia, a condition characterized by elevated uric acid in the blood, is the underlying cause of gout and oxidative stress, which is also linked to carcinogenesis, atherosclerosis, and inflammation. The management of hyperuricemia mainly relies upon the use of xanthine oxidase (XO) inhibitors. However, the unpleasant side effects of drugs for hyperuricemia has spurred the discovery and development of new classes of compounds with XO inhibitory action. In this work, 20 QSAR descriptors were generated for each compound in a dataset consisting of 73 XO inhibitors with a wide range of IC₅₀ values. Principal Component Analysis (PCA) and Discriminant Analysis (DA) were employed to unveil the key QSAR properties of the polyaryl compounds that influence the observed XO inhibitory activity. Discriminant analysis resulted in a four-descriptor linear function that correctly classified polyaryl compounds as active or inactive with 85% accuracy. In particular, it suggests that ovality, absolute hardness, minimum value of localized ionization potential, and number of hydrogen bond acceptors are the key predictors that determine the XO inhibitory activity of polyaryls. Further, the results suggest that a more spherical and less ionizable molecule, with more diffused electron density and fewer H-bond acceptors than the present polyaryls, promises to be a more active drug for gout.

Keywords: *xanthine oxidase (XO) inhibitors, hyperuricemia, gout, principal component analysis, discriminant analysis, fused pyrans, naphthopyrans, QSAR predictors, Chemistry*

Determination of antioxidant capacity and capsule formulation of eggplant (*Solanum melongena*) fruit peel

Royo, Violly R. , Ribo, Annabelle A., Dejillo, Paula Bianca S. , Requillo, Eleana Jane B.

Eggplant (*Solanum melongena*) is a great source of phytonutrients especially phenolic acids. It has been shown from the studies that phenolic compounds specifically from eggplant exhibit high antioxidant action. Several diseases are caused by oxidative stress brought about by free radicals. Antioxidants retard free radical formation and in general, may prevent cellular oxidation. This study aims to determine the total phenolic content and antioxidant properties of eggplant fruit peel extract, the DPPH free radical scavenging activity and anthocyanin content, and to establish the correlation between total phenolic content (TPC) and DPPH assay of eggplant fruit peel and also anthocyanin content and DPPH analysis. The analysis was performed using UV-Vis Spectrophotometer. The overall estimation of total phenolic content showed that Eggplant fruit peel extract contains small concentration of Phenols at 0.0009 µg/100 ml of plant extract in GAE. In terms of antioxidant property, plant extract also demonstrated potential inhibition on the DPPH free radical formation at the range of 9.64% to 27.71%. Further, the level of anthocyanin was found to be 2.50 ppm. Statistical analysis showed that there is a relatively low correlation of total phenolic content in the plant extract and percent inhibition of free radical formation and on the other hand, there is a relatively high correlation between anthocyanin content in the plant extract and percent inhibition of free radical formation with 0.9014 R value. The high percent inhibition of DPPH free radical formation by the plant extract could have been only due to the anthocyanin content.

Keywords: *Solanum melongena, Antioxidant capacity, DPPH, Phenolics, Anthocyanin, Chemistry*

Determination of lipid profile lowering activity of formulated capsule from locally cultivated red yeast (*Monascus purpureus*) rice

Vicente-tablizo, Marilou L., Alcarde, Gerallene Mae F. , Sinoy, Alejli Anne

Cardiovascular disease is one of the leading causes of mortality. The study aims to determine the lipid profile lowering activity of the formulated capsule from locally cultivated Red Yeast (*Monascus purpureus*) Rice (RYR) containing monacolin K, a potential inhibitor of HMG-CoA reductase. The parameters include the triglycerides, High Density Lipoprotein and Low Density Lipoprotein. There were 12 hyperlipidemic rabbits used and divided into placebo, simvastatin (10 mg) and RYR groups. Baseline data was recorded prior to cholesterol induction after 7 days followed by administration of the drugs. Blood extraction for post treatment analysis was performed after 14 days from the first day of cholesterol induction. The findings revealed that the formulated capsule of RYR, with the dose of 0.8 g/kg/day, showed decreased levels of triglyceride and LDL. Dependent t-test analysis at 0.05 level of significance revealed no significant increase in the HDL levels while a significant decrease in triglyceride and LDL levels. This means it has a potential activity as antihyperlipidemic agent.

Keywords: *Monascus purpureus, Antihyperlipidemic, Monacolin K, Chemistry*

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Determination of the acute anti-inflammatory effect of kalamunggay (*Moringa oleifera*) in albino rats

Golez, Cirus Ralph B. , Cornejo, Kelly Loise C. , Albaran, Albert Jay Jaryle B. , Selgas, Merry Rose M. , Falcon, Stephen Jay S. , Yngayo, Aurea Conchita L. , Morales, Sonia S. , San Juan, Ma. Eva C.

Kalamunggay (*Moringa oleifera*) is one of the widely and easily grown plants locally which has been effectively used as an antiinflammatory folkloric remedy. In consideration of the increasing burden of diseases associated with inflammation, this study assessed the acute anti-inflammatory effect of a formulated syrup from kalamunggay leaf ethanolic extract, in the paw edema of carrageenan-induced albino rats. The experimentations utilized three Swiss mice for the determination of the Acute Oral Toxicity Dose (OECD 423) of kalamunggay leaf extract; while 10 and 21 healthy female albino rats for the Approximate Effective Dose (AED) determination and bioassay, respectively. The results revealed that the kalamunggay leaf extract was non-toxic even at high dose level of 2000 mg/kg body weight. The AED of the extract was determined to be from the starting dose of 10 mg/kg to 2511.84 mg/kg body weight. The kalamunggay syrup was formulated to contain 21.87 mg/kg dose for the subsequent bioassay tests. Post-treatment observations include decrease in paw edema only after 4 hours in animals treated with the formulated kalamunggay syrup, while the animals that received Ibuprofen took longer to show edema reduction. The animals that received the placebo simple syrup manifested the least decrease in paw edema. Calculating the mean percentage decrease in the paw edema of the treated animals revealed percentage reductions of 52.45%, 24.39% and 5.78% in the paw edema of albino rats treated with the kalamunggay formulated syrup, Ibuprofen (as positive control) and simple syrup (as negative control), respectively. Analysis of Variance and post hoc multiple comparison tests revealed existing significant differences ($p < 0.05$) between the different treatments, all in favor of the kalamunggay syrup. This indicates that the three treatments' antiinflammatory effects are not comparable or equal. Specifically, the kalamunggay extract syrup exhibited significantly higher ($p < 0.05$) anti-inflammatory capacity than the commercial drug Ibuprofen, which exhibited significantly higher ($p < 0.05$) anti-inflammatory capacity than the simple syrup. As such, the results of this study imply potent property of the kalamunggay leaf extract in eliminating paw edema in carageenan-induced albino rats.

Keywords: Pharmacology, *Moringa oleifera*, Anti-inflammatory, Approximate effective dose, Acute oral toxicity, Ibuprofen, Philippines, Chemistry

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NP

0191

Effect of the chain transfer agent on the raft polymerization of di(ethylene glycol) methyl ether methacrylate in hexafluorophosphate-containing ionic liquids

Arco, Susan D. , Montalbo, Reynaldo Carlos K. , Perez, Ser John Lynon P.

Room temperature ionic liquids (RTILs) continue to be utilized as green, alternative solvents due to their promising properties – negligible vapor pressure, high thermal and chemical stability, and customizability. Recently, these RTILs have been applied in free-radical polymerization techniques such as Reversible-Addition Fragmentation Chain Transfer (RAFT) polymerization. Currently, the literature remains to be sparse and are directed on how the RTILs affect the polymerization process. In this light, we studied the effect of varying the chain transfer agent (CTA) in the RAFT polymerization of DEGMEMA in a series of 1-alkyl-3-methylimidazolium hexafluorophosphate [RMIM]PF₆ ionic liquids. In all RTILs, P(DEGMEMA) polymers were synthesized using two RAFT agents – 4-cyano-4-(phenylcarbonothioylthio)pentanoic acid (CPAD) and 2-cyano-2-propylbenzodithioate (CPDB) – and structurally characterized using FT-IR and ¹H-NMR spectroscopy. Data from gel permeation chromatography (GPC) have shown that the final polydispersity indices (PDI) are near unity, a consequence of the control provided by the RAFT polymerization technique. Experimental reaction rates generally increased with increasing size of the ionic liquid solvent. A significant effect of the CTA was observed in the PDI changes during the polymerization. Using CPAD, PDI values were observed to increase with reaction time. On the other hand, a decreasing PDI trend resulted when using CPDB. These findings indicate that CPDB offered better control over the polymerization than CPAD.

Keywords: RAFT polymerization, Room temperature ionic liquids, DEGMEMA, Chain transfer agent, Chemistry

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NP

0192

Evaluation of mango (*Mangifera indica*) peel derived pectin as pharmaceutical binder

Matilac, Gridlin A. , Manongtong, Baby Bia B. , Baula, Ferlien Mae G. , Agustin, Mary Angelie V. , Bersabal, Kathleen G., Pandian, Karl Eric P.

Pharmaceutical excipients that developed from waste products are economical because they are coming from natural sources. The present study aimed to extract pectin from Mango peels (*Mangifera indica*) and exploring its property as binding agent. Extracted mango pectin was evaluated with its capacity to bind by determining the presence of carbohydrates through Molish's, functional groups present by FTIR spectroscopy, physic-chemical characterization by determining its ash content, pH value, solubility behavior, surface tension, loss on drying, bulk and true density, powder flow property and powder compressibility based on the standards set by USP/NF (1995). Acetaminophen tablets containing starch as a binding agent was used as standard for comparison with the Acetaminophen tablets with pectin as binding agent. On the other hand, mango pectin and starch were compared individually as tablet binder in Paracetamol tablet formulation. Formulated tablets were prepared following the standards of USP/NF. Results have shown no significant difference between the mango pectin and starch in post-compression analysis of the formulated tablets in terms of the disintegration and dissolution. It was also revealed that in hardness test there is a significant difference in the binding capacity of pectin being much harder than starch. Meanwhile, friability test was less than one percent. These test results conform to the specification and

standards set by USP/NF. Study revealed that mango pectin is comparable to starch as binding agent. Mango peels were considered waste products and utilizing it can help the environment.

Keywords: *Mangifera indica*, Pharmaceutical binder, Pectin, Chemistry

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0193

Exploring differences and correlation between thermal-optical transmittance elemental carbon (EC) and reflectometer black carbon (BC) from an urban and a rural site in the Philippines

Jimenez, Gloria R. , Santos, Flora L. , Racho, Joseph Michael D. , Bautista, VII, Angel T. , Pabroa, Preciosa Corazon B. , Valdez, Jeff Darren G.

The Philippines has among the highest black carbon (BC) and elemental carbon (EC) concentrations in atmospheric particulate matter in Asia. Despite numerous studies, there is no single, generally accepted measure or method of analysis for this group of atmospheric particulates. Given the high concentrations of BC and EC in the country, the Philippines offers an interesting case to study BC and EC. To gain a better understanding of the similarities and differences of these quantities, BC and EC in an urban (Valenzuela City) and a rural site (Angat, Bulacan) were compared from September 2011 to August 2012. BC was measured using reflectometry, while EC was measured using the thermal-optical (TO) transmittance analysis. Mean concentrations of EC and BC were $5.54 \pm 2.1 \mu\text{g}/\text{cm}^3$ and $6.54 \pm 2.5 \mu\text{g}/\text{cm}^3$ in Valenzuela City and $1.82 \pm 0.7 \mu\text{g}/\text{cm}^3$ and $1.28 \pm 0.7 \mu\text{g}/\text{cm}^3$ in Angat, Bulacan. Cluster analysis showed that in both urban and rural sites, EC1 had the highest correlation to BC among the three EC fractions. Additionally, EC2 and EC3 were poorly correlated with BC but were highly correlated with each other. Similarly, conditional probability function (CPF) analysis revealed that BC and EC1 originated from nearly the same directions, while EC2 and EC3 do not. These results suggest that BC and EC1 are more related to each other than EC2 and EC3, providing insights into the similarities and differences between BC and EC. To maximize the comparability of BC and EC, optimal values of ϵ – used in reflectometry – were determined for the urban and rural sites. Valenzuela and Angat had optimal ϵ values of $6.31 \text{ m}^2\text{g}^{-1}$ and $1.89 \times 10^{-9} \text{ m}^2\text{g}^{-1}$, respectively. The optimal ϵ value in Valenzuela is close to the generally used ϵ value, $7.0 \text{ m}^2\text{g}^{-1}$, while the optimal ϵ value in Angat is arguably too small and needs further assessment.

Keywords: *BC vs EC, Black carbon, Elemental carbon,, Reflectometry, Thermal-optical analysis, Chemistry*

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0194

Fabrication of supercapacitors utilizing novel carboxylate-functionalized methylimidazolium-based binary ionic liquids

Arco, Susan D. , Pernia, Katherine L. , Yap, Gillian Kathryn B. , Patricio, Jonathan N.

Owing to their distinctively tunable properties including low volatility, low flammability, inherent conductivity, wide electrochemical window, and high thermal stability, developing low viscosity ionic liquids (ILs) is vital for emerging energy storage applications including lithium-ion batteries and supercapacitors. This work introduces novel ILs based on 1-alkyl-3-methylimidazolium cations and carboxylate anions. The ILs were prepared via solventless sonochemical synthesis followed by halide-to-anion exchange and were characterized using FT-IR, ^1H -NMR, ^{13}C -NMR spectroscopy. Ionic conductivity results manifested that the synthesized ILs with dicarboxylates as anions exhibit higher conductivity of up to $653.7 \mu\text{S}/\text{cm}$ as compared to ILs with monocarboxylate and halide anions. Interestingly, ILs having shorter alkyl chain length and more number of

RCO₂- in their structure have shown promising electrochemical characteristics as observed by cyclic voltammetry and impedance measurements. In addition, mixtures of ILs containing different anions have been successfully tested as electrolytes. The fabricated carbon-based supercapacitor prototypes with a combination of low molecular weight carboxylate-functionalized ILs showed a significantly improved capacitive performance through cycling, hence making them an excellent candidate as electrolytes. The utilization of these non-halogenated ILs as substitute for aqueous- and organic-based electrolytes can address issues on energy storage devices, particularly on electrode corrosion and thermal degradation when used at higher working potentials and at elevated operating temperatures.

Keywords: Supercapacitor, Electrolytes, Ionic liquids, Imidazolium, Dicarboxylates, Chemistry

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0195

Facile preparation of a polysaccharide-based self-healing composite material

Penaloza, Jr., David P. , Sanoh, Nurzeba C. , Salazar, Gerlone M.

Conventional hydrogels based on polysaccharides are low-cost, biocompatible, biodegradable, and have great potentials in industrial and biomedical applications. This work discusses self-healing capability for a hydrogel composite system made from ubiquitously abundant biopolymers, chitosan (CS) and oxidized xanthan gum (OXG) filled with modified magnetic nanoparticles (MNP). Crosslinking between CS and OXG provided through Schiff base linkages results in a self-healing material. Films from various ratios of MNP, OXG and CS were prepared and characterized. It was found that the weight ratio of 1:1 per weight of the CS and OXG achieved a good balance between the self-healing capability and the mechanical strength of the resulting material. At a weight ratio of 1:1.5 (CS-OXG) results in a less viscous gel compared to the other gels, linked to the reduction (lower OXG content). Most importantly, the CS-OXG-MNP hydrogel with a weight ratio of 1:1:0.2 exhibited the most efficient self-healing ability. Furthermore, CS-XG gels were also prepared for comparison. These gels did not exhibit any self-healing capabilities.

Keywords: Self-healing, Hydrogel, Chitosan, Composite material, Chemistry

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NP

0196

Flavonoid screening and antiplatelet aggregation activity of miracle fruit (*Crescentia cujete*)

Tahad, Jojean D. , Sarona, Glory Jane N. , Gestupa, Lennzy Gel N. , de Panay, Charmaine A. , Cachero, Emelie E. , San Juan, Ma. Eva C. , Pasicolan, Vivien Leigh F.

Flavonoids have the property to inhibit platelet aggregation. This study investigates *Crescentia cujete* fruit on its flavonoid content using Shinoda test, which confirms its pink appearance. The fruit extract was obtained by maceration using 95% ethanol and extracted through rotary evaporation. This further determines its platelet aggregation activity using Giemsa microplate assay by addition of 4 µL of 0.25M Calcium chloride as inducer. The aggregation activity involved the platelet suspension, human type B+ placed in a 96-well microplate, Aspirin (14.8 mg/mL) as positive and NSS as negative control. These were incubated for five minutes at 37°C. The initial dose of plant extract administered in the well was 1.00 mg/kg dose and the highest at 251.10 mg/kg employing 0.60 logarithmic interval. Result revealed higher inhibitory action ranging from 50% to 87% with similar findings from positive control. The inhibitory concentration (IC₅₀) yielded a concentration of 6.75 mg/mL and proved an inhibitory effect on platelet aggregation. A non-violet gel formation indicated 100% inhibition and manifested

both for fruit extract and aspirin. Hence, it is potent antiplatelet aggregation activity. Acute oral toxicity test was also employed and categorized as non-toxic based on OECD guidelines-423.

Keywords: *Crescentia cujete*, *Flavonoids*, *Antiplatelet aggregation*, *Chemistry*

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2014,
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NP

0197

Green synthesis of silver nanoparticles using *Antidesma bunius* aqueous leaf extracts and its cytotoxicity in human-derived colorectal cancer cell lines

Sumayao, Jr., Rodolfo , Roque, Alexandria Marie , Go, Jan Vincent

Silver nanoparticles (AgNPs) have received vast attention in recent years due to its promising biomedical and therapeutic applications. Biogenic synthesis of AgNPs has become an attractive biogenic route for the synthesis of AgNPs by using plant-derived materials. This study aimed to synthesize AgNPs using the aqueous extract obtained from *Antidesma bunius* (*A. bunius*) leaves as a reducing agent. The properties of the synthesized AgNPs were characterized by UV-VIS spectroscopy, FT-IR spectroscopy, energy dispersive x-ray (EDX), scanning electron microscopy (SEM), and dynamic light scattering (DLS). The toxicity of AgNPs was assessed in colorectal cancer cell line, HCT116, using the presto blue cytotoxicity assay. Synthesized AgNPs displayed the characteristic maximal absorption at 424.0 nm which remained prominent for at least 5 weeks. FT-IR analysis showed that the AgNPs exhibit the characteristic Ag molecular vibration and the chemical functional groups associated with *A. bunius* extracts. EDX analysis of AgNPs showed Ag as the predominant atomic species. SEM revealed spherical Ag nanoclusters which are commonly observed in AgNPs preparation. DLS analysis showed that AgNPs had a mean size of 71.8 ± 0.510 nm and polydispersity index (PDI) of 0.212 ± 0.001 . AgNPs had a zeta potential of -34.2 ± 0.103 mV which indicate moderate stability. The viability of HCT116 cells decreased following exposure to AgNPs for 24 hours. Overall, the results indicate the AgNPs synthesized using *A. bunius* extracts exhibited the properties of AgNPs produced via traditional synthetic approaches. Furthermore, AgNPs exhibited anti-cancer potential and may have therapeutic benefits for the treatment of cancer.

Keywords: *Silver nanoparticles*, *Antidesma bunius*, *Green synthesis*, *Anticancer activity*, *Chemistry*

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0198

Hazardous waste chemicals from dichromate chemical oxygen demand analysis: toxicity reduction, recovery, recycling, and testing

Besagas, Ronnie L. / Del Rosario, Romeo M.

This study aims to find a solution to a pressing hazardous waste problem involved in the determination of Chemical Oxygen Demand (COD) testing by the dichromate method. Specifically, it investigated the effects of chromium(VI) concentration and acidity on the reduction-based detoxification of this dangerous ion, the recovery of the mercuric sulfate, and the reuse of the recovered substance. The study adopted the experimental research design. For the reduction experiments, the supernatant liquid of the spent reagents containing the Cr(VI) was used as sample. Iron filings are used as the reductant. It was added at an amount equal to 1:1 Fe to Cr(VI) stoichiometric mass ratio. For the recovery experiments, the precipitate consisting mainly of mercury-chloride complex was used as sample. Synthetic water solutions were used in all COD determinations employed for evaluating the masking effectiveness of the recovered mercuric sulfate. Results revealed that at decreasing initial Cr(VI) concentration, the efficiency of chromium reduction by iron filings decreases; while at decreasing initial acidity, the efficiency of the reduction increases. Furthermore, mercury in spent reagents can be eliminated and mercuric sulfate can be

recovered but its masking ability is not known because, under the conditions used for COD analysis (spectrophotometric with closed-tube digestion), there is indication that chloride is not at all oxidized.

Keywords: COD, Hexavalent chromium, Reduction, Recovery, Hazardous waste, Chemistry

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2010,
(Filipiniana Analytics)
NP

0199

Heavy metals, trace elements and sedimentation samples in the marine protected areas in Lanuza Bay, Surigao del Sur *Capangpangan, Rey Y., Seronay, Romell A.*

The presence of a high concentration of heavy metals in marine protected areas is considered indicators of anthropogenic influence. Currently, 19 marine protected areas have been established and locally managed within the local government units in Lanuza Bay, Surigao del Sur that may be threatened by pollutants from various sources. Sediment samples and sedimentation rate were taken using the PVC tube sampler and sediment traps respectively inside the MPAs in Lanuza Bay. Heavy metals and trace elements from sediment samples were analyzed using Inductively Coupled Plasma (ICP). The mean concentrations of the different metal ions in the 19 MPAs were remarkably low except for those abundant elements such as Al, Fe, P, and K which varied in the sampling sites. The concentration of heavy metals in Buenavista MPA was consistently higher as compared to other sampling sites, although the recorded values did not exceed the established PEL values. The concentration of total chromium in Adlay MPA and San Pedro MPA exceeded the established PEL value of 90 ppm. Noticeably, the MPA with higher total chromium concentration also obtained higher sedimentation rate with 2.632 mg cm⁻² d⁻¹ and 1.23 mg cm⁻² d⁻¹ in Adlay and San Pedro MPAs, respectively. The concentration of trace elements such as Mo, Ge, W, and Sb was also determined, but the environmental risk currently cannot be assessed yet considering that there are no established PEL values.

Keywords: Heavy metals, Sedimentation rate, Chromium, Trace elements, Chemistry

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0200

Hydrogenation of esters using a non-pincer iridium catalyst *Aguila, Mae Joanne B., Lefort, Laurent*

The reduction of ester to alcohol is an industrially important process, eg for the manufacture of flavors and fragrances. Catalytic hydrogenation presents a more atom-efficient reduction, which has been typically done through the use of heterogeneous copper chromite catalysts, under harsh conditions of very high temperature (> 200 C) and pressure (100-200 bars); generally resulting to poor substrate scope and functional group tolerance. Homogeneous catalysts, on the other hand, can be usually done at milder conditions of temperature and pressure, providing better selectivity of the reaction. Here we report the hydrogenation of esters using a convenient iridium catalyst with a robust and readily available non-pincer ligand phenanthroline (phen). The preparation of the reaction mixture involved preforming the catalyst by mixing tetrahydrofuran (THF) solutions of the Ir(I) salt and the ligand substituted-phenanthroline, followed by addition of the substrate solution in THF. The reaction conversion and yield were determined by GCMS, using dodecane as internal standard. By simply using the preformed iridium catalyst [Ir(cyclooctene)2Cl2-2,9-dimethoxyphen], in the presence of 50 bar H₂ at 100C, good to excellent yields (70-100%) of alcohols were derived after 16 h of reaction. The catalytic system was also found to be amenable to a wide array of ester substrates, although trans-esterifications were also observed in some cases. Alkyl hexanoates and activated methyl benzoates were converted almost quantitatively. Five-membered lactones

are converted in 80-85% yields. Diesters and unsaturated esters prove to be difficult substrates to reduce giving no alcohol products or just reduction of the alkene group.

Keywords: Catalytic hydrogenation, Iridium non-pincer catalyst, Ester, Alcohol, Chemistry

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0201

***In vitro* antibacterial screening of santol (*Sandoricum koetjape* Merr.) leaf crude extract**

Juntilla, Alyzza A. , Gardose, Ditche L. , Aguhar, Bevelyn A. , Nogodula, Judee N.

The emergence of different diseases may pose health risk to all people. Nonetheless, Philippines is blessed with natural resources which can be utilized for treating diseases. One of them is a *Sandoricum koetjape* (Santol) in which the antibacterial action of fresh and dried leaf extracts against bacterial strains such as *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Salmonella typhimurium*, Methicillin resistant *Staphylococcus aureus* (MRSA) ATCC 43300 and isolate, *Bacillus cereus*, *Escherichia coli* 0157:H7, *Listeria monocytogenes*, and *Pseudomonas aeruginosa* were the focus of this study. Kirby-Bauer method was performed for antibacterial action having Vancomycin and Azithromycin as positive controls. T-test analyses revealed no significant difference in the efficacy between positive control and fresh leaf extracts against *S. aureus*, *S. epidermidis*, *S. typhimurium*, *B. cereus*, *E. coli* 0157:H7, MRSA ATCC and isolate. However, there is a significant difference against *L. monocytogenes*, and *P. aeruginosa*. In the case of dried leaf extract, there is no significant difference in the zone of inhibition exhibited by *S. epidermidis*, *S. typhimurium*, *B. cereus*, *E. coli* 0157:H7, MRSA ATCC 43300 and isolate. But, there is a significant difference in *S. aureus*, *L. monocytogenes*, and *P. aeruginosa*. The findings reveal that the positive control is more potent antibacterial drug against the microorganisms than the leaf extracts of Santol.

Keywords: *Sandoricum koetjape* Merr., *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Salmonella typhimurium*, *Bacillus cereus*, *Escherichia coli*, *L. monocytogenes*, *P. aeruginosa*, Chemistry

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2013,
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NP

0202

***In vivo* safety evaluation of granules and dressing hemostatic agents from radiation processed polymeric materials**

Abad, Lucille V. , Relleve, Lorna S. , Barba, Bin Jeremiah D. , Tranquilan-Aranilla, Charito

Granules and dressing hemostatic agents were developed from radiation-crosslinked carboxymethyl cellulose (CMC) and the combination of kappa-carrageenan (KC) and polyethylene oxide (PEO), respectively. Bioburden and sterility studies showed that 25 kGy irradiation dose was sufficient to achieve sterility in ten out of ten samples that were tested. The safety and biocompatibility of both granules and dressing hemostats revealed very promising results that support their suitability as medical devices for bleeding control. Extracts from CMC granules (CMC-G) and KC/PEO dressing (KP-D) hemostats injected into female and male Sprague-Dawley rats did not produce any systemic toxic signs like reduction in feed and water consumption and body weight. During the 14-d testing period, no rats in any of the treatment groups manifested behavioral, respiratory, and neurologic changes indicative of systemic toxicity. Hematology tests resulted in mean values within the published normal range. Blood chemistry assays gave normal alanine amino transferase, creatine, and blood urea nitrogen levels – indicating that the extracts were neither hepatotoxic nor nephrotoxic. Microscopic examination of the kidneys and liver revealed intact and normal structures with no inflammatory cells, fibrosis, or necrosis. No mortality occurred in all male and female test rats regardless of the treatment given; thus, the LD₅₀ for all treatment groups is zero (0). The skin irritation evaluation via intracutaneous injection of hemostat extracts generally did not induce

erythema in four out of five rabbits, while edema was absent in all rabbits per treatment group throughout the 14-d test period. Both hemostat extracts had zero irritation score and is therefore classified as a non-irritant. The Guinea Pig Maximization Test (GPMT) of the Magnusson and Kligman method for skin sensitization potential classified both granules and dressing hemostats as weak sensitizers.

Keywords: Hemostatic agents, Irritation, Safety, Sensitization, Systemic toxicity, Chemistry

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NP

0203

Influence of nutrient supplement in the single heavy metal (Pb^{2+} , Cd^{2+} , Cr^{3+}) uptake and mineral nutrients absorption by water kangkong (*Ipomea aquatica* Forsk.)

Adornado, Adonis P. , Soriano, Allan N. , Navarrete, Ian A. , De Luna, Marjorie S.

The present study investigated the effects of Cd^{2+} , Pb^{2+} , and Cr^{3+} stress on mineral contents (K^+ , Na^+ , Ca^{2+} , P , Mg^{2+} , Fe^{2+} , Cu^{2+} , Zn^{2+} and Mn^{2+}) in the different parts of water kangkong (*Ipomea aquatica* Forsk.) by point analysis method using Horiba XGT-72000, as well as the influence of nutrients on the uptake and accumulation of these heavy metals. *I. aquatica* cuttings were grown in tap water supplemented with a very small amount of NPK fertilizer and treated with $\text{Pb}(\text{NO}_3)_2$, $\text{Cd}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$, and $\text{K}_2\text{Cr}_2\text{O}_7$ under two soaking solutions – hydroponics solution and tap water solution. Results revealed that Cd^{2+} , Pb^{2+} , and Cr^{3+} alter the mineral nutrient absorption of *I. aquatica*. Particularly, the approximate concentrations of most mineral ions (K^+ , Ca^{2+} , Fe^{2+} , Cu^{2+} , Zn^{2+} and Mn^{2+}) in the leaves and stems were reduced by Cd^{2+} , Pb^{2+} , and Cr^{3+} exposure, thus making *I. aquatica* deficient in nutrients when consumed as food. It was also observed that these heavy metals caused a disturbance in $\text{K}^+/\text{Ca}^{2+}$ and K^+/Na^+ ratio, which could have a great impact on water balance. Data also suggest that nutrient optimization may help *I. aquatica* to develop tolerance to Cd^{2+} , Pb^{2+} , and Cr^{3+} and can be a good strategy to alleviate the accumulation of heavy metals by *I. aquatica*. The mechanisms of translocation of Cd^{2+} , Pb^{2+} , and Cr^{3+} from roots to shoots behave differently in the presence of nutrients.

Keywords: *Ipomea aquatica* Forsk., Absorption, Heavy metal uptake, Mineral nutrients, Nutrient supplement, Chemistry

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NP

0204

Investigating the ionic conductivity and electrochemical window of 1-alkyl-3-methylimidazolium halide [RMMIM] $_x$ ionic liquids

Pernia, Katherine L., Patricio, Jonathan N. , Arco, Susan D.

Rapid increase on energy demand has led to the use of supercapacitors which has higher power density and longer cycle life than conventional capacitors and batteries. However, the applications of supercapacitors are hindered by their low energy density. This could be addressed by increasing the capacitance with the use of ionic liquids (ILs) as electrolytes, primarily due to their wide electrochemical window (EW) and high ionic conductivity. In this study, 1-alkyl-3-methylimidazolium halides [RMIM] $_x$ ILs ($X = \text{Br}$, Cl , I) were prepared and were utilized as electrolytes for carbon-based supercapacitors. The [RMIM] $_x$ ILs (C_2 , C_4 , C_6) were synthesized via solventless sonochemical reaction between 1-methylimidazole and 1-haloalkane. ^1H -NMR, ^{13}C -NMR, and FT-IR spectroscopy were used to confirm their structures. Conductivity measurements showed that among the synthesized [RMIM] $_x$ ILs, $[\text{C}_2\text{MIM}]\text{Cl}$ exhibited the highest conductivity of 539.67 $\mu\text{S}/\text{cm}$. Moreover, cyclic voltammetry results revealed that $[\text{C}_2\text{MIM}]\text{Br}$ has the widest EW of 1.44 V recorded at a scan rate of 100 mV/s

at a working potential of -3V to 3V. These significant results proved that [RMIM]X ILs can be used in place of aqueous- and organic-based electrolytes for energy storage applications.

Keywords: *Ionic liquids, Electrochemical window, Electrolytes, Supercapacitor, Chemistry*

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NP

0205

***In vivo* determination of the blood glucose lowering activity of lumboy (*Syzygium cumini*) leaf extract**

Waminal, Mary Claire C. , Sanchez, Patricia Libby R. , Vidal, Rose Jasmin D. , Merida, Rejane V. , Camad, Jeannifer Mae T. , Morales, Sonia S.

Diabetes is one of the leading causes of death and has become an alarming disease with its increasing prevalence rate. Through the times, humankind has been into various medical discoveries for the treatment of various diseases. And thus, plants had been widely the focus of study as sources of treatments. The study was conducted to determine the blood glucose lowering activity of the Lumboy (*Syzygium cumini*) leaf crude extract in hyperglycemic rats induced with Medic orange. The leaf extract was also tested for its toxicity and determination of approximate effective dose and effective dose at 50% of the test animal population. Findings revealed that the Acute Oral Toxicity Test found Lumboy leaf extract as a nontoxic substance. Approximate Effective Dose was determined at 10 mg/kg to 2511.9 mg/kg while Effective dose of population was at <39.81 mg/kg. The leaf extract was then used for the formulation of solution and bioassay result showed no significant difference between the blood glucose lowering activity of the Lumboy leaf extract and Metformin solution using albino rats.

Keywords: *Diabetes, Syzygium cumini, Blood glucose lowering, Hyperglycemic, Metformin, Chemistry*

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2014,
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NP

0206

Lipid lowering potential of kamias (*Averrhoa bilimbi*) fruit and leaf extracts formulated as capsule

Sy, Kathleen Ashley B. , Numancia, Elsa Mae M. , Demetrio, Kessel B. , Indig, Agnes B. , Baula, Ferlien Mae G., Ybanez, Rhoselyn R.

Hypercholesterolemia is a disorder that results to narrowing of the arteries that cause atherosclerosis which is a disease of the heart and vascular system that are the leading causes of mortality in the Philippines. Plants have different potentials and are used primarily to treat diseases. One of these plants that are commonly available in the Philippines is Kamias (*Averrhoa bilimbi*). It consists of functional groups of cyclic ether and alcohol that indicates saponin as the main and active ingredient that has the ability to eliminate lipids. The fruit and leaf extracts of the plant were lyophilized and formulated as capsule. It was administered to the test animal to determine its anti-hyperlipidemic effect. This research determines the acute oral toxicity dose, approximate effective dose and significant difference of Kamias leaf and fruit extracts. The statistical tool used in this study was Dependent T-test to compare the effectiveness of fruit and leaf extract of Kamias (*Averrhoa bilimbi*). It suggested that both fruit and leaf extracts showed non-toxic at the dose of 2000 mg/kg. Formulated capsule of Kamias (*Averrhoa bilimbi*) appeared to have significant difference between the fruit and leaf ethanolic extracts and negative control which is the placebo on its lipid lowering activity.

Keywords: *Averrhoa bilimbi, Lipid lowering potential, Hypercholesterolemia, Chemistry*

Locally available agricultural wastes as source of xylose sugars for xylitol fermentation in the Philippines

Acenas, Jan Tristan M. , Eseo, John Leonard E. , Nayve, Jr., Fidel Rey P. , Arias, Alyanna Mariah dIR , Yanela, Jason E. , Armijo, Donn Paul P. , Tambalo, Richard D., Ison, Luisito G. , Alfafara, Catalino G.

Agricultural wastes are abundant in corn and sugarcane production. Corn cubs, corn stovers and sugarcane bagasse are rich in hemicellulose and good sources of xylan for breakdown to xylose sugars and the high value product, xylitol. Studies were conducted aimed to initiate the development of a local technology for the production of xylitol via biotechnology. Three kinds of lignocellulosic agricultural wastes, sugarcane bagasse (SB), corn cubs (CC) and corn stovers (CS) were hydrolyzed as sources of xylose sugars for the biotechnological production of xylitol. Using Response Surface methodology, the optimum conditions for the high temperature-dilute acid hydrolysis of ground SB, CC and CS were obtained. All responses had reasonable agreement between predicted and actual values of the response. Utilization of the optimized conditions obtained for each substrate led to the production of hydrolysates with high xylose content, low glucose content and insignificant amounts of inhibitory compounds. The hydrolysates obtained were amenable to xylitol fermentation. Selected agricultural wastes can be used in exchange for corn fibers and birch tree material being used in other countries. The Philippines can still enter the worldwide xylitol market if we initiate the use of unlimited resources like agricultural by-products as raw material for xylose sugar and eventually, xylitol. The biotechnological process is an interesting alternative to the chemical process due to reduced production costs, cheaper downstream processing and higher yields.

Keywords: *Agricultural waste, Xylose, Xylitol fermentation, Chemistry*

Management of spent high activity radioactive sources in the Philippines using mobile hot cell

Panlaqui, Angelo A. , Inovero, Abelardo A. , Marcelo, Editha A. , Piquero, Ronald E.

Spent high activity radioactive source (SHARS) is one type of sealed radioactive sources that are typically found inside teletherapy and irradiator devices. As described by the International Atomic Energy Agency (IAEA), these sources are classified as Categories 1 and 2, which pose high risks to human health if they are not managed properly. The radioactive waste management facility (RWMF) does not have the capability of handling SHARS; thus, the RWMF of the Philippine Nuclear Research Institute (PNRI) initiated the safe and secure management of these sources with the assistance of the IAEA through the Nuclear Energy Corporation of South Africa (NECSA). The RWMF performed site preparation for the construction of the mobile hot cell (MHC). The management process involves dismantling the equipment, recovering and encapsulating the source, and placing it inside the long-term storage shields (LTSSs), which are performed inside the MHC. In total, 16 sources were successfully retrieved with a total activity of 204 TBq. The dose rate of both LTSS-1 and LTSS-2 at the surface of the shield was 103 $\mu\text{Sv/h}$ and 102 $\mu\text{Sv/h}$, respectively – both of which are below the regulatory limit of 2 mSv/h for the safe transportation of radioactive package. The utilization of the MHC in managing SHARS has made it possible the safe and secure retrieval of SHARSs, given the lack of capability of the Philippines in handling this type of wastes.

Keywords: *Conditioning, Mobile hot cell, Sealed radioactive sources, Security, SHARS, Chemistry*

Note: Amino acid in raw and treated animal wastes

Ramirez, Ann Maureen E. , Garraway, J. L.

The amino acid in pig slurry are mostly aliphatic acids, the dominant ones being glutamic acid, glycine, alanine and aspartic acid. The amino acids were degraded by aeration, treatment with hydrogen peroxide and aerobic digestion, but not by anaerobic storage.

Keywords: *Amino acid, Animal wastes, Aliphatic acids, Glutamic acid, Glycine, Alanine , Aspartic acid, Chemistry*

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1982 July-September,
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Fil(S) S19 P53

Oxidizability of common halides and applicable masking agents in the dichromate chemical oxygen demand determination

Del Rosario, Romeo M. , Salingay, Maria Luisa B.

This study was conducted for the purpose of evaluating the oxidizability of common halides and finding other complexing agents, which can effectively suppress chlorides, bromides and iodides and at the same time minimize the usage of mercuric sulfate. To compare the extent of oxidation of chloride, bromide and iodide, freshly prepared solutions of different concentrations were used in order to see the variations due to concentration. The following are the findings of the study: In the extents of oxidation, (1) chloride was 48.20% oxidized, (2) bromide was oxidized up to 99.40% and (3) iodide was unusual at 553.4% level of oxidation. But, the oxidizabilities of chloride is just about half of the current literature value of 0.226mg oxygen per mg of chloride indicating an overestimation of earlier studies. As far as the masking effectiveness of the complexing agents, (1) mercuric sulfate was effective in totally masking chloride at 760mg but ineffective in totally masking bromide; (2) aluminum sulfate was effective in totally masking chloride at approximately 1930mg but ineffective in totally masking the other halides; (3) ferric sulfate was ineffective in totally masking the three halides even at the maximum amount used of 2500mg; (4) mercuric-aluminum sulfate mixture was ineffective in totally masking the halides; (5) mercuric-ferric sulfate mixture was very effective in totally masking chloride at approximately 380mg but ineffective in totally masking bromide; and (6) aluminum-ferric sulfate was effective in totally masking chloride at approximately 2180mg but again ineffective in totally masking bromide.

Keywords: *Oxidizability, Complexing agents, Masking, Chemistry*

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2010,
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NP

Peroxide determination and mutagenic analysis of fresh and used canola and coconut oils

Redolosa, Ilona Cris G. , Jamero, Charlene May G. , Cabrera, Annabelle C. , Nogodula, Judee N.

Oil is a common substance used for cooking and may pose development of disease like cancer if not properly regulated its usage. One indication for cancer development from oil is its peroxide value (POV), the concentration

of peroxide and hydroperoxides, which result into a rancidity of fats and oil. This can damage the DNA attributed to the disease development like cancer. Mutagenicity is also a sign of cancer development. Thus, this study focuses on fresh and used canola and coconut oils and tested according to the frequency of usage during cooking such as 2, 3 and 4 times. POV was measured through titration and mutagenic property employing Ames test (direct assay only) using *Salmonella typhimurium* TA98. Results revealed an increasing POV on both kinds of oil when continually used for cooking. ANOVA ($p>0.05$) indicated a significant difference between fresh canola oil from WHO standards, which is within the standard limits but fresh coconut oil is in the borderline of 10 mg/kg thus, susceptible to oxidation. Similar findings revealed from the used cooking oil samples. Mutagenic property indicated no revertant colony from fresh samples. However, used canola samples gave high number of colony ranging from 13 ± 15.5361 to 363 ± 149.1224 while used coconut oil had 13 ± 11.2760 to 376 ± 174.5750 and positive control exhibited 368 ± 24.0901 . Post Hoc multiple comparison tests gave no significant difference on the revertant colony between used cooking oil (4 repetitions) and positive control. Thus, repetitive used of cooking oil may become potent to develop mutagenic property that may lead to cancer development.

Keywords: *Canola oil, Coconut oil, Peroxide value test, Ames test, Chemistry*

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2013,
(Filipiniana Analytics)
NP

0212

Physicochemical characteristics and prebiotic activity of young and mature yacon (*Smallanthus sanchifolius*) roots

*Murray, Alyzza Starla M. , Ignas, Louella Bianca L. , Muyco, Joanna Therese C. , Lim, Richill Gen A. ,
Enoc, Irene Cris B. , Bersabal, Kathleen G.*

The yacon plant (*Smallanthus sonchifolius*) contains inulin and fructooligosaccharides, which are known prebiotics. This study was done with the intent of evaluating the prebiotic activity of dried young and mature yacon root ethanolic extracts. The prebiotic activity was evaluated by the effect of plant extracts on the growth of *Lactobacillus acidophilus*. The prebiotic activity was significantly higher for ethanolic young root extracts at such concentrations compared to that of the ethanolic mature root extracts. At 10% concentration, the young Yacon ethanolic root extract has significantly higher prebiotic activity compared to that of the positive control. The prebiotic activity mature yacon in all the experimental concentrations used (0.5%, 1%, 2%, 5%, and 10%) were significantly different, all have significantly lower prebiotic means, when compared to that of the positive control. All of the experimental concentrations of young yacon ethanolic root extracts have significantly higher mean of prebiotic activity compared to the negative control. Another purpose of this study was to isolate and characterize inulin from young and mature yacon roots. Isolation was done by aqueous extraction and crystallization. Greater amount of inulin was isolated from young yacon root, which was found to have less impurity in a color basis than that obtained from the mature yacon root. Both the inulin from the young and mature yacon roots has no significant % glucose mean difference compared to commercial inulin.

Keywords: *Yacon, Inulin, Prebiotic, Lactobacillus acidophilus, Chemistry*

Root Gatherers, Volume No. 6 Issue No. 1, 89-108
2014,
(Filipiniana Analytics)
NP

0213

Phytochemical screening of five folkloric plants used by indigenous tribes in Mindanao *Bebillo, Mabelliza E. , Casalan, Florie C., Ayo, Joyce Mae Veronne R. , Fano, Jeanie Rose*

Plant is widely used as a source of medicines by some Mindanaoan tribes. The researchers aimed to study five folkloric plants used by five different tribes to treat different illnesses and sickness. These plants were collected and selected based on the interview with the traditional healers of Manobo tribe of Kimgating, Kalilangan

Bukidnon, Matigsalog tribe of Kimanait, Kalilangan Bukidnon, Talaandig tribe of Pangantucan Bukidnon, Maranao tribe of Kalilangan Bukidnon and the Higanon tribe Ulayan, Kalilangan Bukidnon. The plants were identified as Amor-seco (*Bidens pilosa*), Anuang (*Kyllinga monocephala*), Bilabila (*Eleusine indica*), Bugang (*Pennisetum purpureum*), and Gemilina (*Gmelina arborea*). The said plants were tested on its alkaloids, cardenolides and bufadienolides, anthraquinones, flavonoids, saponins and tannins. Field test was done in Bukidnon and remaining tests in University of the Immaculate Conception. Results showed absence of alkaloid while saponins were only present in *K. monocephala* and *P. purpureum*. Steroids were detected to all plants except *E. indica* and *K. monocephala*. While tannins were also detected in all plants except for *K. monocephala* and *B. pilosa*. Flavonoids were shown to be positive in *B. pilosa* and *G. arborea*. All were negative in anthraquinones.

Keywords: Folkloric plants, Mindanaoan lumads, Phytochemical Screening, Chemistry

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2013,
(Filipiniana Analytics)
NP

0214

Phytochemical screening of the bark, leaf and fruit rind of rambutan (*Nephelium lappaceum*)

De Leon, Gerrick James M. , Burlas, Katreena R. , Pasicolan, Vivien Leigh F., Sales, Kershey S.

Nephelium lappaceum is a native inhabitant of Southeast Asian countries such as Indonesia, Malaysia, Thailand and the Philippines where it is commonly known as rambutan. The fruits are eaten fresh or as canned products and some medicinal uses include the treatment for diarrhea, fever, dysentery, and dyspepsia. Since *N. lappaceum* embraces the subtropical lands, it is imperative to explore its phytochemical constituents that run throughout its different parts. Hence, the study aimed in determining the secondary metabolites such alkaloids, saponins and tannins in the barks, leaves and fruit rinds through ethanolic extraction. The extracts underwent preliminary tests using Mayer's reagent and Dragendorff's reagent. All the plant parts yielded definite turbidity for the Mayer's reagent. For the Dragendorff's reagent, the rind and the bark gave heavy precipitation and the leaves gave definite turbidity. Extracts were then subjected to confirmatory testing using the same reagents since they tested positive to preliminary test to verify the presence of alkaloids. Result revealed that alkaloids are present in the rind, leaves and bark. The rind, leaves, and bark were positive for saponins. The froth height of the rind was 1cm, the leaves were at 0.6 cm and 0.5 cm for the bark. Gelatin and ferric chloride tests were used for the detection of the presence of tannin. All plant extracts had formation of white precipitate. Ferric chloride test revealed that each extract gave a bluish black color solution. Barks, leaves and fruit rind yielded positive for alkaloids, saponins and tannins.

Keywords: Pharmacognosy and Organic Medicinal Chemistry, *Nephelium lappaceum*, Phytochemical screening, Chemistry

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2013,
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0215

Preparation of synthetic peptides from dengue virus non-structural glycoprotein 1 (NS1)

Sabido, Portia Mahal G. , Guillermo M. , Nuesca, , Lorenzo, Lisette Kjell Z. , Zulueta, Marjorie S., del Mundo, Florian

Peptides are amino acid polymers that share the same chemical structure with proteins, therefore, it is possible for peptides to substitute for proteins as a biological recognition element. Recently, molecular imprinting technology has been used in the development of artificial biosensors using peptides or epitopes with specific sequences as template molecules that can provide high selectivity towards a targetted analyte. In this study, potential epitopes

for the development of molecularly imprinted polymer (MIP) dengue sensors have been synthesized. The peptides were synthesized using Fmoc solid-phase peptide synthesis (SPPS) method. Lyophilized crude peptides were subjected to reverse-phase high pressure liquid chromatography (RP-HPLC) for purification and characterized using mass spectrometry and circular dichroism spectrometry (CD-ORD). Peptides screened from dengue virus NS1 protein with sequences (1) Ac-EVEDYGFG-NH₂, (2) Ac-KYSWKTWGKAK-NH₂, (3) Ac-VHTWTEQYKFQ-NH₂, and (4) Ac-TRLENLMWK-NH₂ were successfully synthesized, purified and characterized.

Keywords: Peptide Synthesis, Dengue Virus NS1, Epitope, Chemistry

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0216

Pupal eye color of peach fruit fly *Bactrocera zonata* (Saunders) as reference guide for radiation sterilization

Resilva, Sotero S., Sookar, Preeaduth, Obra, Glenda B.

The pupal eye color of Peach fruit fly *Bactrocera zonata* (Saunders) was documented at different holding temperatures. When holding mature pupae samples at 19, 25 (standard holding temperature), 28, and 22–34 °C (natural environment), the development of pupae were 18–19, 9, 7, and 8 d, respectively. Holding pupae at lower temperature delays pupal development and slows down the progression of eye color changes. This is very important in manipulating pupal development, especially when problems occur during sterile insect technique (SIT) operations. The recommended timing of pupal irradiation for *B. zonata* at 25 °C is at 2 d before adult emergence, where the pupae are 9 d old and the eye color is dark reddish-brown. Using eye color as a reference guide for irradiation of pupae, the optimum age when held at 19, 28, and 22–34 °C (natural environment) was 18–19, 7, and 8 d old, respectively. Documented and a close-up photograph of pupal eye color was used as a reference guide to determine the best time for the irradiation of pupae in an SIT program for *B. zonata*.

Keywords: *Bactrocera zonata*, Peach fruit fly, Pupal eye color, Pupal development, Sterile insect technique, Chemistry

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2020,
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NP

0217

Quantitative analysis of caffeine in selected commercially available energy drinks by high performance liquid chromatography

Rellin, Maricar T., Salva, Edna T.

This study was conducted to determine the caffeine concentrations of the five selected commercially available energy drinks and to assess if these certain brand of energy drinks conform to the allowable limit set by the FDA. All samples were purchased from different convenience stores in Davao city. All measurements were tested in triplicate per trial and calculated in parts per million (ppm) or mg/L. The peak area of caffeine in each sample was determined and compared with the peak area of the standard caffeine solutions and the concentrations of caffeine for each sample was calculated using the equation formed by the linear calibration curve of standard caffeine solutions. The caffeine concentrations in the five selected commercially available energy drinks significantly differed from each other. The order of energy drink samples according to increasing caffeine concentration was: Sample A>Sample B>Sample C > Sample D > Sample E. All the experimentally determined caffeine concentrations for the five selected commercially available energy drinks differed with their label claim caffeine concentrations. Moreover, the experimentally determined caffeine concentrations for samples A, B, and C

conformed to the FDA allowable limit (≤ 500 ppm) per serving while the caffeine concentrations of samples D and E exceeded the FDA allowable limit.

Keywords: *Caffeine, Energy drinks, HPLC, Label claims, FDA allowable limit, Chemistry*

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2013,
(Filipiniana Analytics)
NP

0218

**Rainwater chemistry and biochemical effects: basis for air quality assessment of
Cagayan de Oro City, Philippines**
Palmes, Nenita D. , Del Rosario, Romeo M.

This research attempted to characterize the air quality in the vicinity of what has been considered the densely polluted part of Cagayan de Oro City, Philippines - the Agora-Highway intersection—through the study of the rainwater chemistry and the rainwater biochemical effects. The parameters selected include the following: color, appearance, pH, conductivity, nitrate, suspended solids, chemical oxygen demand (COD), and pro-oxidant activity (in vitro). The bioassays used mongo and lettuce seeds for percent germination and root length. Ipomoea reptans (kangkong) was also used for effect on biomass loss and leaf length change. The same plant was then utilized for biochemical tests which included electrolyte leakage, lipid peroxidation, total phenolics, chlorophylls, and carotenoids. A control was run for each of the bioassays using distilled water (Wilkins Distilled Drinking Water).

In the whole, the results of the physico-chemical analyses showed that the rainwater during the period of the study was generally polluted only to a very minimal extent. The exception was the nitrate level which was somewhat high if considered for human consumption. Further, the bioassay and biochemical test results revealed that relative to the control, the rainwater did not acquire any general toxicity. While there are definitely limitations, on the basis of these data, the overall assessment is that the air during the period of this study was still quite safe from the harmful effects of pollutants.

Keywords: *Rainwater, Rainwater chemistry, Biochemical effects, Chemistry*

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2011,
(Filipiniana Analytics)
NP

0219

**Removal of acid black dye from aqueous solution by the use of perlite from Legazpi,
Albay and the design of an agitation tank for the adsorption process**
Serva, Abigail P. , Ongkho, Edricson N. , Pestaño, Lola Domnina B., Cañares, Rizamae A.

Treatment of textile waste water has emerged as a great matter of concern amongst scientific community because of essentiality and scarcity of this valuable natural resource. Various techniques have been employed for waste water treatment, amongst which use of natural materials have made a significant contribution in the area of sustainable environment. In this study, the adsorption performance of perlite for acid black dye from aqueous solution was investigated. Residual solutions of the adsorption process were spectrophotometrically examined at the maximum wavelength of 615 nm. Effects of the parameters such as grade of perlite, treatment of perlite, dosage of perlite and contact time on the removal of the dye were studied. Maximum decolorization of about 96% was observed after 10 minutes with 0.8 g of the modified filter aid perlite. Adsorption isotherms like Langmuir and Freundlich were used to describe this phenomenon. The experimental data were correlated reasonably well by the Langmuir adsorption isotherm with an R^2 value of 0.9895. Spectroscopic tests such as Ultraviolet Spectroscopy (UV-Vis), Fourier Transform-Infrared Spectroscopy (FT-IR) and Scanning Electron Microscopy

(SEM) were done and helped to the conclusion of the effectivity of perlite as an adsorbent for the removal of AB1 dye in aqueous solutions. Using the effluent flowrate from Saffron Philippines, Inc. of 7656 L/day as basis, an agitation tank was designed with a diameter and height of 2.30 m and 2.14 m respectively for the adsorption of acid black dye 1 using 122.5 kg Expanded Perlite (EP) and a power consumption of the impeller motor at 1160 kW.

Keywords: Acid black dye, Adsorption, Agitation tank, Expanded perlite (EP), Textile waste water, Chemistry

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0220

Sedimentation patterns in Sorsogon Bay, Philippines using ^{210}Pb

Bulos, Adelina DM. , Dayaon, Jennyvi P. , Asa, Anie Day DC. , Aniago, Ryan Joseph , Madrid, Jordan F. , Sta. Maria, Efren J., Sombrito, Elvira Z.

^{210}Pb has been used as a tracer to give an insight into the sedimentation process occurring in Sorsogon Bay. The sedimentation process can provide the possible sources, movement, pathways, and sinks of sediments and sediment-associated materials (e.g., chemicals, pollutants) – which are important for a better understanding of the changes happening in the bay and its watershed. The information that will be derived can be used as an input parameter by other researchers doing modeling work (material/water/pollutant flow, movement, dispersion, and residence time dynamics) at Sorsogon Bay. Seven sediment cores have been collected in Sorsogon Bay to determine the ^{210}Pb -derived sedimentation rate estimates across the bay. A sedimentation rate of 1 cm/yr could be estimated for the eastern, central, and western areas of Sorsogon Bay. Areas near Sorsogon City (SO-07), Cadacan River (SO-03), and the area offshore of Buenavista and Rizal (SO-06) have enhanced sediment deposition, which could be due to an area where enhanced erosion from human activities is apparent, proximity to a river system that drains/carries volcanic material and debris from Mount Bulusan, and near an open dumpsite where possible materials (wastes, debris, leachates) could be carried offshore respectively. The sedimentation rates are shown to be higher in the shallower areas of the bay.

Keywords: ^{210}Pb , Sedimentation rate, Sorsogon Bay, Chemistry

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2020,
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NP

0221

SGPT level in paracetamol-induced rabbits treated with formulated capsule from turmeric rhizome (*Cucurma longa*) ethanolic extract

Rideout, John A. , Oliva, Efraim M. , Estimo, Krisna Mae M. , Capito, Arabelle Kristine D. , Cabangon, Neffretteree P. , Borbon, Irah A. , Baweg, Charizel Mea S. , Bagundol, April D. , Babon, Jenny Rose C. , Paramo, Orheliza L. , Morales, Sonia S.

Liver disease is a range of conditions and associated symptoms that develop when the liver becomes damaged. Taking Paracetamol is one cause of liver damage because it is popular as over-the-counter drug that can easily be bought by the people. To address this issue, analysis of the liver damage through the level of Serum Glutamate Pyruvate Transaminase (SGPT) was done in this study using turmeric rhizome (*Curcuma longa*). A phytochemical screening was primarily performed and revealed to have flavonoids. Acute oral toxicity test was employed as a protocol if safe for formulation. This reveals to be non-toxic based on the OECD 423 guidelines at 2000 mg/kg body weight of rabbit. The Approximate Effective Dose (AED) level of Turmeric rhizome is 68.094 mg/kg which is the high dose. Analysis of Variance for SGPT levels between test extract and positive control showed no significant difference. It means that the activity of turmeric rhizome is comparable to essential (positive control). Therefore, the Turmeric rhizome formulated capsule can lower the SGPT level of the paracetamol induced rabbits

under the experimental condition. This study suggests that the *Curcuma longa* will be subjected for further investigation using pathological procedure and Effective Dose (ED90) for additional information on the SGPT lowering potential of the plant material.

Keywords: *Cucurma longa, SGPT, Paracetamol-induced rabbits, Chemistry*

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2013,
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NP

0222

Source estimation and correlation analysis of thermal-optical transmittance elemental carbon (EC) and reflectometer black carbon (BC) from an urban and a rural site in the Philippines

Jimenez, Gloria R. , Santos, Flora L. , Racho, Joseph Michael D. , Bautista, VII, Angel T. , Pabroa, Preciosa Corazon B. , Valdez, Jeff Darren G.

Black carbon (BC) and elemental carbon (EC) are light absorbing atmospheric particulate matter that pose significant effects on health, visibility, and climate. BC and EC, though often well correlated, are not interchangeable due to their different properties and methods of measurement. To better understand the differences between EC and BC and their implications to general air quality, samples were compared from urban (Valenzuela City) and rural (Angat, Bulacan) sites from September 2011 to August 2012. Valenzuela City EC and BC concentrations were determined to average $5.54 \mu\text{g}/\text{cm}^3$ and $6.54 \mu\text{g}/\text{cm}^3$ while Angat, Bulacan values were found to average $1.82 \mu\text{g}/\text{cm}^3$ and $1.28 \mu\text{g}/\text{cm}^3$ respectively. Cluster analysis revealed that for the rural site, Angat, EC1 is grouped with BC, though EC1 and EC2 fractions are present in nearly the same concentrations. For the urban site, Valenzuela, BC clustered with EC1 and other OC fractions, which is expected since Valenzuela is EC1 predominant. Nevertheless, for both rural and urban site, BC is consistently grouped with EC1, while EC2 and EC3 are grouped separately. These results were further verified by Conditional Probability Function (CPF) analysis as Valenzuela EC1 fraction shows different major sources compared to its co-fractions EC2 and EC3. In addition, EC1 shows common major sources with BC. These results give further insights on the fundamental differences between EC and BC.

Keywords: *Elemental carbon, Organic carbon, Black carbon, EC vs BC, Chemistry*

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NP

0223

Spatiotemporal modelling of parasite aggregation in lentic ecosystem

Paller, Vachel Gay V. , Rabajante, Jomar F. , Buhat, Christian Alvin H.

Parasite aggregation is a commonly occurring phenomenon where majority of the parasites accumulate in the smaller fraction of the host population while many individual hosts have low parasite load. The goal of the study is to develop and analyze a spatiotemporal model to explain the possible mechanisms of parasite aggregation. Using Netlogo, we constructed an agent-based simulation involving fish hosts foraging in zooplanktons harboring macroparasites in a lentic ecosystem. Effects of factors such as population density, reproduction of hosts, infection and treatment area sizes, and clustering of source of infection are incorporated and analyzed in our model. Our simulations showed that (i) the initial size of the population of both the fish and zooplanktons have minimal effect on the aggregation of parasites; (ii) increasing the probability of reproduction of both fish and zooplankton leads to parasite aggregation in fish; and (iii) aggregation occurs either by decreasing the size of the infection area or increasing the size of the treatment area in the lentic ecosystem.

Keywords: *Parasite aggregation, Spatiotemporal, Agent-based model, Negative binomial distribution, Parasitism, Chemistry*

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0224

Spectrometric validation of flavonoid content and anti-inflammatory activity of *Chromolaena odorata* leaf extract

Gatab, Guille Marri B. , Lagdamin, Pauline Joy A. , Galicia, Gladys B. , Faller, Nhadyne C. , Camon, Jen Jen I. , Cabadonga, Jean L. , Bermudez, Lyzza Marizz L. , San Juan, Ma. Eva C. , Baula, Ferlien May, Magbanua, Arianne Lorraine P.

One of the leading causes of significant debility among Filipinos is Rheumatoid Arthritis. There is no known cure for rheumatoid arthritis. The available medication is for symptom control and slowing the progression of the disease. The use of hagonoy (*Chromolaena odorata*) could be an inexpensive alternative if proven to be effective. The primary goal of the study was to conduct a bioassay and detect anti-inflammatory properties using *C. odorata* fresh and dry extracts. Alkaloids and flavonoids were identified and the presence of chromophores specifically carbonyl compounds indicative of functional groups found in flavonoids were detected using UV-Vis Spectroscopy. The Acute Oral Toxicity 423 test showed that at the highest dose, 2000 mg, moderate toxicity was exhibited while Approximate Effective Dose was observed at 19.90 mg/ kg and 79.22 mg/kg corresponding with the highest decrease in paw thickness for the fresh and dried extracts, respectively. The bioassay had four arms namely positive control (ibuprofen), negative control (plain suspension), dried and fresh formulated suspensions. Results show that the highest degree of decreased paw thickness was 6 hours after administration. The negative control was expectedly with the least result. Statistical analysis using two-way ANOVA showed that there was a significant difference among the average decrease of paw thickness among the four groups. The post-hoc analysis showed that the positive control had the highest decreasing capacity. There was also a significant difference between the fresh and dried extracts. Lastly, the microbial assay of fresh and dried hagonoy suspensions had no traces of microbes.

Keywords: *Chromolaena odorata, Anti-inflammatory, Spectrometric validation, Flavonoid, Chemistry*

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2013,
(Filipiniana Analytics)
NP

0225

Synthesis of copper-manganese spinel nanoparticles via oxalate precipitation for methanol steam reforming

Buenviaje, Jr., Salvador C. , Barbosa,Roland , Edañol, Yasmin D.G., Payawan, Jr., Leon M.

CuMn spinel nanoparticles were prepared using the oxalate precipitation synthesis technique using nitrate salts as precursors. The samples were characterized using X-ray diffractometry (XRD), and field emission – scanning electron microscopy (FE-SEM). The mixed oxalate precursor, $\text{CuMn} \cdot \text{C}_2\text{O}_4$, was found to be single-phase and crystalline compound. H_2 -assisted temperature-programmed decomposition of the mixed oxalates yielded $\text{Cu}_{1.5}\text{Mn}_{1.5}\text{O}_4$ spinel nanoparticles with CuO present in very minute amounts. FE-SEM analysis of the $\text{Cu}_{1.5}\text{Mn}_{1.5}\text{O}_4$ spinel showed a spherical morphology of the nanoparticles. The average size of the $\text{Cu}_{1.5}\text{Mn}_{1.5}\text{O}_4$ spinel nanoparticles was 11.512 nm. Thus, the nano-sized $\text{Cu}_{1.5}\text{Mn}_{1.5}\text{O}_4$ spinel nanoparticles can be used as catalysts for the methanol steam reforming (MSR) reaction.

Keywords: *Oxalate precipitation, Methanol steam reforming, Nanoparticles, Chemistry*

Two-stage process on the growth of high-density zinc oxide nanostructures via chemical bath deposition on glass substrates

Alguno, Arnold C. , Senados, Kenneth M.

Zinc oxide nanostructures were deposited on glass substrates using ZnSO₄ with varying NH₄OH concentration via one-stage and two-stage chemical bath deposition (CBD) method. The two-stage process was prepared by pre-treatment of the glass substrates with ZnO colloid powder which were obtained from a previous bath deposition before the CBD takes place. Scanning electron microscope (SEM) images revealed that the two-stage CBD technique yielded a high-density of the ZnO nanostructures as compared to the one-stage process. Moreover, the growth of ZnO nanostructures exhibits a hexagonal structure as revealed by the SEM images. The growth of high-density ZnO nanostructures via two-stage CBD technique can be explained by the presence of the early nucleation of ZnO nuclei provided during the pre-treatment of the substrate with ZnO colloid powders. Furthermore, annealing the as-grown nanostructures at 200°C resulted into the decomposition of Zn complexes forming high-quality ZnO nanostructures and coalescence of smaller ZnO nanostructures to formed bigger ones also occurred. Higher absorption spectra can also be observed from the nanostructures grown via the two-stage process which further confirms the growth of high-density ZnO nanostructures. The calculated energy band gap extracted from the UV-Vis spectra is in good agreement with the reported energy band gap of ZnO nanostructures.

Keywords: *ZnO, Two-stage process, CBD, SEM, Annealing, Chemistry*

Urine output increasing activity of the formulated syrup from the ethanolic leaf extract of physic nut (*Jatropha curcas* L.)

Suaybaguio, Rujene F. , Tomas, Marifel A. , Quinones, Joan C. , Pedregosa, Lois Andrea M. , Manug, Elaine Mae Y. , Cabug, Lady Angelic C. , Gica, Hannah Deborah A. , Andong, Mary Jane A. , Paramo, Orcheliza L. , Ribo, Annabelle A.

Diuretics relieve pulmonary congestion and peripheral edema, primarily lower hypertension by decreasing blood volume through the excretion of water in the urine. This study attempts to investigate the urine output increasing activity of the formulated syrup from the fresh and dried ethanolic leaf extracts of Physic Nut (*Jatropha curcas* L.). Fourier Transform Infrared and Ultraviolet-Visible Spectroscopy analyses revealed to contain organic functional groups of alcohol, unsaturated hydrocarbons and carboxylic acid. The findings may warrant the pharmacological capacity of *J. curcas* to increase urine output in which it has saponin that induces diuresis. It was also found out that the plant is non-toxic at 2000 mg/kg dose and not mutagenic. Results revealed that the fresh one can effectively increase the urine output at a dose of 158.489 mg/kg and 10 mg/kg for dried one. Copper was detected for both types of extract using Atomic Absorption Spectrometry but within tolerable limits. Bioassay for formulated syrup has no significant difference from the control drug. Therefore, it is recommended to conduct further tests for thorough investigation.

Keywords: *Copper edema, Diuretic, Jatropha curcas L., Fourier transform infrared, UltraViolet-Visible Spectroscopy, Mutagenicity, Chemistry*

COMPUTER SCIENCE

0228

Middleware-based database server allocation of distributed database on PC cluster systems

Namoco, Jr., Consorcio S. , Landicho, Junar A.

The study seeks to provide a distributed database using the Middleware-based Database Server Allocation (MDSA). The MDSA allocates available servers to cluster computers and search for the best cluster that caters to a query. There were eight experiments performed using MDSA and were compared to the sequential and random search method, which include controlled CPU utilization and random CPU utilization in terms of access time, single query and multiple queries. Experimental results showed that with MDSA, there is a reduction of data response time under varying number of nodes, ranging from 1 to 8 clustered servers.

Keywords: *Database, Distributed database, Middleware, PC cluster, Computer science*

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0229

An MSULBP features selection based on GA and majority voting mechanism in facial expression recognition

Bishak, Akhtar Hazrati , Gheshlagh, Mohammad Bagher Moradi , Sheykhzadeh,

Because of excellent capability of description of local texture, local binary patterns (LBP) have been applied in many areas. Also, to extract individual features the efficacy of the uniform LBP has been validated. In this study, a proposed new facial expression recognition system based on Multi-Scale Uniform LBP (MSULBP) schema can fully utilize LBP information. In the previous works, the selection of the optimal subset of the extracted features has not been considered. But in the proposed algorithm, the MSULBP features were extracted from the original facial expression images. The best subset from MSULBP features was found by genetic algorithm (GA) and majority voting mechanism (MVM) and was represented as a histogram descriptor. Finally, support vector machines (SVM) classifier was used for facial expression classification. The experimental results on the popular Japanese female facial expression (JAFFE) database illustrate that the presented facial expression recognition method based on MSULBP obtains the best recognition accuracy rate. Additionally, experiments show that the MSULBP features are robust to low-resolution images, which is critical in real-world applications.

Keywords: *Features selection, Support vector machines classifier, Facial expression, Local binary pattern, Genetic algorithm, Computer science*

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Development of updated Philippine food composition table handbook
Nacionales, Kristine B.

The most recent edition of the Philippine Food Composition Tables (FCT) handbook was published in 1997. For the past years, the DOST-FNRI continuously generated and compiled nutrient data, which were regularly updated and encoded in the PhilFCT online database. Despite these data being publicly available online, a number of users still prefer the handbook version. This project developed an updated Philippine FCT handbook. Specifically, this study was conducted to review and revise descriptors and scientific names of the food items, input new food items and data generated from the year 2006-2016, prepare explanatory notes, appendices, book cover and layout, and pretest the updated handbook. The handbook was updated through the review or revision of food descriptors and scientific names whenever applicable, encoding and review of new food items and nutrient data, preparation of explanatory notes and related pages. It was pretested during the 45th FNRI Seminar Series on July 5, 2019 at the Philippine International Convention Center in coordination with the Technology Diffusion and S&T Services Division (TDSTSD) of DOST-FNRI. The updated handbook, entitled “The Philippine Food Composition Tables 2019”, contained 1542 food items categorized in 17 food groups. It included additional six new food components, namely total sugar, sodium, cholesterol, saturated, monounsaturated, and polyunsaturated fatty acids. Crude fiber and vitamin A retinol equivalent (RE) were replaced with total dietary fiber and vitamin A retinol activity equivalent (RAE), respectively. Pre-testing results were summarized by the TDSTSD and applicable comments were addressed by the project team. Copyright registration was granted to DOST-FNRI in December 2019. The handbook was officially presented during the Grand Launching of DOST-FNRI 2020: Perfect Vision for Nutrition on February 19, 2020 at the Makati Diamond Hotel. Availability and price of handbook copies will be announced via DOST-FNRI website. Continuous generation and compilation are still recommended to maintain an up-to-date and reliable food composition database.

Keywords: *Philippine food composition table, nutrient data, handbook revision, DOST-FNRI, Education*

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 2020,
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Effectiveness of peer-assisted-learning model in teaching physical examination in otorhinolaryngology to clerks and postgraduate interns
Atienza, Melflor A. , Capuz, Maria Karen A.

Peer-assisted learning (PAL) is an established concept in which students obtain mutual benefits by teaching and learning from each other. In the clinical environment, this often occurs intentionally or unintentionally in various formats such as same level or cross level peer tutoring, peer mentoring, cooperative learning and the like. This study determined the effectiveness of Peer Assisted Learning in achieving identified program outcomes in the curriculum for clerks and postgraduate interns rotating in Otorhinolaryngology specialty.

Study has 2 parts. Part 1 was a one-group pre-test and post-test design that involved teaching training of 16 PGI to be peer tutors in Otorhinolaryngology Physical Examination (ORL PE) to clerks. Video recorded pre-training baseline and post-training actual skills demonstrations of the PGI were rated. Scores were compared using Wilcoxon Signed Ranks test with p value at 5% level of significance. Part 2 was a randomized controlled single-blind trial of Peer-Led vs. Expert Faculty-Led ORL PE training of 55 clerks. Tutees performed a post training video-recorded skills demonstration assessed by a faculty rater who was blinded as to who among the clerks underwent the PAL-Led or Expert Faculty-Led training. Scores of the tutees in the 2 models of instruction were compared using the Mann-Whitney U-test at 5% level of significance.

Part 1 results showed significant improvement in the post-training scores of the 16 PGI in the identified micro skills and ORL PE skills. For Part 2, 33 and 22 clerks underwent PAL-Led and Expert Faculty-Led instruction

respectively. Comparison of performance scores of the clerks in the 2 models of instruction showed no significant difference.

Teaching training for PGI improved their knowledge, skills and attitude in teaching ORL PE skills to clerks. There was no significant difference in the performance outcomes between clerks that underwent PALLED and Expert Faculty-Led model of instruction.

Keywords: *peer assisted learning, teaching training, Education*

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0232

Equivalence of entrustable professional activities and context-dependent item sets as summative assessments in undergraduate physical therapy programs

Grageda, Maria Elizabeth M.

Summative assessment of student performance should provide information on achievement of program outcomes to support evaluation decisions. Alternative approaches to the traditional assessment systems like the written licensure examinations in Physical Therapy (PT) should be explored to ensure valid measurement of achievement of these terminal outcomes.

The study aimed at establishing equivalence of two summative assessments new to PT in measuring achievement of the PT outcomes: work-based assessment using Entrustable Professional Activities (EPA) and knowledge-based assessment using Context-Dependent Item Sets (CDIS).

Thirty-two newly graduated PT's underwent a one-week EPA assessment and took a 102 item CDIS test (based on 14 clinical vignettes). Qualitative data from blueprint review, group face-to-face interviews with participants and assessors, and field notes from observations, and quantitative data from EPA entrustment decisions and CDIS scores were utilized to ascertain their comparability in terms of Purpose, Administration, Quality and Decisions. This was used to determine the extent of equivalence of the two assessments.

Review of both blueprints show alignment with PT outcomes, with integrative content motivating participants towards professional development. Administration were equally acceptable to users, though EPA had more practice opportunities with a longer assessment time. Entrustment decisions in EPA had a high inter-rater reliability, while CDIS had low reliability, with most items having poor discriminative power. Decisions of “pass” or “fail” had good concordance when high prevalence indices were considered.

There is high extent of equivalence in purpose of EPA and CDIS but are not equivalent in terms of administration. There is moderate equivalence in quality and decisions, with potential for increased concordance if improved quality of CDIS is attained.

Keywords: *summative assessment, outcome assessment, entrustable professional activities (EPA), context dependent item sets (CDIS), comparability, equivalence, Education*

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Opportunities and challenges for academic institutions in the era of internationalization: proceedings of the first CPH academic roundtable, 31 January 2017, Manila, Philippines
Antonio, Carl Abelardo T.

The College of Public Health of the University of the Philippines Manila plays an important role in health systems strengthening in the region in its capacity as the Regional Centre for Public Health, Hospital Administration, Environmental and Occupational Health of the Southeast Asian Ministers of Education Organization Tropical Medicine and Public Health Network (SEAMEO TROPED Network). The diversity in contexts, race, culture, and language brought about by the internationalization of an academic institution's student body means that faculty members must not only be technically knowledgeable, but also contextually and culturally aware and sensitive, to be able to fully respond to the needs of foreign students who elect to study abroad. It is in this context that this activity was proposed. Seeking to address the question "How do we adequately prepare the faculty and the curriculum to take on a more global approach to public health education?," the College invited three resource persons—the Deputy Coordinator of the SEAMEO TROPED Network, Director of the UP Manila Office for International Linkages, and the Dean of the UP Manila College of Nursing—to a roundtable discussion among faculty and professional staff. This paper presented a summary of the discussion points that emerged from the event.

Keywords: *public health professional, students, public health, schools, international educational exchange, congresses, Philippines, Education*

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Predictors of academic performance of medical students of University of the Philippines College of Medicine: Class 1990 to Class 2013 lateral entrants
Ignacio, Sharon D. , Catabijan, Carlo G., Canal, Johanna Patricia A.

The criteria for admission at the University of the Philippines College of Medicine (UPCM) are 60 percent premed general weighted average grade (%PMGWAG), 30 percent National Medical Admission Test (NMAT) scores and 10 percent Interview Scores. Through the years, because of the highly competitive nature of the selection process, the admissions cut-offs in PMGWAG and average NMAT have continuously risen. This study covering a 24 year period, aimed to determine the correlation and predictive value between the admissions criteria (%PMGWAG, NMAT, and Interview Score) with academic performance parameters (Percent Medical General Weighted Average Grade or %MGWAG and Class Ranking) and Board Rating. The pre-admission and academic records of accepted lateral entrants from Class 1990 to Class 2013 were retrieved, reviewed and analyzed. These included the pre-med GWAG (%PMGWAG), NMAT and Interview Scores, Med GWAG (%MGWAG), Class Ranking and Board Rating. Pearsons Correlation and Multiple Linear regression analysis were done. All criteria (%PMGWAG, NMAT, Interview Score) for admissions were correlated with the academic performance parameters (%MGWAG, Class Rank) and Board Rating. The strongest correlation was observed in %PMGWAG with %MGWAG and Class Rank. Interview score correlated weakly with the academic performance. Strong correlations between %MGWAG, Class Rank, and Board Rating were likewise observed. Rank upon admission also correlated strongly with Class Rank upon graduation. On linear regression analysis, %PMGWAG and NMAT were more predictive of %MGWAG, Class Rank and Board Rating. The weight distribution of the different admissions criteria should be adjusted accordingly. Interview score, a weak predictor of academic performance and a measure of non-cognitive traits, should be treated separately and independently as an admission criterion.

Keywords: *medical college admission, admissions criteria, medical education, academic performance, UP College of Medicine, Education*

Transformative scale-up of the School of Health Sciences, University of the Philippines Manila

Paguio, Jenniffer T. , Dones, Luz Barbara P. , Peralta, Arnold B. , Salvacion, Maria Lourdes Dorothy S. , Atienza, Melflor A. , Sana, Erlyn A. , Pastor, Claire D. , David-Padilla, Carmencita M.

The School of Health Sciences (SHS), University of the Philippines Manila, established in 1976 offers a one-of-its kind ladder-type, community-based curriculum in health sciences.

This study described the SHS curriculum and how it contributed to the transformative scale-up of the education of health professionals in the Philippines.

This study is a concurrent transformative mixed method design. Data were collected concurrently through interviews of university officials, faculty, students, alumni, communities, and partners as well as observations of review classes and office activities. Quantitative data were collected from school records and performance ratings of students. From the data emerged the basic principles of primary health care and community-based education and they were juxtaposed to describe transformative learning of SHS students and faculty.

All of the 3,481 students admitted from 1976 came from geographically isolated and depressed areas; more than 95% of the graduates are still in the country and chose to serve the communities. The school's ladder-type, community-based curriculum produced competent midwives, nurses, and physicians. SHS did not just transform its students but also the faculty, communities, its partner local, national, and international agencies, and changed the landscape of community-based education in the region.

SHS produced health professionals who chose to serve the communities. It continues to evolve to institutionalize primary health care and community-based education.

Keywords: *community-based education, primary health care, competency-based curriculum, ladder-type program, transformative learning, Education*

ENGINEERING

Analysis and comparison of switching techniques of electronic load controller for micro-hydro power plants

Morcilla, Rojien V. , Pallugna, Reuel C. , Gozon, Clark Darwin M.

This paper presents the four common switching techniques used in today's ELCs. Switching techniques cited in this paper are Binary dump loads control (BDLC), Phase angle control (PAC), Mark to space ratio (MSR), and Pulse width modulation (PWM). The paper modelled the four switching schemes in Matlab-Simulink and compares the switching techniques in term of power and voltage response, total harmonic distortion induced, and frequency deviation of the systems. Furthermore, this paper presents a significant difference of the said switching techniques that could be a basis for future designs and implementation of ELC for small and micro hydro power plants.

Keywords: *Switching techniques, Self excited induction generator (SEIG), Electronic load controller (ELC), Engineering*

Analysis of biogas production from cow, chicken and swine manure

Magomnang, Dianne Mae M. , Villanueva, Eliseo P. , Magomnang, Antonio-Abdu Sami M. , Pabilona, Leonel L. , Rollo, Edward Peter F.

Biogas is a valuable renewable energy carrier. It can be exploited directly as a fuel for internal combustion engines. Methane (CH₄) and carbon dioxide (CO₂) are the main constituents, but biogas also contains significant quantities of undesirable contaminants such as hydrogen sulfide (H₂S). The existence and quantities of these contaminants depend on the biogas source. Their presence constitutes a major problem because of corrosion, erosion, fouling, and can generate harmful environmental emissions. The main objective of the present experimental investigation was to evaluate the biogas produced from different animal manure (chicken, cow, and swine) at same technical settings on the anaerobic digestion process. As a possible means to improve the biogas production, as well as reduce their pollution potential, the idea of using the iron sponge (steel wool) for the removal of hydrogen sulfide and water scrubbing for the removal of carbon dioxide, while operating the reactor at maximum retention period has been applied. Purification of the biogas produced was done using H₂S adsorption and CO₂ absorption; thus, improving its use as fuel for power generation. The results showed that among the (3) three manure studied, swine manure produces the highest total production of biogas with the rate at 1.30561 ft³. In the hydrogen sulfide removal, chicken manure yielded the highest impurities that range from 102-132 ppm. After purification, the concentration became 1 ppm. Thus, the hydrogen sulfide purification is effective. The carbon dioxide concentration in this study found out that the chicken manure produces more CO₂ at 9.99% volume. After the purification process, the reading ranges from 0.14 % to 0.08 % volume. In this study, chicken manure contained more impurities than swine and cow manure.

Keywords: *Biogas production, Purification, Removal treatment, Hydrogen sulfide, Carbon dioxide, Engineering*

Application of low-cost modified camera for NDVI mapping of sugarcane field in Tranca, Bay, Laguna

Delfin, Evelyn F. , Maravilla, Ana Mikaela B. , Renovalles, Eunice M. , Quilloy, Erwin P., Carpentero, Arvin S.

Normalized difference vegetative index (NDVI) has been used as a tool to assess the health of a vegetation. Multispectral cameras are used to acquire this index; however; this type of camera is very expensive. This paper explores the cheaper alternative of acquiring NDVI of a sugarcane field using a modified, digital camera. Modification was done on a digital point and shoot Canon SX230 HS camera by replacing its IR blocking filter with a red filter and loading CHDK settings into its memory. Before actual flight, calibration was performed by customizing the camera's white balance setting with a red card under a shaded location. The NDVI camera was then attached to an unmanned aerial vehicle, the quadcopter. The quadcopter followed a pre-loaded mission for capturing monthly images of the sugarcane field in Tranca, Bay, Laguna. The series of images were stitched into a single image and loaded into QGIS software for extracting the index values and recoloring of images. Recoloring was done using a Red-Yellow-Green color scheme. Resulting images showed that the modified camera was able to discriminate the crop from the soil, as well as, the difference in photosynthetic activity among the sugarcane varieties.

Keywords: *NDVI, Modified camera, Sugarcane, Low-cost, Mapping, Engineering*

Assessment of cumulative trauma disorders among workers in Southwest Nigeria sawmilling industry

Adeyemi, Hezekiah O., Udoh, Emmanuel I.

This study assessed Cumulative Trauma Disorders (CTDs) among workers in Southwest Nigeria sawmilling industry. The aim was to ascertain the prevalent types, and likely occurrence of the injury among the group of workers. Sixteen sawmilling factories were studied. Physical observation method was used to assess job demands, methods and workplace safety. Questionnaires were completed among 267 workers through written interview. This measured subjective injury and/or prevalence of CTDs symptoms on different body regions. Sound and vibration meters were used to measure noise and vibration levels of 64 machines respectively. Calculated mean values of measurements were compared with the recommended standards. The statistical analysis was done using Non-parametric Chi-Square tests on SPSS application. Low back, shoulder and wrist/hand were the leading regions of the body where pains were reported by interviewed workers. Among the risk factors capable of contributing to CTDs occurrence, standing for long hours, forceful gripping, forward bending, hand twisting and wrist deviation were reported. The statistical analysis results established associations between some two or more prevalent risk factors capable of leading to CTDs. Workers may be prone to De Quervain's disease, Degenerative joint disease and Lumbosacral strain among others which may affect their musculoskeletal, vascular and nervous systems.

Keywords: Sawmilling, Industry, Tasks, Workers, Injury, CTDs, Pains, Engineering

Bati-Bot: self-navigating and stabilizing image-capturing robot

Palermo, Eutequio III Zante L , Somera, Iryne Vanessa D , Campos, Norman Charles O , Andrade, Joseph C, Pepito, Kynji Kyle Niño A.

Manual surveillance of checking each banana plant on the farm is a tedious work since it has to survey each plant for their status. Farmers tend to become carefree about it and tend to send insufficient data which at some occasions are misinforming. Errors in gathering information occur due to faulty human perception. In response to this situation, the proponents designed and implemented the Self Navigating Image Processing Mobile Robot. It is a robotic system that navigates through a specific banana field, captures images of each bananas while travelling, then sends those images to the client application for examining possible diseases. The user begins the deployment by starting the client application and clicks the "deploy" button. The robot then starts to navigate through the banana field by signs. It momentarily stops when it detects numbers, with each represents a specific banana, then starts to take pictures: one for the numbers, two for the banana leaves on different sides. The robot will turn left when it detects a left sign; right if it detects the other opposite. It will completely stop traveling and starts to send images to the client application when it detects the "home" sign. Each sent images of banana leaves will be then examined by the client application in respect to its number whether if that specific numbered banana is healthy or unhealthy. Summary report in the client application will showcase current and previous robot's travels in each different timeframe, with each of the robot's travels presents which of the numbered banana/s is/ are healthy or otherwise.

Keywords: Self Navigating, Self-stabilizing, Stabilizing image, Image processing, Autonomous robot, Engineering

Big dreams, small site master planning for expansion on small sites
Luis, Prosperidad C.

The explosive development of new technologies in diagnostic and treatment services and the demand for the use of these technologies by doctors and patients alike, are two strong factors that have catalyzed the ongoing expansion and renovation activities among the bigger, private hospitals in the Philippines. People in respective communities and localities have demanded that their hospitals provide state-of-the-art facilities so that they need not leave their homes to avail of these services in far-away Metro Manila where they are provided by the more modern hospitals of the country. An example of such a hospital is a private, general, and tertiary hospital in the mid-west region of the Philippines. It was founded in 1954 and has grown continuously and progressively from an 8-bed clinic to the 300-bed hospital that it is now. The community around it has transformed from a quiet residential neighborhood to a bustling residential-commercial area. This worked well for the hospital in terms of clientele, but the urban community has hemmed in the hospital in its site and has made physical expansion and development a difficult endeavor. The hospital administration undertook a consultative exercise among its key medical and administrative personnel and consolidated a Wish List based on the staff's and patients' needs and requirements perceived from day to day operations. As expected, the Wish List represented the "dream" of everyone, big dreams that are difficult to accommodate within the site of the hospital. This paper presentation will use this hospital as a model in presenting a process by which "big dreams" may be accommodated within a "small site".

Keywords: *State-of-the-art facilities , Hospital, Small sites, Engineering*

**Body position detection using accelerometer integration human belt with GPS
localization interconnected through GSM**

*Villaverde, Jocelyn Flores , Linsangan, Noel B , Naungayan, Karel Paulo S , Torres, Jumelyn L , Baltazar,
Jesse Michael E , Cruz, Febus Reidj G.*

Global Positioning System (GPS) is a celestial navigation system comprising of a network of satellites that indicates the location of any GPS receiver on the planet. It is a number of applications mainly on navigation and some for security purposes. This paper designed a human belt tracking belt device that enables its users to send short message service (SMS) text containing the user's current location to its chosen contact person. It is designed to be used for security purposes. The prototype will send messages if the predetermined values are reached by the accelerometer reading. The device implemented a program that automatically adjusts fall threshold depending on the user's behavior. It used an ATMEGA 644 microcontroller, GPS and SMS.

Keywords: *GPS, SMS, Fall detection, Accelerometer, Engineering*

Carbon fiber-supported $\text{Ni}_3(\text{NO}_3)_2(\text{OH})_4$ flower like structures for supercapacitor applications

Dahonog, Luigi, Balela, Mary Donnabelle L.

Supercapacitors are considered the next generation energy storage devices because of their high power and energy densities. Nickel (Ni)-based electrodes have already been identified as one of the promising electrodes for supercapacitors because of their good electrocatalytic performance. In this work, nickel nitrate hydroxide $[\text{Ni}_3(\text{NO}_3)_2(\text{OH})_4]$ nanostructures were grown on the surface of carbon fiber paper via hydrothermal method. X-ray diffraction (XRD) confirmed the presence of carbon as current collector and the as-prepared product to be $\text{Ni}_3(\text{NO}_3)_2(\text{OH})_4$. Scanning electron microscopy (SEM) revealed the flower-like structures attached on the surface of carbon fibers. A surface area of $36.46 \text{ m}^2/\text{g}$ was observed based on Brunauer–Emmett–Teller (BET) measurements. The electrochemical behavior was characterized using cyclic voltammetry (CV) and charge-discharge measurements in a three electrode set-up. Highest capacitance was observed at lower scan rates and lower current densities. A specific capacitance of $1,352.40 \text{ F/g}$ and 782.73 F/g were calculated at a scan rate of 2 mV/s and a current density of 2 A/g , respectively.

Keywords: Supercapacitor, Carbon fiber, Nickel nitrate hydroxide, Engineering

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Carbon-supported nickel-based catalysts for hydrogen evolution reaction

Gorospe, Alloyssius E.G., Balela, Mary Donnabelle L.

One promising method to produce hydrogen is through the use of platinum (Pt)-based electrodes to catalyze hydrogen evolution reaction (HER) in water electrolysis. However, though this method is proven to be efficient, the small reserve of platinum makes this method expensive; thus, its large-scale applications are limited. To address this problem, carbon-supported nanostructured metals, such as nickel and cobalt, have been used as alternatives to platinum. In this study, carbon black was used as the carbon support for nickel, and the HER catalytic performance was tested. The catalysts were synthesized by chemical reduction method using hydrazine as reducing agent. SEM and XRD revealed the structural and morphological characteristics. Linear sweep voltammetry (LSV) was used to evaluate the HER performance of the catalysts in 1 M KOH and the overpotential was determined. The polarization curve of the catalyst obtained was compared to that of carbon black alone and results revealed an improvement in the performance upon the addition of nickel. Stability studies show that the performance of the catalyst decreased after 500 cycles of cyclic voltammetry (CV) indicating instability which may be possibly due to delamination of the catalyst from the current collector.

Keywords: Hydrogen evolution reaction (HER), Carbon-supported nickel, Catalyst, Engineering

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Coal fly ash as cement replacement on mortar mixed with Mangima stone and conventional fine aggregates

Uy, Ritchelle Marie A. , Mabano, Mea C. , Egama, Vanessa Jane D. , Curiba, April Mae G. , Ape, Jovyline L. , Cabahug, Ruel R.

A study was conducted to investigate the characteristics of fly ash as cement replacement on mortar mixed with Mangima stone and conventional fine aggregates. Since many studies have established that coal fly ash and Mangima stone can be a good substitute for concrete aggregates, the researchers decided to create a new experiment to show the combination of the two materials on a mortar mixture. Several design mixtures were evaluated to compare the test findings. The quality tests of the Mangima stone with conventional fine aggregates and cement with different proportions of fly ash included the following: specific gravity (SSD) and absorption test and sieve analysis (gradation test). It also presents the results of the investigation carried out to evaluate the compressive strength of 1:3 mortar mixes in which conventional fine aggregates was replaced with 50% Mangima stone fine sand by weight which was further modified by partially replacing cement with six percentage ratios i.e.0%, 20%, 40%, 60%, 80% and 100% of coal fly ash. The compressive strength was determined by three (3) trials at 7, 14 and 28 days of age. Test results revealed that the combined use of Mangima stone and conventional fine aggregates exhibited that fly ash can only be utilized as cement replacement on mortar by 20% which attained the type S mortar.

Keywords: *Compressive strength, Specific gravity, Mangima stone, Fly ash, Portland cement, Engineering*

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NP

Coffee bean classifier

Relacion, Juvie Pauline L. , Pusad, John Michael G , Dumdum, Jon Dexter H , Cabalquinto, Jerameel J.

This study aimed to develop a coffee bean classifier system that would obtain the weight of the coffee bean sack, detect the moisture content of the coffee beans and identify the beans according to its classification (grade 1, 2 or 3). The device would automatically compute the cost of the coffee bean sack in accordance to the reading of the sensors. The device has a tablet computer that would display the reading of the device and print a receipt for the sellers and buyers. This study made use of the engineering design process with iteration techniques and descriptive approach. A researcher-made questionnaire was used in evaluation and functionality test procedures (each component with 15 trials each) were conducted to assess the functionality and stability of the device. The evaluation results signified the working functionality of the project. It solved the problem faced by physical and manual systems employed by the coffee bean buyers.

Keywords: *Computer engineering, Design project, Coffee bean, Coffee bean classifier , Weight moisture content, Descriptive, Philippines, Engineering*

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2016,
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NP

Colometric detection of copper (II) ions in water using humic acid-functionalized silver nanoparticles

Perez, Jem Valerie , Lopez, Edgar Clyde , Villena, Emil David , Gavan, Jon Nyner , Zafra, Michael Angelo

Many metal-working industries can introduce copper into the water supply which poses potential dangers to people from the ingestion of copper-contaminated water. This merits the need for a low-cost method to monitor the amount of copper present in water. This can be done through the use of silver nanoparticles (AgNPs) as a colorimetric sensor. In this study, humic acid-functionalized silver nanoparticles (HA-AgNPs) were synthesized and used to detect Cu(II) ions in aqueous media. The HA-AgNPs were synthesized by chemical reduction approach using silver nitrate (AgNO_3) as the Ag precursor, sodium borohydride (NaBH_4) as the reducing agent, and humic acid (HA) as the stabilizing and functionalizing agent. The amount of HA was varied from 0 – 200 ppm HA and their stability was studied for a storage period of two months. To test its ability to detect Cu(II) in water, the HA-AgNPs were mixed with aqueous solutions of Cu(II) and their spectral changes were observed. The UV-Vis spectra of the synthesized HA-AgNPs showed the location of the surface plasmon resonance (SPR) peak at around 413 to 421 nm, which is the typical range of the location of the SPR peak of AgNPs. The HA-AgNPs were found to be stable for two months of storage with HA concentrations above 5 ppm. The HA-AgNPs showed a linear response with increasing Cu(II) concentration. The best HA-AgNPs assay yielded a limit of detection (LoD) for Cu(II) of 18.26 ppm and a limit of quantification (LoQ) of 60.85 ppm. This shows that the HA-AgNPs can be used as a low-cost method for Cu(II) detection.

Keywords: *Colorimetric detection, Silver nanoparticles, Humic acid, Surface plasmon resonance, Copper detection, Engineering*

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Conceptualization of the absorptive capability paradox in technology transfer projects: a study of the Ghanaian construction industry

Owusu- Manu, De-Graft , Antwi-Afari, Maxwell F., Edwards, David John , Parn, Erika

Technology transfer projects within the construction industry transcends cross-national, -industrial sector and/ or business-to-business interfaces to transfer knowledge and technical capacity to enhance a recipient's capabilities. These capabilities encapsulate both new forms of knowledge (soft technology), and/ or skills and tools (hard technology) which drive business efficiency gains and concomitant productivity/ profitability enhancements. In the developing world, technologically advanced construction organizations from developed nations often initiate and steer the technology transfer process when working with developing world partners. Maximizing the opportunity presented depends upon the recipient's 'absorptive capacity' and hitherto scant research has been conducted in this novel area of construction science. This paper therefore seeks to clarify the enablers of absorptive capability in Ghanaian construction technology transfer projects. Using a quantitative analytical approach, theoretical hypotheses generated were tested on empirical data gathered from technology transfer projects. Results reveal that a significant relationship exists between the dependent variable (absorptive capacity) and independent variables (employee capability; knowledge sharing; working culture; research and development (R&D) capability; and communication capability). The findings will provide guidance for construction contractors in developing countries who seek to improve their technical knowledge and capability.

Keywords: *Absorptive capability, Concepts, Enablers, Ghana, Technology transfer, Engineering*

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2016,
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Crumb rubber tire as partial replacement for fine aggregates in concrete hollow blocks

Pilapil, Paolo Nicole Edritz G. , Luniza, Leroy John B. , Mamon, Gil Carlo H. , Lagutin, Pegelou Jhon S. , Bacol, Jasper L. , Cabahug, Ruel R.

The study aims to investigate the feasibility of crumb rubber material derived from waste rubber tires to partially replace fine aggregates in the production of concrete hollow blocks (CHB). Three mixtures in the proportions of 20%, 40% and 60% crumb rubber replacement were evaluated for compressive strength of CHB at curing age of 7 days, 14 days and 28 days respectively. A conventional CHB was also prepared to serve as basis for comparing compressive strengths. Results revealed that all mixtures did not attain the standard minimum requirements specified on NSCP on compressive strength of conventional load bearing concrete hollow blocks. Results from this experimental investigation showed that by increasing percentage replacement of fine aggregates with crumb rubber aggregates created proportional reduction of the compressive strength making the CHB unable to attain required strength for load-bearing structures.

Keywords: *Crumb rubber tire, CHB, Alternative fine aggregates, Engineering*

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2016,
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NP

Crustal deformation of Luzon and its implications on the stability of the Philippine survey network

Reyes, Rosalie B. , Dela Cruz-Cayapan, Charisma Victoria , Bacolcol, Teresito C. , Klein, Elliot C. , Galgana, Gerald A., Rada, Wilfredo

Tectonic deformation displaces the physical positions of regional or national coordinate reference system and/or survey network reference markers quite significantly when situated within fast-deforming, seismically active Plate Boundary Zone (PBZ) regions. Due to unusually high station velocities that reflect high strains near and within active PBZs, the coordinate positions of such survey reference markers need to be re-evaluated within short time spans to remain useful. Such rapid changes must be measured to assess the nature of deformation, and then construct models to accurately quantify changes and then apply proper component corrections (i.e., in-between surveys) in order to maintain the spatial integrity of geodetic networks as a function of time. To determine the effects of regional tectonic deformation on existing survey networks, we evaluate the GPS velocity field gathered from GPS stations situated in Luzon, a region sandwiched between two active, opposing subduction zones: the Manila Trench and the Philippine Trench. This region is traversed by numerous active faults such as the Philippine Fault System, and the (Marikina) Valley Fault System. Using GPS observations, we model the Luzon region as made up of independently rotating but interacting tectonic block microplates or blocks, separated by active faults. We then quantify the individual contributions of tectonic block rotation and transient elastic locking strain to estimate the overall deformation field that affects the Philippine Survey Network from its establishment in 1992-1993 to the present. Our preferred block model results show that most stations have been affected by >1 m displacement, with a handful having ~2 m of accumulated displacement in the Sundaland reference frame from their observed initial positions in 1993. Differential inter-block motions of stations dictate that stations need to be reobserved at shorter time spans. Continuum models of residual strain rates further reveal regions of complex internal deformation that may further exacerbate the geometric instability of existing geodetic networks.

Keywords: *Geodesy, Crustal Deformation, Luzon, Active tectonics, Geodynamics, Surveying, Engineering*

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2020,
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NP

Design and implementation of an automated fish feeder robot for the Philippine aquaculture industry: feeding mechanism and float design module

Macalla, Gian Paulo B. , Pascua, Diogenes Armando D. , Osa, Johanna Ericka F. , Espaldon, Aeus Joshua , Deroy, Maria Cizel U.

The researchers developed an automated fish feeder robot's feeding mechanism and floater mechanical assembly to be used in aquaculture farming that aims to aid in the distribution of feeds. Data such as the conveyor's feeding capacity per unit time, the density of pellets dispensed in the cage and per quadrant were calculated and critical load check and stability tests were completed. Visual tests for the prototype were also conducted. The Aslong 12v JGB37-550 direct current (DC) motor was used to drive the bucket conveyor which is responsible for the transport of pellets to be dispensed to the outlet. On the other hand, the 3-blade commercial remote-controlled (RC) boat propeller driven by the Graupner 12V brushed motor was used to propel the floater while navigating and dispensing feeds throughout the fish cage. After assembling and building the whole prototype and combining the feeding system and the floater design, the researchers have tested its effectiveness, stability, and operation. With those parameters tested and calculated, it is concluded that the design of the feeding mechanism and floater is operational and suitable for automation of fish feeding in fish cages.

Keywords: *Aquaculture, Bucket conveyor, DC motor, RC boat propeller, Brushed motor, Engineering*

Mindanao Journal of Science and Technology, Volume No. 15 Issue No. 1, 89-102
2017,
(Filipiniana Analytics)
NP

Design study of gyro-stabilized, remote-controlled weapon station

Guirnaldo, Sherwin A. , Telen, Mary Ann E.

Weaponry is a crucial element in the battlefield. Artillery should be stable and steady when it is fired to the target. However, when the target is moving, artillery becomes a challenge for the shooter to lock its target; the same case when the shooter is moving. Accuracy and precision is a must to avoid casualties and reserve resources. Hence, this study designed a weapon dock that is controlled remotely to have a stable aim on the target. The technology used sensors called gyroscope that is responsible for indicating change of direction and stabilization. A joystick was used as a remote controller for the pitch and yaw which help the shooter to point and lock its target for better accuracy. Quantitative results were gathered from gyro and joystick that aid the researchers to record errors and inaccuracy in the system which served as the baseline for the stabilization controller to correct. The study achieved the stabilized disturbance with its best response time of at least 630ms which may be improved with fast motor and self-tuning fuzzy proportional-integral-derivative (PID) controller.

Keywords: *Gyroscope, Pitch, Yaw, Stabilization, PID, Engineering*

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2017,
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NP

Designing for cohesive project implementations: enhancing corporate & thematic identities

Santaromana, Francis L.

Buildings of integral development TALK, are INTERACTIVE not only in function but by virtual images as well. It cannot be ignored that opportunities of impact exist and add value to the greater recall. These are not just limited

to qualitative assessment but are quantifiable if appropriate tools and benchmarks are applied. A new language to justifiable creative investment is defined as well as a reference to INFORMED decision making. The Parallelogram Design Process: A methodology that provides branches, extensions, and adjustments particular of cohesive projects applications and testing, parallel to both form & function development. Cohesive Approach to As-built Identity: Form Legibility: Factors on Mass, Color, Recall & Impact< Visual Identification: Effective Retention of Icons, Users, and Corp. Images Effectivity of Design Styles: Aesthetics, Consistency, Intrigue, Mystery, and Abstract Nature Impact Assessment Tools: Programs and methodologies to objectively measure effectivity of architectural applications. Creative imageries: Interactive visuals & Photo Image Simulations Measuring Site Values with points grading to predict maximum visual delivery. Learnings from Recall and Recognition: A post-construction test and assessment for success and/ or failure of application. The benefits will yield qualitative and quantitative data for comparative evaluation of Design Visuals. It presents a planning tool that aims to provide a more efficient creative investment for the designers. Lastly, it gives reference and justification to the less revealed design applications for use as information in clientele decision-making.

Keywords: *Parallelogram Design Process, Cohesive Approach, Visual Identification, Effectivity of Design Styles, Impact Assessment Tools, Creative imageries, Learnings from Recall and Recognition, Engineering*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 27-34
2005,
(Filipiniana Analytics)
NP

0254

Detection of malathion using molecularly imprinted polymer on quartz crystal microbalance

Balela, Mary Donnabelle , Arco, Susan , Suyat, Yasmin Yvon , Dela Vega, Geramheen

The extensive use of pesticides can result in overexposure and residues in soil, water and produce. For instance, residues of malathion are found on some vegetables. Molecularly-imprinted polymers (MIP) have been recently developed for sensing pesticide residues. In this study, malathion-imprinted polymers were prepared via precipitation polymerization and deposited on quartz crystal microbalance (QCM) electrodes. FTIR spectroscopy proved the incorporation and removal of malathion in the matrix of MIP. SEM images revealed that MIP particles are larger than the non-imprinted polymer (NIP) particles due to the incorporation of malathion. Binding experiments were done using standard malathion solutions of 10 to 60 ppm. The MIP-QCM sensor had a greater response than the NIP-QCM sensor. This is due to the specific binding sites in the MIP matrix. On the other hand, the response of NIP-QCM sensor is attributed to the non-specific adsorption sites in its matrix. A sensitivity and detection limit of 1.62 Hz·L/mg and 5.67 ppm, respectively, were determined for the MIP-QCM sensor. Lastly, the MIP-QCM sensor is stable and reusable up to three (3) cycles.

Keywords: *MIP, Malathion, QCM, Pesticide, Sensor, Engineering*

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0255

Determination of discharge coefficients by drop rate method using ultrasonic level sensor

Salvaña, III, Camilo Jose S., Villanueva, Eliseo P.

The study of cheaper alternatives to commercially available flow meters in the market continues because cost has since been one of the major factors considered in instrument selection. This study presents the results of an experimental investigation involving the use of Unplastized Polyvinyl Chloride (UPVC) pipe male adapter as an alternative variable head flow meter. Seven test specimens of different geometries were made from NELTEX®

20 mm UPVC pipe male adapter having a throat to diameter ratio, β , of 0.665. The results showed that the values of coefficient of discharge corresponding to geometric variation of the adapter can be determined accurately using an open tank draining model as proven by Torricelli's Law. Of the seven specimens tried, the shorter and tapered specimen is the better meter geometry based on its higher values of coefficients of discharge which in effect lead to faster discharge times.

Keywords: *Discharge coefficients, Ultrasonic level meter, Variable head meters, Flow meters, Engineering*

Mindanao Journal of Science and Technology, Volume No. 9 Issue No. 1, 29-44
2011,
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0256

Development of leadless glaze utilizing indigenous raw materials for locally made ceramic decorative wares

delos Santos, Nevelyn T., Salamangkit-Mirasol, Emie

Glaze is a vitreous coating applied to a ceramic item which has been fired to fuse and to give strength or waterproofing, decoration and color. Glaze materials are generally classified into three groups of oxide constituents as intermediates (Al_2O_3 , Fe_2O_3), acids (SiO_2), and bases (CaO , MgO , Na_2O , K_2O , MnO). The potters in the province rarely used glaze in their ceramic wares due to unavailability of local suppliers. The objective of this study was to develop a leadless glaze utilizing indigenous raw materials such as: Imelda red clay (IRC) as source of Al_2O_3 , SiO_2 , and Fe_2O_3 ; rice hull ash (RHA) as source of SiO_2 ; banana leaves ash (BLA), coconut husk ash (CHA), and commercial soda ash (SA) as sources of the CaO , MgO , Na_2O , K_2O , MnO oxides. Five varying percent ratio of clay (5-25 wt. % - increasing) and RHA (30-20 wt. % - decreasing) with constant percentages of the bases oxides (BLA-20, CHA-20, SA-25, wt. %) were prepared and mixed with water. The mixtures were ground using mortar and pestle until glaze slip consistency was achieved. The specific gravity of the glaze slip was controlled and the viscosity was also measured. The glaze slip was applied into bone-dried ceramic decorative ware specimens by brushing and dipping method, and glost-fired at 1050°C in an electric kiln. Based on the results of the evaluation, a greenish matt to glossy glaze surface appearance was successfully achieved from the glaze slip mixture with 5:30:65 wt. % of IRC, RHA, and base oxides, respectively and applied by dipping method. These can be evidently observed visually and through the microscope. With the abundance of indigenous raw materials possible for leadless glaze development, production of glaze for local potter's utilization is very promising.

Keywords: *Decorative wares, Formulations, Leadless glaze, Engineering*

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0257

Development of porous ceramic diffuser from red clay, diatomite and rice hull ash mixtures using slip casting method

Jabile, Liezl M., Ibarra, Ephraim

A red clay-based porous ceramic for water aeration diffuser application was produced from different compositions of Lama-Lama clay, Kapatagan diatomite, and rice hull ash. The formulations were based on the clay to silica ratio of 40/60, 45/55, 50/50, and 55/45. Low-cost additives like cornstarch and cassava starch were also added as pore formers at 15 weight percentage. Cylindrical and rectangular test pieces were made by slip casting that was fired at 1050°C and 1150°C . The solid casting of slip was done by heating in a microwave oven at 60°C and 80°C , respectively. Various tests were conducted on the fired specimens such as firing shrinkage, water absorption, apparent porosity, bulk density, specific gravity, modulus of rupture, and scanning electron

microscopy. The best formulation appropriate for air diffuser was the sample with the composition of 55/45 clay to silica ratio without starch and was fired at 1050°C.

Keywords: *Ceramic diffuser, Diatomite, Red clay, Rice hull ash, Slip casting, Engineering*

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2017,
(Filipiniana Analytics)
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0258

Development of terra sigillata utilizing Ilocos clay and locally prepared sodium silicate as thin coating for ceramic cooking wares

Dulig, Jorella Francia , Salamangkit-Mirasol, Emie

Terra sigillata slip (TSS) is generally prepared from ultra-refined clay, water, and deflocculant. This was often used in ancient times to coat thinly bone-dried ceramic wares instead of glaze. Pottery is an old industry in Ilocos Norte since the province is known to be rich in clays and other indigenous materials for ceramic production, however, potters utilize thick clays in coating outer surfaces of their ceramic products. In this study, wet beneficiated clay from Barabar, San Nicolas, Ilocos Norte, tap water, and locally produced sodium silicate solution prepared from rice hull silica and sodium hydroxide solution as deflocculant were used in the development of TSS. The mixture of clay, water, and deflocculant is 1:2.2:0.03 by percent volume ratio. The mixture was left undisturbed for at least three hours then the top 1/3 layer was siphoned and specific gravity adjusted to 1.15-1.20. The TSS was applied to the inner surface of bone-dried ceramic cooking ware specimens by brushing 3 to 5 coatings and was polished immediately with a soft cloth until glossy coating was achieved. The specimens were dried and fired (open and electric) at 900oC to 1200oC. The surface appearance, fit, and thickness of the fired TSS were evaluated using polarizing microscopy and scanning electron microscopy (SEM) techniques. Evaluation showed that the developed TSS applied to the specimens resulted to a glossy and glaze-like appearance. The SEM images evidently showed the thin coating of TSS applied to the specimens with an average thickness of 27.2 µm while the conventional coating used by local potters is 173 µm. These results suggest that the developed TSS utilizing local raw materials can be adopted by potters as coating to their ceramic products.

Keywords: *Clay, Ceramic cooking pot, Sodium silicate, Terra sigillata, Engineering*

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0259

Discarded rubber tires as an alternative for sand in a soundproofing mixture

Rosales, Cristina Amor M. , De Leon, Raiza F. , Abrugena, Kuri Leigh D. , Naag, Mark Angelo Y.

There is a large market for cars and their accessories in the Philippines in which 200,000 tons of used tires are generated in the country yearly. Used tires can only be recapped up to three times before they are discarded, thus, resulting in environmental issues due to improper disposal of tires. The use of waste rubber tires as construction material replacement has become an unstable recycling activity. This has resulted to an increased supply of waste rubber crumbs in the market for reuse. This study focused on the sound absorbance characteristic of waste rubber crumb. Waste rubber crumb was utilized as sand replacement for cement tile and its sound absorbance was determined. Waste rubber crumb and cement were mixed with the varying ratio of 2:1, 1:1, and 1:2. A 250 mm x 250 mm x 2 mm mold was used to make a concrete tile. To determine the effect on sound absorption, a decibel meter was used to measure the level of sound inside a cube covered with rubber crumb cement tile. Results showed that of the three ratios of cement to rubber crumb, 1:1 displayed a 6.4% decrease in sound level.

Keywords: *Rubber, Soundproofing, Sound absorption, Engineering*

Efficient electrocatalytic oxygen evolution of unique hierarchial hollow NiCo₂O₄ nanourchins in alkaline medium

Flores, Charles Lois I., Balela, Mary Donnabelle L.

Noble metal oxides such as iridium and ruthenium oxides (IrO₂ and RuO₂) remain to be the state-of-the-art electrocatalysts for oxygen evolution reaction (OER) due to their excellent electrochemical properties. However, these materials are expensive, scarce, and unstable in aqueous medium, hence impeding their use for large-scale applications. As such, transition metal oxides have attracted considerable attention as electrocatalysts for OER. In this study, cobaltosic oxide (Co₃O₄) was synthesized using a simple and controllable hydrothermal method followed by a post-thermal treatment. Effects on the physico-chemical and electrochemical properties of partial substitution of Ni²⁺ in Co₃O₄ structure were determined. Initially, quasi-spherical Co₃O₄ nanoparticles with a mean diameter of 63.03 nm, BET specific surface area of 30.83 m²/g, and crystallite size of 20.43 nm were produced. Incorporation of Ni²⁺ led to dramatic morphological transformation, forming microspherical urchin-like aggregates of NiCo₂O₄ with a mean spike diameter of 20.62 nm. It was observed that the crystallite size decreased to 12.25 nm while BET specific surface area increasing to 49.04 m²/g. Such improvements in the physico-chemical properties translated to better electrochemical performance of NiCo₂O₄ in alkaline medium. It recorded an onset overpotential of 290 mV and a Tafel slope of 68.4 mV/dec while Co₃O₄ obtained 340 mV and 95.1 mV/dec, respectively. Even after 1000 cycles of cyclic voltammetry, a quite minimal reduction in current density at 1.75 V of about 4.18% was registered, suggesting good stability in alkaline medium. In addition, sulfurization of NiCo₂O₄, producing NiCo₂S₄ resulted to an even better electrochemical performance. It attained an onset overpotential of 250 mV, one of the lowest reported for such system. This is competitive with the commercially available IrO₂ and RuO₂, making it a promising electrocatalyst for OER.

Keywords: *Hydrothermal, NiCo₂O₄, Nanourchins, NiCo₂S₄, OER, Engineering*

Electrical load aggregation assessment of Central Mindanao University Campus, Philippines

Cultura, II, Ambrosio B., Eduave, Dana Maria Y.

The study focuses on evaluating the technical and economic impacts of aggregating the electrical loads that are paid by Central Mindanao University (CMU). Planning was done, by modeling an aggregated electrical distribution system of the university on Powerworld Simulator. Then financial cost comparison on power bills between the existing scenario and proposed electrical load aggregated system was calculated. Savings on load aggregated system was computed. Subsequently economic assessment was executed. In the yardsticks of economic merits, the proposed load aggregated electrical distribution system of CMU will help increase the university's savings on electricity bill.

Keywords: *Electrical distribution system, Load aggregation, Engineering*

Emissions from refined coconut oil ethyl ester-diesel blends: a preliminary study

Ferrer, Emmanuel L., Rollon, Annaliza P., Quiros, Edwin N.

The study describes the production of ethyl ester biodiesel from refined coconut oil. It aimed to replace the toxic methanol by a renewable and relatively safe ethanol and to determine whether the product properties conform to Philippine National Standard (PNS) specifications for B100 fatty acid methyl ester biodiesel. Emission characteristics of the biodiesel were also studied using a single-cylinder engine generator set fueled with neat diesel, B1, B2, and B5 biodiesel blends, at 61%, 77%, and 93% electrical loads, which are low, medium, and high load respectively. Successful conversion via base-catalyzed transesterification was carried at process conditions of 1% (weight to oil) KOH catalyst, 59% excess ethanol, 1.5 hours reaction time and ambient temperature at mixer setting of about 4500 rpm with a yield of 93.64% ester. Several properties of the produced coconut ethyl ester conformed to PNS specifications with the exception of cetane index, acid value, water content, and total glycerine content. The calculated cetane index was 46.327 which is close to US and Brazil standards for cetane number. Emission tests revealed that the B1 blend had the optimal emission characteristics with most of the parameters while B2 blend had the most significant decrease in CO emission. B1 reduced CO₂ emission by 8%, NO_x at 7% and THC by 2.5% at high load when compared to base petro diesel. B2 blend reduced CO emission significantly by 46% at low load and 22% at medium load when compared to base petro diesel. The remaining B2 and B5 blends had an average increase of about 10% and 16% NO_x emissions respectively, a typical characteristic for most biodiesels.

Keywords: *Biodiesel, Ethanol, Ethyl ester, Coconut oil, Biodiesel emissions, Engineering*

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NP

Estimating the yield of a collector well with parallel infiltration galleries as laterals

Macuha, Richmark N.

In recent years, collector well with horizontal laterals is being used more often to tap groundwater resources. However, at the moment, majority if not all yield studies are focused on collector wells with radial orientation of laterals. In countries where trenchless technology is still uncommon, like in the Philippines, collector wells either have a single long lateral or parallel laterals. This paper presents applicable yield estimation techniques for collector wells with parallel laterals in the riverbed. The first method uses a source-sink pair model and image well theory, obtaining an approximate analytical solution. The second makes use of MODFLOW, a numerical approach to come up with a local groundwater model. The estimates from both are found to be in good agreement with actual yields measured in a study area. The developed equations can be used for rapid estimation of yield to other candidate sites. Although the MODFLOW model produced more accurate results than the approximate analytical method, it should also be used with caution as the estimates are usually greater than the actual, which can pose a problem for water supply development.

Keywords: *Collector well, Infiltration gallery, Horizontal well, Water supply, Engineering*

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2019,
(Filipiniana Analytics)
NP

An experimental investigation of mahogany carpel ash as cement replacement in concrete

Baguhin, Israel A. , Cabahug, Ruel R.

This study investigates mahogany carpel ash as cement replacement at five different design mixtures: 20%, 40%, 60%, 80% and 100% mahogany carpel ash composition. Specimens without mahogany carpel ash were also prepared to serve as the control specimens for this study. The mortar specimens were tested for compressive strengths at curing age of 3 days, 7 days and 28 days. The characteristics of the ash were also determined to understand the physical and chemical contents of the ash. Results revealed that the use of 20% mahogany carpel ash cement replacement was able to meet the American Society for Testing and Materials (ASTM) C270 minimum strength requirement for Type M mortar. The 40% and 60% cement replacement met the minimum standards for Type N mortar and the 80% cement replacement met the minimum standards for Type O mortar. These findings provided information that may be useful to further conduct specific studies to enhance the utilization of mahogany carpel for concrete technology and the construction industry.

Keywords: *Mahogany carpel ash, Cement replacement, Pozzolan, Compressive length, Engineering*

Mindanao Journal of Science and Technology, Volume No. 15 Issue No. 1, 54-62
2017,
(Filipiniana Analytics)
NP

Experimental investigation on locally increasing the thickness of sheet metal by beading and compression technique

Iizuka, Takashi , Namoco, Jr., Consorcio S., Takakura, Norio

In this study, the possibility of locally increasing the thickness of sheet metal by beading process followed by compression is investigated. Several parameters are considered such as bead height, die width, sheet thickness, forming process iteration, material type and lubrication. The effects of these parameters on the deformation behavior during compression process of the sheet metal are examined. Results show that an appreciable amount of local increase in thickness is possible under optimum conditions of bead height and number of process iteration. Also, the application of lubricant enhances the uniformity of thickness distribution along the bead area.

Keywords: *Sheet metal , Beading, Compression, Bead height, Engineering*

Mindanao Journal of Science and Technology, Volume No. 10 Issue No. 1, 25-34
2012,
(Filipiniana Analytics)
NP

Face recognition system using local ternary patterns for blind assistance

Suniel, Jeziel C. , Chong, Rachel M. , Luspo, Rodelo A. , Reposilo, Wagner John L., Quijada, Jr., Ramir C.

Blind people require auditory stimulus in order to determine what is near them. Many tools have been developed to help them explore the world more easily. Face recognition using image processing techniques can be used to determine persons around a blind person however, existing methods are easily affected by noise, which is a common problem when dealing with real world images and imaging systems. This study designed a portable system that can capture images, detect and recognize faces in the images, and output an audio signal regarding the total number of detected faces and if a face is recognized. The focus of this study is to create a face recognition algorithm that is robust in the presence of noise. The local ternary pattern (LTP) is a relatively new enhanced local texture descriptor of the local binary pattern (LBP). It is basically composed of two LBP codes whose threshold

can be easily changed, which makes it more robust to noise. Its histograms are used as a texture descriptor of the detected face. This method is computationally simple and illumination invariant. The said descriptors are the inputs to a previously trained support vector machine (SVM) in order to recognize the detected face. An 8-fold cross-validation on known images resulted to higher recognition rates for a polynomial kernel. Thus, this is used for training the SVM and testing other images. An accuracy of 92.7% resulted when actual captured images are tested. The same images are artificially added with Gaussian noise to determine the algorithm's performance. The results show that as the noise level increases from 10 to 30, the accuracy slightly decreased and maintained at above 90%. In comparison, other methods' accuracy significantly decreased to below 90% even at noise level of 10. Furthermore, the system is capable of recognizing persons up to a distance of approximately 2.8 m.

Keywords: *Face recognition, Local ternary pattern, Blind assistant, Support vector machine, Engineering*

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NP

0267

The Filipino spirit in the making of space: an overview *Ozaeta, Emilio U.*

What makes a place? What makes space? In particular, what makes a space Filipino? This paper proposes that it is not rationality or logic of form that dictates the making of a Filipino architecture but, rather, the unseen core of the Filipino being, diwa, which determines the visible form and, more significantly, the intangible space at its core. The author uses a model, derived from Jocano's model of the Filipino value system, to illustrate the various levels at which the diwa manifests itself and the corresponding architectural expressions that result. This paper is a work preliminary to a larger study in which the author hopes to derive a theory of Filipino place-making that is more cognizant of a Filipino spirituality of being than the current Western standards by which Filipino architecture is currently being criticized.

Webster's New Dictionary of Synonyms provides the following entry: "Architecture, architectonics and their corresponding adjectives architectural and architectonic are often indistinguishable, but they tend to diverge in emphasis. The nouns mean the science of planning and building structures (as churches, houses, bridges, and ships) that involve problems of artistic design, engineering, and adaptation to the ends in view". In relation, Vitruvius holds that an architect must be well versed in the following areas of knowledge: drawing, geometry, optics, history, philosophy, music, medicine and astronomy. Further, the following statements are made by author Garry Stevens in his work, *The Reasoning Architect: Mathematics, Science and Art in Architecture*: "Consider, for example, the methods that we use to ensure that buildings stay up. First, we assume that there are such methods...second, there is a causal connection between what we do, the materials that we use, and their sizes and the ability of a structure to remain upright...Third, this reason involves properties of the structure, the beam, and the forces acting on it...Fourth, the reasons behind the structure's behavior are discoverable by engineers or scientists...Fifth, we can predict the behavior of the beam...Sixth, we can use all this knowledge to alter the structure, to manipulate it to suit our purposes... (Now consider that) events that fall into patterns or regularities that are the product of rules and natural laws, that an invocation of these rules is the only legitimate explanation of these events, and that these rules can be discovered and understood by humanity, which can then use them to change the world."

Given all the above it appears, then, that the popular and, in many institutions, academic view of architecture is one of reason, logic, and rationality. Decisions in the design process should be made by deduction and conscious knowledge. Structures must be built by the reasoning mind and even beauty must be subject to theoretical principles. That is, if the work is to be considered architecture at all.

In contrast, consider the following by Bachelard in his *Poetics of Space*: "...all really inhabited space bears the essence of the notion of home...The sheltered being gives perceptible limits to his shelter. He experiences the house in its reality and its virtuality, by means of thought and dreams".

For millions of years man has made space as an expression of himself, deciding how he is to determine the areas of his cave dwelling or the form of his hut. Rationality may have been used in the practical considerations of

shelter from the elements but the impetus, the driving force that dictates the intuitive rightness or wrongness of his space are certainly not dictates of his logic. Why, then, does man make space the way he does?

This paper proposes that it is nothing less than man's innate spirituality that dictates the creation of his tangible and intangible spaces. Individual, cultural, and universal aspects of spirituality, as defined later, are seen to be the forces that determine man's perception of himself, others, and the universe and the impetus to his reflection of this in his architecture. This work hopes to provide a preliminary overview of the topic by examining the phenomenon of Filipino spirituality and its reflections in Filipino architecture. In the following discourse cultural manifestations of this spirituality are discussed and inferential relationships to the ways the Filipino defines his space are determined. In this way a possible direct conclusion may be made on cultural spirituality as the major determinant of the way we, as Filipinos, make space preparatory to further explorations and discourse on the relationship of spirituality and space on individual and, further, universal levels.

Keywords: *Filipino spirit, Space, Engineering*

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2005,
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0268

Fusing of silver nanoparticles at room temperature using halide solutions for conductive inks

Balela, Mary Donnell L. , Rezaga, Bethel Faith

Printed electronics has recently gained much attention due to its potential applications in photovoltaics, transistors, displays, batteries, antennas, and sensors. Printed patterns usually utilize inks consisting of metal nanostructures designed for various substrates and thus, application. In this work, a highly conductive ink for printable electronics was formulated at room temperature using silver (Ag) nanoparticles as the conducting material and halide solutions as fusing agents for print-on-paper applications. Ag nanoparticles were synthesized in an aqueous system via chemical reduction method. The synthesized Ag nanoparticles were then washed and treated with halide solutions (NaCl and NaBr) at room temperature for fusing of nanoparticles and thus increase the conductivity of the ink. The fused Ag nanoparticles were dispersed in an ink formulation and were printed on different substrates. Results showed that the as-synthesized Ag nanoparticles had an average diameter of about 24 nm. After dispersing the Ag nanoparticles in a halide solution, a significant increase in particle size to about 188-197 nm was observed. The enlargement of particle size was accompanied by the increase in conductivity of the Ag nanoparticle ink. The resistance was reduced from 110 kilohms to 35 and 9.3 ohms for the as-prepared and sintered Ag nanoparticles using NaBr and NaCl solution, respectively.

Keywords: *Silver, Nanoparticles, Halides, Room-temperature sintering, Printable electronics, Engineering*

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0269

GIS-based drought vulnerability assessment of rice farm areas in Butuan City, Agusan del Norte, Philippines

Japitana, Michelle V. , Montepio, Roger C. , Apdohan, Arnold G.

The study seeks to evaluate the vulnerability of the area by providing calculated information to predict drought hazard and strengthen disaster preparedness management. It aims to assess the geospatial landscape map on drought vulnerability in Butuan City by integrating the actual information gathered from actual interviews, surveys and GIS/RS analyses with the use of LIDAR derived dataset. The analyses include physical, agro-ecological and socio-economic indicators clustered under the components such as exposure, sensitivity and

adaptive capacity. Key Informant Interview (KIIs) was conducted to assign the weights of each indicators and was determined using Analytical Hierarchy Process (AHP). Results revealed that 5 barangays, among 46 barangays, topped as the most vulnerable drought attributed to generally low adaptive capacity and high in potential impact (sensitivity and exposure). These barangays are attributed low capacity to adjust or survive to certain hazard disturbances. Also, this component (adaptive capacity) has greatly contributed to the entire vulnerability status of an area since its effect depends on the availability of the coping mechanisms to adjust such disturbances.

Keywords: *Drought, Vulnerability, Analytical hierarchy process (AHP), Adaptive capacity, Engineering*

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0270

Groundwater vulnerability assessment of the Davao River Basin using GIS-based drastic method

Albano, Susan , Utrera, Rodel T. , Alibuyog, Nathan

Groundwater vulnerability is a burning issue all over the world due to the deterioration of groundwater level and increasing contamination which pose serious detrimental risk to the environment. To identify this risk, extensive research has been carried out to assess the groundwater vulnerability by using different methods. In this study, a GIS-based DRASTIC method was use assess the groundwater vulnerability of the Davao River Basin. Results of the study showed that the river basin generally has low vulnerability to groundwater pollution. The northern portion which covers the province of Bukidnon has relatively higher vulnerability index (VI>90) compared to the southern part covering Davao City. Small patches near the mouth of the river basin were found to have relatively higher vulnerability index compared to other areas in Davao. In spite of the low vulnerability index, the basin was found to be highly susceptible to non-point pollution coming from agrichemical wastes. Results of the study serve as an important input in the development of groundwater management plan in the area and may prove useful in land use zoning and in identifying priority areas where appropriate pollution control can be established in the area.

Keywords: *DRASTIC, GIS, Vulnerability, Groundwater, Davao River, Engineering*

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0271

Housing design for the urban district

Ramos, Grace C.

Planning by the public sector has often been carried out using a “template approach.”. This approach takes off from the assumption that all areas being planned for are the same in terms of physical and social qualities. It is, however, important to note that each city is unique and that within each city exist various districts that also differ in function and features. Urban planning, therefore, should factor in the special characteristics that arise out of the district’s role in the city and even national affairs. Districts can be categorized under any of the following: The Central business district serves as the hub for the service sector of the economy. Closely associated and oftentimes adjacent to CBD’s are Downtowns that serve as the outlets for the manufacturing sector. Institutional districts are distinguished by the concentration of educational, religious, cultural and government buildings. Industrial districts are production centers where efficiency of operations is of prime importance. Tourism districts are defined by the presence of historically significant natural and man-made assets. Usually located on waterfronts, Market districts cater to wholesale trading. Circulation networks, terminals, parking spaces characterize Transport districts. All of these districts are products of organic development and territorial specialization. These are natural processes that arise out of very strong economic and social forces that physical planning must go along with.

Keywords: *Template approach, Central business district, Market district, Engineering*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 35-40
2005,
(Filipiniana Analytics)
NP

0272

Hydrothermal synthesis of zeolite crystals incorporated by nitrogen-doped TiO₂ nanoparticles for the photocatalytic degradation of tatzazine

Payawan, Jr., Leon M. , Edaño, Yasmin D.G. , Buenviaje, Jr., Salvador C.

Water pollution due to wastewater effluents particularly from organic dyes and pigments of textile and food industries have been a global concern. Various materials and processes have been developed to address this problem. In this study, a composite material of zeolite crystals and nitrogen-doped TiO₂ nanoparticles was synthesized to degrade tartrazine via combined effects of adsorption and photocatalysis. Firstly, doped TiO₂ nanoparticles were produced by sol-gel method. The TiO₂ colloidal solution was then incorporated in zeolite crystals through *in situ* hydrothermal technique. Based on the results, the synthesized zeolite-TiO₂ composite products had crystalline structure and spherical morphology. The incorporated TiO₂ nanoparticles had particle size of 59.96 ± 0.77 nm, good uniformity with polydispersity index of 0.387 ± 0.010 , and great stability in water due to Zeta potential of 32.8 ± 2.4 eV. A red shift in the ultraviolet-visible spectrum was also observed upon doping. These material properties led to a catalytic efficiency of $85\% \pm 2.1$ in the photodegradation of tartrazine for 1 hour. In summary, the material was found feasible as a photocatalyst in degrading organic dyes.

Keywords: *Zeolite, Titania, Photodegradation, Tartrazine, Nanoparticles, Engineering*

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0273

Identifying potential critical risks in the construction supply chain – an empirical study in Ghana

Edwards, David John , Parn, Erika , Darko, Amos, Owusu- Manu, De-Gra

Risk management is an important tool for organizations operating in a global environment. Hence, this paper seeks to identify potential critical risks existing in the construction supply chain (SC) in order to aid risk management processes. From the literature, 11 risks factors that may affect the construction SC were identified. A questionnaire survey based upon these factors was then carried out and 49 responses were received from contractors and suppliers in Ghana. The mean score analysis was used together with the one-sample t-test to identify potential risks in the construction SC. The K-S test was used to investigate any differences between ratings given by the two groups of respondents for a particular risk factor. The internal consistency and reliability of the risk factors was assessed using the Cronbach's alpha coefficient (α). The results show that fluctuations in prices, changes in interest rates, shortage of materials, frequent changes in SC inputs and unexpected changes in demand are potential critical risks. Generally, there was no statistical difference between the perceptions of the stakeholders on the ranking of the risk factors. Using the research presented, readers are able to identify potential risks in the construction SC for risk management activities and implement suitable risk mitigation. Although a plethora of research exists on risk management, few studies have attempted to identify risks in the construction SC – this research goes some way to fill that void.

Keywords: *Construction, Risk management, Risk typology, Supply chain, Supply chain management, Engineering*

Mindanao Journal of Science and Technology, Volume No. 14 Issue No. 1, 79-100
2016,

Improving the rigidity of sheet metal by embossing and restoration technique

Namoco, Jr., Consorcio S.

Embossing and restoration technique is conducted as a simple method to strengthen sheet metals. Soft aluminum, mild steel and stainless steel sheets of different thickness are subjected to embossing and restoration at different sheet patterns and emboss height. Deflection tests are then conducted to evaluate the effects of the parameters considered on the increase in the rigidity of sheets. Experimental and numerical methods are both employed in the investigation. Results show that the restoration technique is effective in increasing the rigidity of thin sheet metals. By taking into considerations several important parameters, improvement in rigidity can be enhanced as shown in this study. Also, it should be emphasized that this technique can be used not only for increasing the rigidity of sheet metals but also for making decorative sheets without any special forming tools.

Keywords: *Sheet metal forming, Restoration, Embossing, FEM simulation, Rigidity, Engineering*

Mindanao Journal of Science and Technology, Volume No. 8 Issue No. 1, 25-34
2010,
(Filipiniana Analytics)
NP

Induction generator control and monitoring system for micro-hydro power plants

Estoperez, Noel R. , Ambrosio, Denice Mari R. , Pallugna, Reuel C. , Gozon, Clark Darwin M., Morcilla, Rojien V.

The study is concerned with the evaluation of the performance of a locally made Induction Generator Control and Monitoring System (IGCMS) for micro-hydro plants implemented using mark-space ratio technique in low-cost microcontrollers. The heart of a micro-hydro power plant is the generator, the device that converts mechanical energy into electrical energy. Most commonly used generators are the Synchronous generator (SG) and the Induction generator (IG). Induction generators have the advantage of being cheap, readily available, and robust. However, the difficulty in determining its capacitance requirements and of controlling its generated voltage and frequency under varying loads present major challenges. This paper proposes the use of low cost microcontroller based induction generator load control and monitoring system employing mark-space ratio technology. Results showed this to be a comparatively accurate and economical means of controlling micro hydro generators.

Keywords: *Micro-hydro power plants, Induction generator control and monitoring system, Mark-space ratio, Engineering*

Mindanao Journal of Science and Technology, Volume No. 10 Issue No. 1, 1-24
2012,
(Filipiniana Analytics)
NP

Investigation of sheet metals subjected to simultaneous embossing on both sides utilizing multiple punches

Namoco, Jr., Consorcio S.

In this study, an innovative technique of embossing process of sheet metal is presented. Such technique involves simultaneous embossing on both sides utilizing multiple punches. This technique has advantages over the embossing method conducted in one side of the sheet only utilizing a die. In embossing with a die, since only one

side of the sheet is being processed, the residual stress in both sides of the embossed sheet is different, and it may cause warp to occur. Moreover, decreasing the pitch between emboss is restricted or limited with the tool and die used in forming. In an attempt to overcome these limitations, a process that performs embossing simultaneously on both sides utilizing multiple punches has been explored. In this study, simultaneous embossing on both sides of soft aluminum has been conducted and the mechanical properties of the embossed sheet are then investigated. Results showed that the bending rigidity of the embossed specimen increases with the emboss height. It was found out that the value of tensile strength and total elongation has no appreciable difference from that of plain sheet at $\theta=450$ direction.

Keywords: *Sheet metal, Simultaneous embossing, Bending strength, Tensile strength, FEM simulation, Engineering*

Mindanao Journal of Science and Technology, Volume No. 11 Issue No. 1, 21-36
2013,
(Filipiniana Analytics)
NP

0277

Ivatan heritage architecture: a survey of different house types and their evolution

Ignacio, Jose F., Alejandro, Roland Miguel

The typical representation of an Ivatan house (heritage house of Batanes) is a house made of stone, lime, wood and thatch roof made of cogon, a structure resembling houses found in European hinterlands. It clearly depicts the effects of harsh climatic conditions on the islands and the efforts of the Ivatans to adapt to a rigorous tropical environment. It tells a story of how the indigenous communities built compact and sturdy houses for protection against ravaging typhoons and the cold Siberian winds.

Unknown to most, however, is that this stone house is a product of an evolutionary process dating back to pre-Hispanic times. It is not an accurate assumption to say that the lime-stone-wood-and-thatch house is the sole representation of an Ivatan dwelling. Although the lime-stone-wood-and-thatch house has withstood the test of time, the fact remains that there are several other house types that have endured to this day most of which are made of wood-and-thatch.

This paper presents a survey of the “extant” Ivatan house types and morphologies that have evolved over a long period of time. An architectural timeline is presented as an attachment to this paper to establish the evolutionary process of the Ivatan heritage house (see Table 1). This paper does not include a description of non-existent pre-colonial heritage architecture in Batanes.

Keywords: *Stone, Lime, Wood, Thatch roof made of cogon, Engineering*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 102-107
2005,
(Filipiniana Analytics)
NP

0278

Kinetics and equilibrium modeling of single and binary adsorption of aluminum (III) and copper (II) onto calamansi (*Citrofortunella microcarpa*) fruit peels

Tayo, Lemmuel L. , Binauhan, Melanie G., Adornado, Adonis P. , Soriano, Allan N.

The present study aimed to study and compare the adsorption ability of calamansi (*Citrofortunella microcarpa*) fruit peels (PCFP) for the removal of both Al(III) and Cu(II) ions in single (non-competitive) and binary (competitive) aqueous systems by batch adsorption techniques. Electron microscopic and spectroscopic techniques were used to characterize the surface morphologies for the biosorbent and quantify the removal rates of heavy metal, respectively. Models were then used to describe in detail the adsorption kinetics and isotherms for both single and binary metal system. The influence and dependency of different experimental conditions on

adsorption performance were also analyzed. PCFP was successful in adsorbing Al(III) and Cu(II) heavy metal ions in single and binary system with removal rates reaching 100%. The biosorption process follows Ho's pseudo-second order kinetics. The Langmuir isotherm model was useful to explain the adsorption process, dominated by electrostatic interaction between adsorbent and adsorbates, indicating a monolayer adsorption at the binding sites on the surface of the peels. The results obtained in this study will provide insights into adsorption mechanism and phenomena involved and will be useful for further applications of system design in the treatment of practical waste effluents.

Keywords: *Citrofortunella microcarpa*, Biosorption, Adsorption kinetics, Isotherm models, Binary heavy metal system, Engineering

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0279

Management information system for smart agriculture (MISSA) soil sensing in Initao, Misamis Oriental

Maureal, Alex L. , Inson, Mark Jvann C. , Echavez, Grace E. , Pecson, Roland Joshua S.

The present practice in the Department of Agriculture 10 (DA 10) involved a conventional process of data collection in the farms, relying mainly on the farmer's perception which causes inconsistency. Given the seen gap, this study on the Management Information System for Smart Agriculture (MISSA) Soil Sensing System was conducted. It is an approach to modernize the determination of the nitrogen, phosphorous, and potassium (NPK) quality and pH level of soil samples qualitatively. The main objective of the study was to develop an integrated sensor prototype determining the NPK and pH which has a local database generating a geographical coordinate transmitted to a develop MISSA Portal. Soil samples were collected from selected farms in Tubigan, Initao, Misamis Oriental and analyzed qualitatively using the developed MISSA soil sensing prototype. Obtained results were comparable to the DA standard for soil tests.

Keywords: *NPK quality, pH level, Sensing device, Soil sensing, MISSA, Engineering*

Mindanao Journal of Science and Technology, Volume No. 15 Issue No. 1, 63-75
2017,
(Filipiniana Analytics)
NP

0280

Mangima stone as alternative coarse aggregate in concrete

Lamberte, Joseph Cloyd L. , Cabahug, Ruth Guinita , Cabahug, Ruel R., Neri, Anecito C.

A study was conducted to investigate the characteristics of concrete mixed with Mangima stone as alternative aggregates. Several design mixtures were evaluated to compare the test findings. The quality tests of the Mangima aggregates included the following: abrasion test, unit weight (kg.cu.m), specific gravity (SSD), absorption test and sieve analysis (gradation test). Concrete specimen samples were tested for compression tests. The study concluded that the Mangima stone can be a suitable alternative material for coarse aggregates to produce structural concrete because results showed that compressive strength of the concrete blended with Mangima aggregates attained higher strength capacity than the conventional (basalt) aggregates.

Keywords: *Phyllite schists, Mangima stone, Concrete, Aggregates, Alternative aggregates, Engineering*

Mindanao Journal of Science and Technology, Volume No. 9 Issue No. 1, 19-28
2011,
(Filipiniana Analytics)
NP

A methodology in determining the optimum mix generation units

Caliao, Nolan D. , Morcilla, Rojien V.

Due to the introduction of restructured and deregulated electricity market worldwide, many generation units of different technologies compete for electricity demand. Thus, choosing the best mix of power generation to allocate such demands of energy becomes the challenge for the energy practitioners. In this paper the problem of choosing the best source of energy is simulated technically, economically, and financially to come-up with the best mix. The 15 combinations of energy sources were first subjected to technical and economic dispatch. Combinations that passed the technical and economic dispatch were then subjected to financial evaluation using the parameters such as net present value (NPV), internal rate of return (IRR), and payback period. To illustrate the method, 4 generation technologies (coal, biomass, wind, and solar) were simulated for a 200MW base load and an additional 500 MW demand in the next 15 years. Upon the test of the methodology in the generation technologies, a mix of coal and wind sources is the most optimal for the base load of 200 MW, while for the peak load of 700 MW in 15 years, the mix of coal, wind and biomass is the most optimal in both technical, economic, and financial evaluations.

Keywords: *Economic dispatch, Marginal cost, Net present value (NPV), Internal Rate of Return (IRR), Payback period, Engineering*

Mindanao Journal of Science and Technology, Volume No. 8 Issue No. 1, 35-56
2010,
(Filipiniana Analytics)
NP

Modeling sand-shoveling related pain risks with fuzzy logic

Olorunfemi, Bayode J. , Akinyemi, Olasunkanmi O. , Ismaila, Salami O. , Adefemi, Adeyemi A. , Adeyemi, Hezekiah O.

This study developed a fuzzy linguistic model to predict work-related pain in sand shovelling. The primary objective was to develop a knowledge-based economic tool for ergonomics risk assessment capable of predicting same opinions of injury as obtainable with workers' self narrated. The model used 81 possible "IF THEN" linguistic rules fired into Mamdani inference engine to make decisions about the rank of risk associated with sand shovelling task variables. Scoop per minute, length of scoop, shovel/load mass and throw span were the four inputs variables used with "Sand-Shoveling Pain (SSP) risks" as the output. Validation result shows that 70% of the model predictions opinions corresponded to that of the opinion interpretation of the self-narrated numeric pain rating (SNNPR) of the affected 120 workers. The model generated risk (MGR) values had statistically significantly higher level of predicted risk (mean=3.91, SEM=0.47) compared to SNNPR (mean= 3.6, SEM = 0.50), with $t(38) = -0.449$, $p = 0.656$ with 95% confidence interval for the difference (-1.71, 1.09). Pearson correlation coefficient of the MGR values and the workers' SNNPR values was found to be 0.73. The independent sample t-test result ($p = 0.667$) also indicated a no significant difference of means. The model which could be applied in any workplace where it is necessary to consider ergonomics of work method and/or workplace design for manual shovelling tasks, was able to achieve the targeted objectives hence quality of reality was attributed to it.

Keywords: *Fuzzy, Pain, Risk, Sand, Scoop, Shovelling, Engineering*

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2016,
(Filipiniana Analytics)
NP

Molasses as retarding admixture for concrete in road construction

Trinidad, Jilljun D , Taotao, Honiedel V , Gorro, Joselle A , Galvez, Leigh Dee S

Industrial pollution continued to be a major factor causing the degradation of the environment around us. It affects the water we use, the air we breathe and the soil we live on. Also, it is reported that Shree Renuka Sugars LTD in India which is one of the largest sugar producers in the world discharged fluids into the Belgaum fields. The farmers claimed that it damaged their crops. They also claimed that the ground water about two kilometers around the sugar factory had also been contaminated. Molasses on the other hand is a viscous by-product of sugar industry, which used sugarcane in the production. The growing problem in pollution due to those waste prompted the researchers to look for the possibility that the so called waste product can be used as a retarding admixture for concrete. This study sought to answer the following questions; what are the flexural strength of concrete with molasses and stuccotard 80 on the fourteenth day and thirty-fifth day? What are the initial and final setting time of the cement paste with molasses and stuccotard 80? The researchers investigated the usage molasses as a retarding admixture for concrete by comparing it to the conventional retarder specifically stuccotard 80. The same ratio of the retarders was used which is 300ml of retarder is to 100kg of cement, concrete mixture used in this study and both followed a ratio of 1:2:4 for cement, sand, and gravel respectively. Five samples each were produced and were cured for fourteen days and thirty-five days. Based on the results of the study, it can be concluded molasses can be a retarding admixture; which could delay the initial and final setting time of concrete and at the same time it could increase the flexural strength of concrete.

Keywords: *Molasses, Retarding admixture, Road construction, Engineering*

Asean Journal Of Engineering Research, Volume No. 5 Issue No. 1, 13-33
2016,
(Filipiniana Analytics)
NP

Non-conventional method for acoustical control: renovation of the intel CV1 cafeteria

Evangelista, Alex Ray P.

In modern urban life noise is an ever increasing problem. Escalating noise levels and noise intensities in all types of environments have proven to be disruptive to efficiency and productivity, and psychologically and physically harmful to the body. Noise can also be downright annoying, and can interfere with any activity, especially rest and relaxation. Thus, noise should be controlled not only in spaces where sound is an essential component, like recording studios or theaters, but also in places meant for relaxation, like private homes, restaurants, and even cafeterias.

Although in designing large office buildings, the architect usually considers noise control and good overall acoustics for the conference and seminar rooms, the library, or even the work areas, little attention is given to non-work oriented spaces like the cafeteria. Without the proper acoustical attention, these spaces can cause discomfort and can deprive their users of the rest their minds and bodies need in between work hours.

Because good acoustical conditions are often disregarded at the onset of design stages, acoustical improvements are only considered after the problem has been actually realized and experienced. At this point, standard measures to solve the problems of noise are sometimes difficult to implement, for one reason or another.

It is not unusual for large spaces like a cafeteria to have parallel walls and floors, a low floor to ceiling height, and very little surface absorption. These physical characteristics guarantee that sound and noise in this space will endure a lengthy reverberation time. Additionally, if the space is constantly full of activity, the problem of noise levels and intensities increases.

Initially then, the designer tasked to solve these problems would probably look into the possibilities of reducing the floor area, increasing floor to ceiling heights, and simply replacing surface materials with highly sound absorptive alternatives. Though theoretically these measures would work, in reality these are usually easier said than done. Ceiling heights may be fixed permanently; enclosing surfaces like walls and ceilings may not provide

enough absorption, even if replaced with very absorptive material; and restrictions related to the type of space might disallow the application of conventional acoustical treatment. Thus, there would be only minor changes to the reverberation time, and consequently insignificant improvements to noise control.

However, non-conventional methods to reduce sound levels and ultimately improve the acoustical conditions can be introduced. Such methods can include providing openings through dropped ceilings, directing sound to absorptive surfaces, and providing additional absorption through “space absorbers,” absorptive furniture, and partitions.

This paper will present a case study of how these methods were introduced in the new design of the Intel CV1 Cafeteria. Other possible methods, whether utilized or not, will also be introduced. As a conclusion this paper will project how acoustical conditions in this, and other similar spaces, will be improved.

Keywords: *Acoustical control, Non-conventional method, Urban life, Engineering*

*Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 18-26
2005,
(Filipiniana Analytics)
NP*

0285

The oecodesignator: the ecocentric environmental design professional

Flor, Enrico G.

The environmental design professions are having a difficulty redefining their practice for the next millennium, especially with current circumstances that question the validity and efficacy of their respective practices. A paradigm shift, brought about by concepts from fields outside the environmental landscape profession can contribute to a holistic approach and conduct of their respective practices that will address sustainability of a designed and built project, as well as the true integration of all these professions into what we can call generically as the oecodesignator. Rather than competing professions, the new paradigm espouses the concept that they are all of the same breed, utilizing the same thought processes to attack a spatial and environmental problem, but differing only through the context filter and language that one opts to use.

Keywords: *Engineering*

*Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 58-65
2005,
(Filipiniana Analytics)
NP*

0286

Optimizing link capacities in the traffic network surrounding the commercial business district (CBD) of Cagayan de Oro City, Philippines

Agdeppa-Namoco, Rhoda P.

Traffic congestion has become one of biggest problems brought about by modernization and has greatly affected big cities all over the world. Various strategies, such as the creation of new or alternate routes, have been explored by road management agencies in order to reduce delay. However, in order to achieve effective traffic management, it is important to know the link capacities in the traffic network. Cagayan de Oro City, tagged as the city in bloom, in blossom and in boom, continues to prosper and with it, transport vehicles, including public utility jeepneys (PUJs), in the city are also continuously increasing, thus causing traffic congestion in the city especially around its commercial business district (CBD). In this paper, a mathematical model is formulated and solved to provide guidance on how to allocate congestion in the traffic network surrounding the CBD of Cagayan de Oro City, Philippines, in an equitable manner such that the overall network congestion or delay can be minimized.

Keywords: *Traffic congestion, Traffic management, Link capacity, Engineering*

Photocatalytic property of Cu-doped hematite (α -Fe₂O₃) hierarchical nanostructures

Balela, Mary Donnabelle L. , Rezaga, Bethel Faith Y. , Cervera, Rinlee Butch M. , Aquino, Christian Laurence E.

Photocatalysis is a promising route in the treatment of dye-laden wastewater as this process does not produce any sludge that would require secondary treatment and is also relatively easy to handle. Hematite (α -Fe₂O₃) is a good candidate as a photocatalyst because it is very cheap, stable, and environmentally benign. This work reports the enhancement on the photocatalytic property of Cu-doped hierarchical α -Fe₂O₃ nanostructures synthesized via hydrothermal method. Precursor materials (FeCl₃, CuCl₂, and Na₂SO₄) were mixed in 40 ml distilled H₂O at varying mole ratios and hydrothermal treatment was done at 120°C for 6 h. Precipitates were then washed and consequently calcined at 400°C for 2h. X-ray diffraction and Raman spectroscopy methods reveal successful synthesis of rhombohedral α -Fe₂O₃ phase and doping of Cu. Morphological analysis using SEM showed formation of urchin-like nanostructures, with uniformity decreasing with increasing dopant levels. Photocatalytic activity was assessed via photodegradation of methyl orange under UV-C irradiation and showed that degradation efficiency and kinetics was best at 15% Cu dopant. The pseudo-first order kinetic rate constant of the 15% doped sample had about twenty times improvement compared with the undoped sample. Improved photocurrent for the 15% doped sample was obtained through chronoamperometric measurements which is consistent with the degradation performance of synthesized photocatalyst.

Keywords: Photocatalysis, Cu-doped hematite, Urchin-like structures, Engineering

Photoelectrocatalytic degradation of acid orange 52 using copper-doped titanium dioxide nanotubes under UV light

Perez, Jem Valerie D. , Boadod, Kristoffer Francis P. , Cleofe, Vince Aron F. , Cañal, Rio Ysabel A. , Lopez, Edgar Clyde R.

Doping titanium dioxide (TiO₂) has been the traditional approach to narrow the band-gap of TiO₂, hence, extending its photocatalytic activity to the visible-light region and allowing the possibility of solar-driven photocatalysis. Previous studies have shown that doping with transition metals widens the light absorption range of TiO₂ by introducing new energy levels lower than the conduction band of TiO₂. Among the transition metals, copper has received considerably less attention compared to the rare earth metals such as Pt and Pd which are very expensive. In this study, highly-ordered arrays of copper-doped titanium dioxide nanotubes (Cu-TiNTs) were synthesized by double anodization of titanium sheets. Cu-TiNTs were shown to have an average inner diameter of 52.13 nm, a wall thickness of 14.28 nm, and a tube length of 0.6401 μ m. Fourier-transform infrared spectroscopy confirmed the presence of characteristic O-Ti-O bond of TiO₂ while X-ray fluorescence spectroscopy confirmed copper-doping with an average dopant loading of 0.0248 wt%. Even at this low dopant loading, Cu-TiNTs were shown to be photo-active in degrading Acid Orange 52 (AO 52) under UV light illumination. The kinetic data of AO 52 photodegradation were best described by the pseudo-first-order kinetic model ($R^2 \geq 0.991$) with a kinetic rate constant of $9.42 \times 10^{-3} \text{ min}^{-1}$ for Cu-TiNTs as compared to $6.04 \times 10^{-3} \text{ min}^{-1}$ for pristine TiNTs. Overall, doping pristine TiNTs with Cu was shown to enhance their catalytic properties in degrading textile dyes such as AO 52.

Keywords: *Titanium dioxide nanotubes, Doping, Anodization, Photoelectrocatalysis, Acid Orange 52, Engineering*

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0289

Physical characterization of low fired porous ceramic whiteware utilizing bone ash, quartz and clay for artware products

Clemente, Jennyrose C. , Dejeto, Rodrigo V., Galut, Christian Mark S.

There are numerous studies on bone ash as raw materials in both earthenware and porcelain whiteware bodies that produce translucent and vitreous compound with minimal to zero porosity. In contrast, this study focused on utilizing bone ash in low fired porous ceramic whiteware bodies for artware products. The formulation was based on the ideal “Bone China” compound which has 50% bone ash, 25% quartz, and 25% clay. These were substituted with local materials from Ilocos Norte. The bone ash was obtained by calcining up to 1050°C of cow’s bone collected from the local restaurant. After calcination, this was ground for several hours using pot mill prior to screening at 75 µm sieve. The Pasuquin quartz and Sta. Ana clay were gathered from the mountainside of Ilocos Norte. Both materials separately underwent preliminary processes such as drying, crushing and grinding prior to screening at 75 µm sieve. The three materials were proportioned, mixed with the desired amount of water together with 0.3% Na₂SiO₃ as dispersing agent until a homogeneous mixture was achieved to form a slip. The test samples were solid cast using 2 in x 2 in x 8 in plaster of Paris mold, dried and fired separately one at 1050°C and the other at 1100°C, respectively. Results showed that the total linear shrinkage obtained were 2.15% and 3.56%, respectively, which are within the ideal range of 17% maximum. The modulus of rupture (MOR) were 51.21 lb/in² and 136.21 lb/in² which were very low compared to the ideal range of 1400~2000 lb/in². The water absorption values were 31.13% and 29.87% and the apparent porosity were 48.20% and 46.78%, of the samples fired at 1050°C and 1100°C, respectively. Whiteware products can be classified as “vitreous” when water absorption and apparent porosity is less than 1%, otherwise this is classified as “porous” ceramic whiteware.

Keywords: *Low firing, Ceramic whiteware, Bone ash, Artware, Engineering*

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0290

Physiological stress monitoring system

Fernandez, Jr., Emmanuel C. , Putong, Barby Jay G , Sanao, Queensette Chelline A, Plariza, Carl Gabriel L.

The study aimed to create a device that measures the physiological parameters that detects the stress level of an individual. The physiological parameters used are heart rate, hand temperature and galvanic skin response. The researchers used the experimental development design, descriptive survey and statistical method in gathering, summarizing, analyzing, and interpreting data of the research. The statistical methods used in this study are mean and one sample t-test. Based on the results, the heart rate measurement and hand temperature measurement has no significant difference compared to the standard device of the parameters. An Android application was also developed for the data to be displayed. The research evaluation results were proof that the device was able to detect and measure the physiological parameters relating to stress.

Keywords: *Stress monitoring system, Physiological, Stress, Engineering*

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2016,

Preparation and evaluation of sodium silicate solution from rice hull char and sodium hydroxide for ceramic slurries application

Patac, April Mae , Pambid, Mauro Jay , Salamangkit-Mirasol, Emie , de la Cruz, Girlie P.

Sodium silicate (Na_2SiO_3) solution is mostly prepared from quartz as source of silica (SiO_2) with sodium carbonate as source of sodium oxide (Na_2O) and melted at around 1300°C . Na_2SiO_3 is widely used as a raw material or component in various industries as deflocculant, electrolyte in coatings, detergents, soaps, and many others. Though commercial Na_2SiO_3 is relatively cheap, it is not readily available. In this study, an industrial waste rice hull char (RHC) was used as SiO_2 source and sodium hydroxide (NaOH) as Na_2O source in the preparation of Na_2SiO_3 solution. Five varying ratios of RHC to 3 M NaOH solution were mixed and heated at 80°C while continuously stirred for 3 hours. The heated mixtures were filtered and the specific gravities (spg) of the filtrates were adjusted through heating at 200°C with stirring until spg of 1.55-1.60 is achieved. The viscosity and pH of the prepared Na_2SiO_3 were also measured. The amount of SiO_2 in the RHC and washed residue were determined by XRF analysis. The effects on the specific gravity, viscosity, and casting rate of the clay slurries with the prepared Na_2SiO_3 as deflocculant were determined. Results of the XRF analyses revealed that the RHC consisted mainly of SiO_2 and the washed residue had an intense black color which was associated with the presence of mainly carbon and low SiO_2 . The clay slip with prepared Na_2SiO_3 as deflocculant exhibited favorable properties such as consistent specific gravity, controllable viscosity, good casting rate, and clean casted samples. Therefore, the preparation of Na_2SiO_3 from waste rice hull char and sodium hydroxide at very low temperature is very promising for production of this material for local users.

Keywords: *Clay slurries, Deflocculant, Rice hull char, Sodium silicate, Engineering*

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Prevalence of symptoms and risk factors of health problems of solid waste collectors in the Philippines

Matias, Aura C. , Mariano, Lizbeth A.

Exposure to solid wastes may result to several health problems. Solid waste collection should be effectively done. However, in the Philippines, collection is done manually, exposing the solid waste collectors to health risks. In 2017, the authors made an initial study on respiratory health problems of solid waste collectors and found out that 19.29% of them experiences its symptoms [1]. On this study, the prevalence of symptoms and risk factors of the other most common health issues among these workers: musculoskeletal, gastrointestinal, and dermatological symptoms were examined. The study found that in terms of prevalence of symptoms, the health problems are ranked as follows: MSD (39.55%), gastrointestinal (21.54%), and lastly, dermatological (12.86%). Significant factors found for MSD are the age of the worker, educational background, volume of alcoholic drinks consumed, perception of work demand (time pressure), long walks at work, and assignment to institutional biodegradable waste route. For gastrointestinal symptoms, the significant factors are hours of sleep, volume of alcoholic drinks consumed, frequency of taking baths, and perception of community support. Lastly, for the dermatological symptoms, the significant factors are sticks of cigarettes smoked per day, perception of work demand (time pressure), perception of work difficulty, perception of community support, and assignment to institutional non-biodegradable route. Significant risk factors can be used as guide in improving the conditions of solid waste collectors. Logistic regression models were also constructed to predict the presence/absence of each health problem.

Keywords: *Solid waste collectors, Musculoskeletal, Gastrointestinal, Dermatological, Risk factors, Logistic regression models, Engineering*

Prototype alarm device system with short message service (SMS) dissemination for storm surge - prone areas

Bagay, Joshua O , Paredes, Vicent John A , Bartolay, Wilfred Roy O , Gozalo, Christian Ellis W , Monilla, Maria Katrina Joy U , Lerio, Jefferson Kevin A

The main objective of the study was to produce a prototype that would give warning through an alarm and Short Message Service (SMS) to the public in case of a storm surge occurrence. This study focused only on storm surge and it can be beneficial to the community by imposing awareness, which leads to preparedness. Through mitigation techniques and prevention effects, sudden death can be avoided. Results of this study shows that the prototype can indeed recognize storm surge, trigger the alarm, and send text messages to those concerned. This would benefit the Civil Engineers, Department of Science and Technology (DOST), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the community and future researchers.

Keywords: *Storm Surge, Prototype, Alarm System, Short Message Service, Signal Number One, Signal Number Two, Signal Number Three, Arduino, Engineering*

Reduction of technical loss on a feeder of an electric cooperative in Mindanao by feeder reconductoring

Eduave, Dana Maria Y., Daquiado, Dimas N.

Technical loss reduction program in distribution systems has been activated due to the increasing cost of electricity. These initiatives are already introduced to the cooperatives in the form of incentives and penalties. This paper focuses on the impact of technical loss reduction by reconductoring the 3-phase, 4 wire primary distribution line of a feeder with 2/0 conductor wire size to ACSR 3/0, AWG 6/1 with the total length of the overhead line 20,344.01 meters and simulated through powersolv DSAS. Simulation results showed that the implementation of this reconductoring led to an 8% reduction of the feeder technical loss. The financial viability revealed that the cost of the reconductoring project could add Php 1.20 per kWhr for 3-year recovery period and Php 0.64 per kWhr for 5-year recovery period to be added to the power bills of the consumers, but could also give rate reduction of Php 0.35 per kWhr for the 22 years for the 3-year recovery period and Php 0.37 per kWhr for 20 years for the 5-year recovery period. Feeder reconductoring is beneficial not only to the Electric Cooperative but to its consumers. A 5-year recovery period of reconductoring the feeder of the particular substation is more attractive since Php 0.64 per kWhr to be added to the power bills of the consumers is not very noticeable to affect the budget of regular earning family.

Keywords: *Technical loss, Distribution systems, Reconductoring, Electric cooperative, Engineering*

High renewable energy (solar and wind) penetration hybrid energy systems for deep decarbonization in off-grid areas

Pascasio, Jethro Daniel A., Ocon, Joey D.

The country's off-grid islands rely on diesel fuels for electricity supply which are unreliable, expensive, and emit greenhouse gas emissions. The government subsidizes the electricity costs, and most grids operate at certain hours only to reduce the economic and environmental impacts. This study evaluated the techno-economic viability of solar-wind-battery-diesel hybrid energy systems as an alternative solution in 143 existing off-grid island areas using HOMER® Pro. The application obtains the optimal hybrid system architecture with the minimum electricity costs using typical island load behavior. The solar and wind resource data were obtained from the PHIL-LiDAR 2 Program. The results showed that 135 out of 143 islands favor both solar and wind energy, 5 islands favor solar only, and 3 islands favor wind only. Putting up these hybrid energy systems require PHP 55.19 billion in investments with potential savings of PHP 7.93 billion annually or about 69% reduction in the required subsidies. The results suggest high sensitivity towards wind resource potential due to the lower costs of wind energy. With a potential energy share of 62%, wind power for off-grid islands should be highly considered alongside solar power, especially in areas with high wind resource potential, to provide reliable energy access, reduce electricity costs, and reduce greenhouse gas emissions.

Keywords: *Renewable energy, Solar, Wind, Techno-economic analysis, Off-grid, Engineering*

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The roots of our problems with our physical environment: a modest theory

Del Castillo, Nicolo C.

The problems the country faces with regard to its physical environment, particularly in urban areas, may have its roots in the 1898-1907 turn of the century period. Traffic and the accompanying pollution, urban congestion, and the incessant housing problem may all find their roots in a crucial point in our country's past: the end of Spain's rule and America's "benevolent assimilation." The paper aims to present documentary evidence on the causes of contemporary problems such as the perceived lack of discipline in our streets and the congestion of people and vehicles in urban centers. Particularly, it will discuss the results of past studies on urban public places: the bus stops, sidewalks and urban nodes, and relate it to fundamental flaws in our urban design standards and ultimately in our concept of nationhood. In relating it to the concept of nationhood, the paper shall point out crucial points in our history where the foundations of Philippine urban design and architecture have taken root and ultimately affect the physical environment, as we know it today. It will attempt to show how the country's policy makers were "seduced" into believing that everything American was "the modern way" and that traditional values should be discarded. Eventually, as the tenets of modernism came under fire, and with the renewed "veneration" of the vernacular traditions, our physical environments put on a "Filipino face," but still retained the Western "bones". Seen as a whole, our path to genuine nationhood may be seen as a story of interrupted starts and miscues. From the interrupted formalization of our First Republic under Aguinaldo, to the knee-weakening coup attempts in 1987, our story shows we never had the chance to bloom and flourish as a unique culture and that we had to continually battle against Western/ foreign interests and mannerisms. This second turn of the century for our country may be the last chance we may have in correcting our flaws and forging a new path toward a true people-oriented environment. This paper was presented in the Philippine Studies International Conference last July 2000.

Keywords: *Physical environment, Contemporary problems, Lack of discipline, Engineering*

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2005,
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NP

Short-term and long-term stability studies of copper and iron in drinking water-reference material

Encarnacion, Elyson Keith , Daniel, Christy S. , Guerrero, Jan-Ervin C.

Reference materials (RMs) are vital for validation and quality control of analytical procedures. The RMs are prepared using accepted protocol for RM production in drinking water. In this study, evaluation of stability of the RM during shipment to the end-user (short-term stability) and during storage (long-term stability) was conducted. After the RM material was dispensed into separate bottles and found to be statistically homogeneous, 14 samples for short-term and 18 samples for long-term were identified using stratified random sampling. For short-term studies, the method followed an isochronous approach. Samples were placed in three different locations each with monitored temperature conditions (0C, 27C and 40C). After three weeks, the samples were collected and analyzed in triplicates under repeatability conditions using Teledyne Prodigy 7 ICP-OES. For long-term studies, the samples were stored in two different temperature conditions (0C and 27C). The samples were analyzed 3, 6 and 9 months after production of the RM. Stability of the RM was determined using Trend Analysis in accordance to ISO Guide 35. Results of tests showed no-bottling trend indicating that the RM was stable after 9 months. Long term stability testing is on-going and will continue until 24 months after production.

Keywords: *Reference material, Stability Test, Trend Analysis, Engineering*

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Silver-doped titanium dioxide nanotubes for photoelectrocatalytic degradation of acid orange 52

Perez, Jem Valerie D. , Lopez, Edgar Clyde R., Ocon, Joey D.

Titanium dioxide (TiO₂) is the most widely used photocatalyst because of its low cost, wide availability, and non-toxicity. However, it requires UV light for photoactivation due to its fast electron-hole recombination and wide band gap. Doping TiO₂ with transition metals such as silver is one way to extend its photoactivity in the visible light region. In this study, highly-ordered Ag-doped TiO₂ nanotubes (Ag-TiNTs) were synthesized by one-pot double anodization of Ti sheets. The as-anodized TiNTs were calcined, characterized, and used as photoelectrodes for photoelectrocatalytic degradation of Acid Orange 52 (AO 52). The effects of varying light intensity and electrical bias on the degradation of AO 52 were investigated. Ag-TiNTs were successfully synthesized with an average diameter of 46.82 nm, a wall thickness of 8.71 nm, and nanotube length of 1.18 μ m. Silver was found to be homogeneously doped within the interstitials of Ag-TiNTs with 2.06 wt% Ag loading. Increasing the applied potential and light intensity both resulted in faster degradation of AO 52. Maximum degradation was achieved after 120 min under a constant current density of 1.0 mA cm⁻² and UV intensity of 2,000 μ W cm⁻² achieving 94.62% AO 52 degradation with a pseudo-first order kinetic rate constant of 21.14 x 10⁻³ min⁻¹. Ag narrows the band gap of TiO₂ by acting as an electron trap that minimizes electron-hole recombination and extending its activity to the visible light region. Overall, Ag-doping was shown to enhance the photoelectrocatalytic performance of pristine TiNTs in degrading AO 52.

Keywords: *Titanium dioxide nanotubes, Doping, Anodization, Photoelectrocatalysis, Acid Orange 52, Engineering*

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Solution combustion synthesized-porous Co₃O₄-based nanoparticles as oxygen evolution reaction catalysts in alkaline medium

Balela, Mary Donnabelle , Acedera, Rose Anne

Over the recent years, cobalt (II, III) oxide (Co₃O₄) has been used as an oxygen evolution reaction (OER) catalyst due to its abundance, low cost, environmental sensitivity, and good stability even in alkaline medium. In this work, porous Co₃O₄ nanoparticles were synthesized through solution combustion. Cobalt nitrate hexahydrate and glycine were used as the oxidant and fuel, respectively. Stoichiometric amounts ($\phi = 1.0$) of such were dissolved using a very minute amount of distilled water. Upon mixing, the precursor solution was heated until it reached its combustion temperature. The samples were then calcined at 300, 500, and 700 °C. FESEM analysis revealed the sponge-like morphologies of the powders and showed the presence of nanosized pores. On the other hand, SSA values were found to decrease as the calcination temperature was increased. XRD results showed that a subsequent heat treatment is required to produce a single phase-oxide, as the uncalcined sample was composed of spinel Co₃O₄, and periclase CoO phases. For the electrochemical results, the as-synthesized oxide exhibited the best electrocatalytic performance in 1 M KOH with onset overpotential and Tafel slope values as low as 356 mV and 80 mV·dec⁻¹, respectively. Following such findings, uncalcined samples were synthesized with fuel-to-oxidizer ratios (ϕ) equal to 0.5 and 1.5. Electrochemical testing showed that the nanopowders synthesized at $\phi = 0.5$ has better OER catalytic properties than that synthesized through stoichiometric conditions ($\phi = 1.0$). The onset overpotential was found to be 319 mV. The overpotential required to obtain a 10 mA cm⁻² current density was also lower at 447 mV, in contrast the 452 mV required for the sample synthesized at $\phi = 1.0$.

Keywords: *Solution combustion synthesis, Cobalt oxide, Oxygen evolution reaction, Electrocatalyst, Engineering*

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Spatial utilization in informal settlements

Lejarde, Godesil G. , Santos, Romeo B. , Gonzaga, Gemma Sheila C.

This paper looked into the nature of spatial utilization in informal settlements. A survey of two informal housing settlements with contrasting locations was conducted to determine the way space is 'utilized' in relation to the geographical and demographic characteristics of the localities. Preliminary results of this initial study show that considerable differences indeed are manifest, altogether obvious though, coming as it should from the effects of geographic & economic factors involved. But the informal settlers' utilization of the spatial elements of the house shows a number of things more. Among others, it points to a common tendency among informal settlers to rationalize and to rise above geographic and demographic limitations, such that the resultant spaces being created are manifestations of an attempt to privacy, organization and utility—however crude these might be.

Keywords: *Informal settlements, Geographical, Demographic, Engineering*

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NP

Specific energy consumption of heat pump drying system

Villanueva, Eliseo P. , Closas, Adonis A.

The study developed a heat pump dehumidifier (HPD) dryer prototype incorporating an external condenser. The main feature of the HDP dryer prototype is its capability to adjust the drying air temperature and moisture content depending on the drying requirements of a particular product. It consisted of 90cm x 56cm x 61cm (length, width & height respectively) drying chamber and 4 layers of tray system and each layer has 1 tray. The tray has a dimension of 46cm length and 37cm width respectively. A 1.5 hp (1.12kW) piston compressor. Mango was used in the experiment as a test sample product. Three test sample loads were experimented, namely: 170g, 340g and 510g which were dried in the HPD dryer system for a drying air temperature of 40 oC and drying air velocity of 0.7 m/s. The specific moisture evaporation rate (SMER); and the specific energy consumption (Ekg) for both wet and dry products were calculated using the measured data. The amount of moisture evaporated to reach the final moisture content of 15% wet basis was calculated and the energy consumed was determined in kilowatt-hour meter from the measured value. The results revealed that there is reduction of energy consumption as product load is increased.

Keywords: *Energy consumption, Heat pump dryer, Specific energy consumption, Specific moisture evaporation rate, Engineering*

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A study of plant species suitable for riverside-riparian areas

Villa Juan, Jose Dan

Transition zones between land and water environments are narrow strips of land called Riparian Areas having a distinct ecosystem. Ecologically these areas hold great importance in regulating natural cycles between terrestrial and aquatic environments. However these zones are plagued with problems stemming from natural occurrences and those coming from man-made actions.

Specific plant species are looked into and analyzed against given criteria and then tabulated to assess each plant's usefulness against specific needs / problems of riverside-riparian areas. This practice in rating plants creates a system whereby species are applied correctly and with reason.

Keywords: *Ecology conditon, Environmental condition, Natural cycle, Engineering*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 51-57
2005,
(Filipiniana Analytics)
NP

A study on the potential of agricultural waste from *Oryza sativa* - rice straw and rice husk - as a potential adsorbent for carbon dioxide capture

Zhang, Joyce , Peñaflor, Janssen , Clarete, Kerstein , Estrada, Samuel , Carillo, Airic , Cabriga, Chasin, Castro, Jhulimar

Post-combustion carbon dioxide capture through adsorption process has been receiving widespread attention over the past decade as a mitigating technology for climate change. Since desirable adsorbents for CO₂ capture are those that are both efficient and low-cost, one of the most sought materials is biochar from agricultural wastes. In

this study, biochar derived from the slow pyrolysis of rice straw and rice husk were investigated for its potential as adsorbents for carbon dioxide capture. Specifically, the surface characteristics, selectivity, adsorption capacity, and thermal stability of the biochar were investigated. Results showed that the rice straw biochar with adsorption capacity of 2.6 wt% is more capable of adsorbing carbon dioxide than the rice husk biochar with adsorption capacity of 1.1 wt%. Furthermore, to determine the conformity of biochar with commercially available adsorbent, the adsorption capacity of rice straw biochar was compared to that of a commercial activated carbon. Meanwhile, the rice husk biochar was compared to carbon residue derived from rice husk used as a boiler fuel to further determine the potential for CO₂ capture of a carbon material derived from industrial waste. Since both biochar derived from rice straw and rice husk were selective to carbon dioxide, it can be deduced that both agricultural waste from rice after pyrolysis can be potential adsorbents for carbon dioxide capture.

Keywords: *Rice straw, Rice husk, Carbon dioxide capture, Climate change mitigation, Engineering*

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0304

Surface runoff estimation: basis for sediment load simulation of Madgao and Saug Rivers Watershed in Asuncion, Davao Del Norte, Philippines
Tio, Darice Anne R, Biado, Charlotte Jane C, Caparos, Marc Thotilo V, Relator, Jayford T.

In this study, thematic maps of Madgao and Saug Rivers Watershed in Asuncion, Davao del Norte, Philippines were generated through Quantum Geographic Information System (QGIS) software in order to estimate surface runoff as basis for sediment load simulation with the aid of Hydrologic Engineering Center – River Analysis System (HECRAS) software. As a quantitative-descriptive-evaluative study, the primary data gathered from the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), National Irrigation Administration (NIA) and Provincial and Municipal Planning and Development Offices (PPDO & MPDO) of Davao del Norte and Compostela Valley and the secondary data from engineering surveys enabled the researchers to provide numerical and narrative description about the characteristics of the study watershed and the behaviour of the riverine system. This study will be helpful in monitoring watershed health, the functionality of Saug irrigation facility and in mitigating existing or possible sedimentation risks. It benefits the national and local governments, the entire community within Madgao and Saug Rivers Watershed, engineers, Department of Environment and Natural Resources (DENR), the future investigators and researchers.

Keywords: *Thematic maps, Watershed, Surface Runoff, Sediment Load, Quantum Geographic Information System (QGIS), Hydrologic Engineering Center River Analysis System (HECRAS), Engineering*

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2016,
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0305

A survey on the implementation of safety standards of on-going construction projects in Cagayan de Oro City, Philippines
Cabahug, Ruel R.

A survey using structured questionnaires and actual field visits was conducted to various on-going projects in Cagayan de Oro City in the year 2011. A total of 375 respondents from 36 contractors were subjected to the questionnaires which included project managers, project engineers, foremen, carpenters, masons, equipment operators, welders, steel men, electricians and laborers. Apart from the data obtained from questionnaires, actual field visits were conducted to gather further information using the checklist of Occupational Health and Safety Standard practices of the Department of Labor and Employment's Department Order No. 13. Results revealed

that in actual field condition, the standard safety practices were poorly implemented and in most cases, the standard safety requirements were just taken for granted. While the contractors were obliged to do their part in educating and promoting 'health and safety' practices in the construction sites, this study proved otherwise.

Keywords: *Construction, Construction management, Safety, Health and safety, Health and safety in construction, Occupational health and safety, Engineering*

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2014,
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NP

0306

Synthesis and characterization of ceramic lightweight aggregate utilizing Ilocos Norte clay and corn cob char

Ulit, Charles John U. , Doño, Andrew C.

Ilocos Norte clay (IC) and corn cob char (CC) were synthesized as ceramic lightweight aggregate (CLA) for lightweight concrete (LWC) application. Chemical analysis of IC and CC were determined using x-ray fluorescence (XRF) technique. Likewise, mineral compositions of IC were determined using x-ray diffraction (XRD) technique. Chemical analysis of IC were 45.01% SiO₂, 25.17% Al₂O₃, 20.62% Fe₂O₃, 7.50% MgO, 1.28% TiO₂, 0.16% MnO and 0.25% CaO. Chemical analysis of CC were 72.65% SiO₂, 4.91% Fe₂O₃, 11.13% CaO, 11.14% P₂O₅, 0.15% ZnO and 0.02% ZrO₂. Major minerals present in IC were clay, quartz and hematite. Three (3) varying percentage amount of IC and CC were made (97:3, 94:6, and 91:9) and fired at 950oC for two (2) hours. Physical characterization after firing was based on American Standard for Testing Materials (ASTM). CLA1 (97:3) samples have 17.8% water absorption, 33.14% apparent porosity and 20.05% linear shrinkage. CLA2 (94:6) have 22.76% water absorption, 39.16% apparent porosity and 20.48% linear shrinkage. CLA3 (91:9) have 32.03% water absorption, 47.57% apparent porosity and 20.43% linear shrinkage. Results show that CLA2 and CLA3 have better physical properties than CLA1, therefore CLA2 and CLA3 were mixed with ordinary Portland cement to form lightweight concrete (LWC2 and LWC3) samples. Morphology of CLA2 and CLA3 were observed using scanning electron microscope (SEM). Bulk density and compressive strength of LWC2 were 1.62 g/cm³ and 12 MPa respectively. Also, bulk density and compressive strength of LWC3 were 1.6 g/cm³ and 9.36 MPa, respectively. Results of the LWC samples were comparable to normal concrete cement. The advantages of using CLA are that they are lightweight and better insulator to heat and cold temperature because of their porous nature.

Keywords: *Ceramic lightweight aggregate, X-ray fluorescence, X-ray diffraction, Scanning electron microscope, Engineering*

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0307

Synthesis and characterization of forsterite (Mg₂SiO₄) using Ilocos Norte soapstone and magnesium carbonate

Pondoc, Dionesio C. , Dela Cruz, Anessa M., Doño, Andrew C. , Franco, Samuel S.

The study focused on the synthesis and characterization of forsterite using Bangui soapstone from Ilocos Norte to synthesize Forsterite. Magnesium carbonate was used to adjust the MgO-SiO₂ molar ratio to 1:0.3, 1.1:0.4, 2:1, 1.5:0.9, and 1.34:1. Powdered raw Bangui soapstone (BSR) was prepared for calcination. The oxide composition from the X-ray fluorescence analyses of the calcined Bangui soapstone (BSC) and MgCO₃ was used to calculate the amount of materials required to obtain five 20-gram formulations. The homogenized mixtures were pelletized to form 1.5-centimeter diameter pellets to be sintered at a temperature of 1300°C for an hour. The amounts of

forsterite formed in the specimens were determined using the X-ray diffraction patterns obtained. Specimens with 2:1 molar ratio, having the highest amount of forsterite were ground for observation under the Scanning Electron Microscopy. The apparent bulk densities of the samples were determined using the Archimedes' principle. The relative density of forsterite was also calculated using the lattice parameters obtained in the XRD results. The study showed that BSR and BSC contained an almost 1:1 MgO-SiO₂ weight percent ratio and revealed that sintered specimen containing ideal amount of MgO and SiO₂ formed 92.6% forsterite, as predicted in the MgO-SiO₂ binary phase diagram. The low apparent bulk densities of the specimens are indicative of the presence of pores in the samples. The relative densities of the materials containing forsterite (1:0.3, 2:1, and 1.5:0.9 mole ratios) indicate the densification of the crystalline material during nucleation. This suggests that sintering time facilitates the densification of the materials.

Keywords: *Forsterite, Soapstone, SEM, XRF, XRD, Engineering*

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NP

0308

Travel perception towards uncertainties among industrial technology and engineering students: inputs to class scheduling

Namoco, Jr., Consorcio S. , Dagoc, Angelie M. , Agdeppa-namoco, Rhoda P.

Travel behaviors and travel patterns of different individuals vary. This study considers the travel perception of various industrial technology and engineering students of the Mindanao University of Science and Technology (MUST), Cagayan de Oro City, Philippines, in response to various travel uncertainties. Based on the students' preferences, the effects of travel uncertainties to their travel behavior and travel time allocation under various circumstances, such as major exams, class quizzes and regular classes, for various courses are considered. Preferences of students on various factors such as type of jeepney, jeepney's route, and behavior of jeepney driver, number of rides to take to get to school, among others, are investigated. Results show that the number of preferences considered by these industrial technology students and engineering students for their travel allocation varies according to their trip purpose and to the courses they are to attend. Moreover, a travel function model is then developed based on the preferences considered by these students when making travel decisions. Such results are valuable inputs for scheduling the various classes taken by technology and engineering students in order to optimize their learning process especially in Mathematics courses.

Keywords: *Perception, Travel uncertainty, Travel preferences, Industrial Technology Students, Engineering Students, Engineering*

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2010,
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NP

0309

Urban development, urban land use planning and the dilemma of housing for the urban poor

Lucas, Josefino C.

The history of urban development, land use planning and housing of the Third World cities remains in stark contrast with those of the rich and developed countries although both share a common thread. Pseudo-urbanization aptly describes development of poorer, former colonial cities where fundamental and structural economic systems are weak and superficial. In such an environment, clashing political and economic interests prevent freer access to land by the masses and the urban poor. Proper land use planning allows governments to efficiently direct the timing and magnitude of public capital investments thereby setting the pace of economic growth and development.

On the other hand, ideally, private sector interests in a dynamic marketplace of free enterprise and price mechanism subsequently are able to deliver a land and housing market accessible to most people. In the case of Metro-Manila, a long colonial history bred a feudal land system covering much of agricultural and urban lands, which perpetuated a monopolistic tendency in land ownership. The control, supply and use of much of the urban areas of the city were in the hands of a few, and urban planning if there was any was but a de-facto corporate-driven or property-led process that favored select private interests. It is in urban housing where the greatest inequality stares everyone in the eye. The urban land use dichotomy of Metro-Manila consists of formal and informal land use elements interspersed with one another. One is formal, planned and legal whilst the other is extralegal, unregulated, informal and self-appropriated as in slums and squatter areas. The first critical step to address this problem is to recognize that the informal sector is a large source of untapped capital that needs to be brought into the mainstream of economic activity. This can make wealth generation possible for the urban poor once some form of acceptable property rights over their assets is established. This presumes that access to urban lands by the informal sector is made feasible through a system of documented ownership and protection from speculative pressures of land prices. Interventionist land use planning can break this wedge and integrate disparate land use activities. Dilapidation and urban decay are as much a result of competing interests of the favored few versus the disadvantaged masses. There are existing policies and laws that can be tapped as well as bureaucracies that can be reconfigured to support an activist program of urban development without need of dividing society and fomenting unrest. Eliminating artificial land scarcity and opening access to land to all under a regime of unrestricted economic opportunities for all are key to having a just and humane city.

Keywords: *Urban development, Urban land, Urban poor, Engineering*

Muhon A Journal of Architecture, Landscape architecture, and the designed environment, Volume No. 2 Issue No. , 41-50
2005,
(Filipiniana Analytics)
NP

0310

Young coconut husk ash as partial cement replacement in masonry application

Cabahug, Ruel R. , Racaza, Olan L.

To address the increasing amount of municipal and urban wastes brought about by tough and heavy biodegradable wastes from popular consumption of young coconut water and meat in municipal and urban centers in the country, a study is conducted to utilize these waste materials into ash to substitute cement for concrete production. Wasted young coconut husks with their shells were collected and burnt at 600 0C to produce ashes that were tested for its physical and chemical characteristics. The ash was mixed with fine aggregates and water to six design mixtures using Young coconut husk ash (YCHA) at 20%, 40%, 60% 80% and 100% as partial replacement of ordinary Portland cement. Specimens without YCHA (0%) are also prepared to serve as the control specimens of this study. The study provided an encouraging implication on the use of young coconut husk ash as partial cement replacement to up to 60% by weight in which mortar produced are acceptable for certain type of construction applications.

Keywords: *Young coconut husk ash, Cement substitute, Partial cement replacement, Engineering*

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2016,
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NP

Assessment of the marine macrofouling community in Naval Base Heracleo Alano, Cavite City

Sia Su, Glenn L. , Ramos, Gliceria B. , Lim, Brian M. , Mangulabnan, Jezzah R. , Ocampo, Melody Anne B., Vallejo, Benjamin M. Jr.

Ports and naval bases play a significant role in understanding marine macrofouling and the associated transport of species across boundaries. Structures on ports and piers become habitats of foulers, whether indigenous or non-indigenous. There is a paucity of literature on species composition of foulers in ports in the Philippines. Naval Base Heracleo Alano in Cavite City, formerly known as Sangley Point, is a potential habitat for non-indigenous species.

The study assessed benthic biofoulers at four areas in close proximity at Naval Base Heracleo Alano, Cavite City, using artificial collectors. Fouler collector design was adapted from the North Pacific Marine Sciences Organization (PICES). Fouler collectors were deployed in 4 sampling points from November 2015 and retrieved in February 2016. Collected fouling organisms were identified using taxonomic keys. Species diversity (H) through Shannon Wiener Index, Species Evenness (H'/H'max), and Simpson's Index were determined.

A total of 6203 organisms belonging to 20 families was collected. Common macrofoulers were bivalves, polychaetes, decapods, amphipods, and barnacles. Shannon-Wiener index values as well as species evenness were relatively consistent. Values of the Simpson's index indicated the presence of dominant species, *Balanus* sp. The macrofouling community contained 7 non-indigenous species, *Mytella charruana*, *Brachidontes*, *Mytilopsis sallei*, *Hydroides*, *Stylochus*, *Sabella*, and *Membranipora membranacea*. The macrofouling organisms present in the area may pose problems in submerged equipment and cause some financial loss to the facility; the non-indigenous maybe potential threats to the local ecosystem. All seven non-indigenous species are potentially invasive, although their abundances suggest otherwise.

A baseline listing of species was generated and showed various species of foulers in the naval base, with *Balanus* being the dominant species, which is the same as other studies in the Asian region. Seven non-indigenous species were detected. There is a need to monitor the non-indigenous species, as *Mytilopsis sallei* (origin: Carribean) has been reported to in huge numbers in the Indo West Pacific region, particularly in Singapore, Hongkong, Thailand, India, Taiwan, China, Malaysia, Japan, and Australia; *Brachidontes* (Origin: Indo- Pacific) has spread to the Mediterranean and Red Sea.

Keywords: *marine macrofouling, post and naval base, Philippines, Shannon Weiner Index, Balanus, Environmental science*

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2019/03,
(Filipiniana Analytics)

Economic cost estimation of selected strategies to control soil transmitted helminth infections in the Philippines

Soares-Magalhaes, Ricardo , Halton, Kate , Graves, Nicholas , Garcia, Fernando B. Jr., Clements, Archie

Soil-transmitted helminth (STH) infections are among the most common infections worldwide. Due to the scarcity of resources, it is necessary to approach resource allocation in a systematic way such as the use of economic evaluation. One of the initial and most critical considerations in the conduct of economic evaluation is economic cost estimation. This study aims to estimate the economic costs associated with STH control strategy in terms of frequency (i.e., annual vs. biannual) and mode of delivery (i.e., mass vs. targeted). It also aims to identify whether such cost varies subnationally or among the three island groups of the country: Luzon, Visayas, and Mindanao. A multi-level source data collection was carried out to capture the available resource inputs given the country's devolved setting. To capture regional or geographical variation in costs, local data were obtained from purposively

selected Local Government Units (LGUs) that were visited during the period June-October 2013. Costs from the national level have been captured through the Department of Health's regional offices. Both financial and non-financial costs of a round of mass annual treatment strategy have been collected, examined, and extrapolated using assumptions from other costing studies. It is apparent that MB treatment strategy was the most expensive among the 4 interventions, while TA treatment strategy turned out to be the least expensive. The variations in costs among the different levels of government that have been observed across the 3 island groups reflect the extent of responsibilities that each LGU health office unit has in the programme implementation. The devolved set-up of the country's health system has a large impact in the delivery and implementation of the programme. Given the devolved health services in the country, respective LGUs would eventually need to step-up to fill in the gaps in implementing the programme.

Keywords: *soil transmitted helminth, STH, cost estimation, scale-up, economic cost, Environmental science*

Philippine Journal of Health Research and Development, Volume No. 21 Issue No. 4, 37-44
2017/12,
(Filipiniana Analytics)

0313

Ecotourism carrying capacity assessment for the Agusan Marsh Wildlife Sanctuary: the case of Sitio Panlabuhan Floating Village, Loreto, Agusan Del Sur, Philippines

Lopez, Sarajane O. , Seronay, Romell A. , Apdohan, Julie Rose D., Lador, Richie

Sitio Panlabuhan Floating Village located within the boundary of the Agusan Marsh Wildlife Sanctuary (AMWS) is promoted by LGU-Loreto Agusan del Sur as a local prime ecotourism destination. Currently, ecotourism activity is managed by a local people organization – the Tribong Manobo of Sitio Panlabuhan Agusan Marsh Organization (TMOSPLAMO). This study generally aimed to assess the carrying capacity of the Sitio Panlabuhan using Limit of Acceptable Change (LAC) and Boullon's Carrying Capacity Mathematical Model (BCCMM). The Real Carrying Capacity calculation revealed a total average of 42 individuals per day. However, when tourists opt to stay at the floating village, only a total of 12 persons per day are allowed due to limiting factors such as accommodation facilities, availability of basic services like electric current and domestic and drinking water, and the availability of transportation. The results of this study would provide baseline information to promote community-based sustainable ecotourism as a tool to ensure the protection and conservation of natural resources against future expansion in Sitio Panlabuhan.

Keywords: *Ecotourism, Carrying capacity, Limit of Acceptable Change (LAC), Boullons Carrying Capacity Mathematical Model (BCCMM), Real Carrying Capacity (RCC), Environmental science*

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(Filipiniana Analytics)
NP

0314

Environmental assessment of metal pollution in Manila Bay surface sediments

Sombrito, Elvira Z. , Sta Maria, Efren J. , Olivares, Ryan U.

The impact of human activities on the sediments of Manila Bay was evaluated through elemental analysis to determine the trace metal element concentration and calculate the corresponding metal enrichment factor (EF). The samples were analyzed using the X-ray tube-excited XRF (X-ray fluorescence) with Ag secondary target to quantify elements Mn to Pb, while the Fe target was used to quantify elements Na to Cr. The radioisotope-excited XRF with ²⁴¹Am was used for Cd and Hg. The normalized EF has been calculated against baseline values to estimate the environmental impacts of human activity on the bay. In an attempt to provide a better understanding of sediment movement and reworking in the bay, spatial distribution of metals was correlated with the obtained ²¹⁰Pb radioactivity levels in Manila Bay sediments. Overall, heavy metal and other trace elements are low in Manila Bay sediments, mostly ranging from deficient or minimal to moderate enrichment except for some stations where enrichment of Mn and Cu is significant. Nevertheless, there is a need to estimate the enrichment levels in

marine sediments to effectively understand the risk and impact of heavy metals to support management and decision making for the rehabilitation, protection, and maintenance of a healthy ecosystem along the bay.

Keywords: *Elemental analysis, Manila Bay, Pb-210, Sediment, Trace metal, XRF, Environmental science*

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2020,
(Filipiniana Analytics)
NP

0315

Estimating residential water demand in a relocation area with inadequate piped water system

Palanca-Tan, Rosalina

This paper assesses household water demand and estimates a demand equation particularly for low-income households in the Philippines. The study uses survey data on the value and volume of household water purchases from different water providers in a government resettlement area. The paper provides empirical evidence on the impact of average water price on household water consumption, as well as the effects of household income and size on household water consumption. The study finds that households buying water from jetmatic pump wells and water tankers pay more than five times that of those served by the piped water system. This much higher cost of water from non-Water District sources could have constrained their water consumption to just about half that of the Water District customers. The estimated water demand equation reveals that demand for water significantly decreases with the average price of water but is only weakly responsive to price changes, with a price elasticity of -0.38 . It is also found that water demand is not significantly affected by household income implying that it is not the households' low income but the unavailability of efficient water providers that constrains consumption to a bare minimum. These findings confirm the high vulnerability of low-income households to inadequate and inefficient water providers, necessitating more prudent programming of the resettlement areas' water supply system.

Keywords: *Income elasticity of demand, Price elasticity of demand, Residential water demand, Water supply systems, Environmental science*

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0316

Perceived ecosystem services of Agusan Marsh Wildlife Sanctuary, Caraga Region, Philippines

Seronay, Romell A. , Campus, Jr., Roberto G. , Mora-Garcia, Chime

Wetlands provide important and diverse benefits to people around the world, contributing provisioning, regulating, habitat, and cultural services. Despite the high value of ecosystem services derived from wetlands, around the world they have been systematically drained and filled to support agriculture, urban expansion, and other developments. It is in this plight that a survey was conducted to determine the role of one of the biggest wetland ecosystems in Mindanao which is the Agusan Marsh Wildlife Sanctuary. An interview with different stakeholders such as farmers, fishermen, local residents, and local leaders were done. A focus group discussion was conducted in order to validate the collected data. Results indicated that provisioning services were more important for stakeholders living closer to the marsh while regulatory services were more important for downstream communities. Communities living closer to the marsh are willing to pay around 50 PhP as an environmental fee for the conservation of AMWS in particular for its water provisioning services. Flooding control service is the regulatory service that has an impact towards the lower stretches of Agusan River and too

much financial effort has been given to flood control projects particularly in Butuan city but less priority to enhance the conservation and environmental development of the marsh.

Keywords: *Conservation, Ecological services, Wetland, Willingness to pay, Environmental science*

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2019 July,
(Filipiniana Analytics)
NP

0317

Scanning electron microscopy (SEM) investigation of polystyrene damage due to colonization by locally isolated *Xylaria* sp.

Tavanlar, Mary Ann , Egloso, Mary Bernadette V. , Abecia, Janine Erica D. , Santiago, Anna Theresa A.

Colonization of microorganisms on pollutants is the first indication of the potential ability of microbes to utilize plastic pollutants as a carbon source by sequential biodegradation into usable form for sustenance. The Philippines is considered as the third highest country contributing to global mismanaged plastic waste. To locally manage and find a natural and innovative solution to this worldwide concern, this study aims to evaluate the capacity of *Xylaria* sp. SDM (sterile dark mycelia) wild type, which was previously reported to colonize polyethylene plastic, and mutant strains to colonize polystyrene, which is among the widely produced plastic pollutants in the world. Assessment of the ability of local *Xylaria* sp. strains to grow, penetrate, and damage the surface and inner structures of polystyrene was investigated using scanning electron microscopy (SEM).

Xylaria sp. strains were cultured in a pH 5.0 mineral medium with 0.5% glucose as carbon source and polystyrene as a co-carbon source, and stored at 250°C for 50 days. At the end of the incubation period, due to irremovable fungal strains on the surface of the polystyrene strips, samples of polystyrene from each strain were subjected to SEM.

On the 20th day of incubation, the presence of mucilaginous sheaths and fungal growth were observed on the surface of treated polystyrene strips. At the end of 50-day incubation period, scanning electron microscopy (SEM) confirmed fungal growth and colonization, through the presence of mycelial mats and hyphae, of the wild type and mutant strains on the surface and subsurface structure of polystyrene except the control. Moreover, physical surface damage in the form of holes, cracks, and crevices on polystyrene demonstrated the active burrowing action of *Xylaria* sp. strains further supporting the potential of this fungus to damage polystyrene plastic.

Whereas fungal growth on a polymer surface is necessary but not sufficient to conclude the process of carbon assimilation as the final biodegradation step, the initial colonization of *Xylaria* sp. strains on polystyrene supports its ability to establish itself and physically damage the pollutant. Hence, this study extends the existing knowledge on the colonizing ability of *Xylaria* sp. on plastic making it a potential candidate organism to biodegrade plastic waste, which is one of the topmost environmental waste hazards in the world today.

Keywords: *Xylaria* sp., biodegradation, polystyrene, plastic, scanning electron microscopy, Environmental science

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 1, 64-70
2019/03,
(Filipiniana Analytics)

0318

Urban heat island phenomenon: a look into the Metro Manila setting ***Galingan, Zenaida C. , Dul-loog,***

The microclimate phenomenon called Urban Heat Island (UHI) is fast becoming a worldwide concern. A description of the phenomenon, its history, the factors influencing it and its effects on the urban landscape is presented. It also discusses how UHI impinges on the regional and global environment. The paper would like to

impart how an urban heat island is investigated in other countries and their mitigating measures to counteract or lessen its effects.

Lastly, the paper discusses the present status of Metro Manila and the possible presence of UHI. It also provides insights on how a study can be undertaken through the use of existing local data and resources and the experiences and knowledge of other countries.

Keywords: *Microclimate phenomenon, Urban heat island, Environmental science*

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2005,
(Filipiniana Analytics)
NP

0319

**Willingness to pay towards the protection of Pinandagatan Falls as ecotourism site
within Andanan Watershed Forest Reserve Area, Philippines**
Ranay, Adam A. , Seronay, Romell A. , Bariquit, Lysinder A. , Amarille, Mey

The operationalization of ecotourism in protected areas would provide both ecological and economic benefits. Pinandagatan Falls located in the eastern portion of the Andanan Watershed Forest Reserve (AWFR) is a potential site for ecotourism development. Before ecotourism activities commence, the economic valuation and the willingness to pay (WTP) of the residents for the conservation of Pinandagatan Falls should be determined. Face-to-face interview with 153 household respondents was administered to obtain information on the socioeconomic profile and willingness to pay for the protection of the Pinandagatan Falls. The respondents were female (70%) and married (86%), with average age of 39 years old. Their source of income was farming (86%) and most of the respondents' education was at elementary level. Multiple linear regression analysis was used to compute the mean WTP of the respondents. Overall, 96% of the respondents were willing to pay for an entrance fee amounting to ₱38.33 per person that could serve as a fund for the protection and conservation of the Pinandagatan Falls. Variable years residing in the barangay were highly significant at 9% level. The findings revealed that gender, ethnicity of the respondents, number of years in the barangay, and marital status were the factors affecting their WTP. Establishing an entrance fee for the protection of Pinagdagan Falls is very vital for a better management and utilization of resources. The results of the study provide good information for an appropriate plan for the conservation and development, particularly eco-tourism efforts, within the Andanan Watershed Forest Reserve.

Keywords: *Contingent valuation, Pinagdagan falls, Andanan Watershed Forest Reserve, Environmental science*

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FISHERIES

0320

**Compressor fishing practices among fisher-divers of lampirong (*Placuna placenta*) and
their associated health risks in a coastal municipality in Panay, Philippines**
Bañez, Ma. Arve B.

Compressor fishing is a strategy adopted by small-scale artisanal fishers of coastal communities in Panay, Western Visayas. The practice persists among subsistence lampirong fisher-divers whose livelihood depends on seasonal fishing. *Placuna placenta* known locally as lampirong is valued for its shells, which are made into shell craft like

the famous capiz window. Related studies which examined traditional diving practices and compressor fishing identified risks factors such as the inappropriate dive training and use of unsuitable diving gears.

The study aims to investigate the plight, and the health risks associated with common malpractices among lampirong fishers-divers who utilize the compressor fishing strategy.

In this ethnographic study, five (5) lampirong fisher-divers narrated the health risks and managing practices that they have adapted to survive compressor fishing. Primary data from field observation and interviews with the fisher-divers as well as secondary data from related studies were utilized for comparison and analysis. Considering the health risks compressor fishing poses to fisher-divers, I attempted a reflexive position drawing from the principle of ecological public health.

The health risks of compressor fishing are known to fishers- divers, thus, they have developed managing practices which include the observance of certain clear- cut rules (the do's and don'ts) meant to ensure underwater survival. Improvised diving gears are worn but barely protect the lampirong fishers-divers from decompression illness or sickness. Related studies validated these symptoms such as nose bleed, dull pain in the ears, blood dripping from the ears, headache, and physical fatigue from prolonged dives. They rationalized the practice of lampirong compressor fishing as a means to bring food to the table for families in fishing communities.

Philippine law prohibits or regulates compressor fishing, thus, there is still a need for a policy or program addressing the health risks of compressor fishing.

Keywords: *compressor fishing, decompression illness (DCI) or decompression sickness (DCS), lampirong fisherdiver, health and well-being, ecological public health, Fisheries*

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2019/09,
(Filipiniana Analytics)

0321

Evaluation of gender differences in technical efficiency of tilapia farming in the Philippines

Tanay, Dennis D. , Rayos, Joseph Christopher C.

Gender mainstreaming has been identified as a major issue in the development of tilapia producing society group. The role of women, in particular, has been recognized despite their limited access to tilapia production due to tradition and other socio-cultural constraints. The purpose of the study was to evaluate gender differences in the technical efficiency of tilapia farmers in the Philippines using the stochastic frontier production function analysis. Data were collected from randomly selected tilapia farms using a face-to-face survey method with the aid of a structured questionnaire of 70 respondents of men and women tilapia farmers. The results indicate that male tilapia farmers are more efficient technically than female farmers with mean technical efficient indices of 0.47 and 0.29 respectively. It was found that the yield level in tilapia production among male and female farmers can be raised if the use of major variable inputs such as focus pond area/cage and stocking rate influencing in the output could be increased. The analysis also indicates that access to government facilities/services, use of aerator and the culture method used of farmers have positive significant influence on the level of technical efficiency. This study recommends that the government should guide and provide training on farm management skills which will enable the farmers to maximally utilize their variable inputs focusing on efficiency as their goal. The increase in economic productivity of the fish farmers in the country is largely about enabling women to realize their full potential and improve their own and their families' quality of life.

Keywords: *Technical efficiency, Tilapia, Gender differences, Fisheries*

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NP

Factors influencing adoption of mariculture by small-scale fisherfolk: the case of Padre Burgos Mariculture Zone, Quezon, Philippines

Magistrado, Myleen L.

The establishment of mariculture parks in the Philippines provides an opportunity for marginalized fishing communities as an alternative source of income. However, the high cost of mariculture operation has prevented local fisherfolk from participating in mariculture as investor-operators. This study determined the factors that significantly influenced the participation of local fisherfolk in Padre Burgos Mariculture Zone (PBMZ). Socio-economic characteristics, access to skills and training, access to capital and credit facilities, and membership in fisherfolk association were the independent variables used in the analysis. A total of 313 fisherfolk households were interviewed in four (4) barangays in the municipality of Padre Burgos, Quezon. Two types of survey were conducted, the fisherfolk survey and cooperator survey. With a total of ten (10) investors currently operating in the PBMZ, only 2 were local investors, a fisherfolk organization and a multi-purpose cooperative. Less than 5% of the local fishing household members were employed since the establishment of mariculture zone. This study adopted the logistic regression model. Results showed that the decision to participate in mariculture zone is a function of age, gender, education, number of household members, access to training and access to credit. Cost-benefit analysis showed the profitability of mariculture operation in the municipality.

Keywords: *Mariculture, Marginalized, Adoption, Fisheries*

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NP

Short and long-term effects of a household detergent on the early development of the dulong *Mirogobius lacustris* Herre

Vallejo, Abelardo N. Jr.

The effects of teepol, a LAS-containing household detergent, on the development of *M. lacustris* using bioassay-teratogenic tests are reported. A 48-hr bioassay showed an LC_{50} of $28.84 \pm 2.594 \text{ mg l}^{-1}$ with 95% fiducial limits of 21.458 and 38.761 mg l^{-1} . Cleavage embryos of the four- or eight-cell stage were exposed to two sublethal concentrations of teepol (15 and 20 mg l^{-1}) until hatching. About 30% of the newly hatched yolk-sac larvae exhibited various bending and/or curling of its body axis. The body surfaces of the embryos also showed desquamation and its fin (and finfolds) have been eroded.

Keywords: *Linear alkylbenzene sulphonates, Detergent toxicity, Teratogen, Desquamation, Dulong, Developmental malformation, Fisheries*

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1986 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Ascorbic acid, color, provitamin A and sensory qualities of calamansi (*Citrus mitis* Linn.) juice after various processing operations and lengths of storage

Calamansi (*Citrus mitis* Linn.) was expected, diluted with emulsifier homogenized and pasteurized in boiling water for 15 min. Ascorbic acid, provitamin A, color and other chemical constituents were determined during the processing operations and subsequent storage of the juice. Sensory qualities were determined for the juice which was stored for 1 week up to 1 1/2 years.

Homogenization and pasteurization did not significantly affect ascorbic acid content of the juice. A significant reduction of ascorbic acid from 52.84 to 38.64 mg/100 ml was observed after 12 days storage at room temperature.

Homogenization significantly reduced the color from 0.37 to 0.18 mg/100 ml and the provitamin A from 0.26 to 0.17 mg/100 ml. No further change occurred subsequent processing steps and storage periods.

Titrate acidity changed from 7.02 to 5.44 mg/100 ml, pH from 2.22 to 3.33, soluble solids from 8.00 to 8.73 Brix, and dry matter from 8.58 to 9.58% during homogenization.

Sensory qualities of processed juice stored for 1 week up to 1 1/2 years did not differ. Pasteurization did not result in the development of cooked flavor. Stale flavor was not detected in the bottled juice after 1 1/2 years storage.

Keywords: *Ascorbic acid, Calamansi juice, Provitamin A, Homogenization, Pasteurization, Food science and technology*

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1982 October-December,
(Filipiniana Analytics)
Fil(S) S19 P53

Design and development of superheated steam treatment system (SSTS) for stabilized brown rice

In an earlier study implemented by the Department of Science and Technology-Food and Nutrition Research Institute, (DOST-FNRI), the shelf-life of brown rice was improved from 1-4 months to 4-9 months. This current study was a collaborative project between the Department of Science and Technology-Metal Industry Research Development Center (DOST-MIRDC) and DOST-FNRI. It aimed to study the efficiency of a locally-fabricated superheated steam treatment system (SSTS) assembly as an alternative process in producing stabilized brown rice (SBR). The specific objectives were to: (1) evaluate the stability of the SBR through free fatty acid, physicochemical, and chemical analysis, (2) determine the acceptability of SBR using sensory evaluation, (3) determine safety of SBR using microbiological and aflatoxin analysis, and (4) estimate the shelf-life of SBR. RC 160 palay variety was used and optimum processing parameters were determined. Standardization process was established for SBR and samples were characterized based on its chemical, physico-chemical, microbiological and sensory properties. SBR stored at room temperature were randomly collected every month for analysis to determine estimated shelf-life. Optimum processing parameters for SSTS assembly was determined and found to be 90 seconds treatment time per batch of 10 kgs. Results showed that heat treatment applied had no significant effect on the moisture content, water activity and pH of brown rice samples ($P=0.05$). In terms of color, all treated brown rice had greater L^* values than untreated brown rice. Free fatty acid of treated sample was also significantly lower compared with the untreated sample. Treated brown rice samples were aflatoxin-free and were within safe limits in terms of microbiological standard. Average hedonic score for all sensory attributes of cooked brown rice samples was 7 or "like moderately". Optimized treatment parameters significantly improved the shelf-life of brown rice from 2 months to 9 months. Batch type SSTS assembly used in the study significantly improved the shelf-life of brown rice up to 9 months. Treated brown rice samples were not significantly different compared with the control sample in terms of physico-chemical, chemical and sensory properties, and found safe for human consumption. It is recommended to conduct pilot scale production of SBR using the batch type SSTS assembly.

**Determination of the nutrient contents of selected indigenous and underutilized
Philippine fruits and vegetables**
Avena, Ennata M.

Philippine vegetation is mostly indigenous but remains underutilized because of non-familiarity and scarce information on nutrient contents and location. These types of fruits and vegetables can potentially combat malnutrition and reduce non-communicable diseases (NCDs). The study determined the nutrients and physico-chemical properties of selected indigenous and underutilized fruits and vegetables. A total of fifteen samples collected from different parts of the country using convenience sampling included sapinit (*Rubus moluccanus* Linn.), kandis (*Garcinia lateriflora*) pulp and meat, maraitum (*Nephelium mutabile*), tabo (*Willughbeia* sp.), palau-biyok (*Willughbeia* sp.), unripe libas (*Spondias pinnata*), ripe libas, libas leaves, young and near mature, coriander (*Coriandrum sativum*), thyme (*Thymus vulgaris*), sweet basil (*Ocimum basilicum*), orange-fleshed camote (*Ipomoea batatas* (L) Lam.) and rabanos (*Raphanus sativus* L.). Descriptions of samples were recorded. Nutrients analyzed were water, fat, protein, ash, energy, carbohydrate, total sugars, total dietary fiber (TDF), beta-carotene, vitamin C, iron, calcium, sodium, potassium and zinc while physico-chemical properties included color, % Total Titratable Acidity, 0Brix and pH. Analysis per 100 grams (g) showed fat (0.1-1.9g), protein (0.3-5.3g), carbohydrate (1.3-27.2g) and energy (28-115 kilocalories). TDF was as high as 14.6g, total sugars (0.7-23.0g), Ca (5-768mg), Fe (0.1-19.9mg), K (57-1053 mg), Na (5-83mg), Zn (0.1-2.2mg), vitamin C (0-51mg), beta-carotene (0-7002ug) and vitamin A (0-1167ug RE). The study highlighted the high beta-carotene of orange-fleshed camote (7002ug) and the leaf vegetables (2469-6142ug). The results of analysis of the indigenous fruits and vegetables will be included in the Philippine Food Composition Tables (FCT). The study showed the potential of these fruits and vegetables as other alternative food items for nutrition and health. The indigenous Philippine fruits and vegetables analysed in this study can have the potential use as raw materials for local and export food production. It is recommended that more indigenous and underutilized fruits and vegetables be analyzed to ensure conservation and tap their potential as other food option.

Keywords: nutrient content, Philippine vegetation, malnutrition, non-communicable disease, *Rubus moluccanus* Linn., *Garcinia lateriflora*, *Nephelium mutabile*, *Willughbeia* sp., *Spondias pinnata*, *Coriandrum sativum*, *Thymus vulgaris*, *Ocimum basilicum*, *Ipomoea batatas* (L) Lam., *Raphanus sativus* L., Food science and technology

Development of a fluidized bed dryer for the production of stabilized brown rice

In an earlier study implemented by the Department of Science and Technology-Food and Nutrition Research Institute, (DOST-FNRI), a technology using expensive and imported equipment improved the shelf-life of brown rice. If this equipment can be locally-fabricated, a savings of 30% maybe realized. This effort, in collaboration with the Department of Science and Technology-Metal Industry Research Development Center (DOST-MIRDC), will encourage rice millers to adopt stabilized brown rice technology. The current study aimed to evaluate the locally fabricated fluidized bed dryer (FBD) in terms of its functional performance. Specifically, it aimed to: (1) evaluate the free fatty acids and physico-chemical properties of treated brown rice and, (2) determine the acceptability of treated brown rice using sensory evaluation. The locally-fabricated fluidized bed dryer, designed and developed by DOST-MIRDC was used in the treatment of brown rice from RC160 palay variety. Three (3) observation runs were conducted to determine performance of the equipment. The treated brown rice was

characterized based on its physico-chemical and sensory properties. No significant effect on the sensory properties of the treated brown rice sample compared with untreated one was observed during the first observation run with significant increase of free fatty acid (FFA). These results were attributed to poor fluidization and fluctuating temperature of the locally-fabricated FBD. Results of the second observation run showed significant negative effect on the sensory properties of treated brown rice due to flue gas emitted from the heat exchanger of the equipment. Increase in FFA was still observed but significantly lower compared with the previous run. Similar results were obtained in the third run conducted. Results from the sensory evaluation and physico-chemical analysis of the treated brown using the locally-fabricated FBD suggest further runs to meet standards for stabilized brown rice. The treatment using locally-fabricated fluidized bed dryer produced brown rice from RC160 variety with lower sensory acceptability and high FFA. Fine tuning of the locally fabricated FBD assembly, especially on the steamer part is necessary. Further observation, optimization, and standardization are recommended to establish optimum processing parameters for the locally-fabricated FBD. Shelflife study of optimized brown rice is recommended when the FBD is fully operational.

Keywords: *Food science and technology*

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0328

Development of a ready to eat crispy noodle strips as snack food

Lainez, Wenefrida N.

The widespread occurrence of protein-energy malnutrition among infants and preschoolers in developing countries including the Philippines has been widely documented and its ill effects are manifested both physically and mentally. Among Filipinos, eating snacks normally taken in between meals has been integrated in their eating pattern. Expanded snack products usually cereal-based have been known and patronized for many years; cereals having low nutritional value, incorporation of nutrient-rich food materials such as legumes vegetables can improve its nutrient contents. Flavored fried noodle-style snack is one of the snack foods patronized today due to its convenience in preparation. Development of ready-to-eat noodle strips composed of legume, vegetable and cereal as snack food through extrusion can help alleviate the problem of PEM (Protein-Energy Malnutrition) among infants and pre-schoolers in the country. The study was conducted at the Nutritional Food Research and Development Laboratory and Food Processing Facility of the DOST-Food and Nutrition Research Institute (DOST-FNRI), Bicutan, Taguig City. Rice and green pea grains was purchased from Divisoria, Metro Manila. Swamp cabbage was purchased from Upper Bicutan Public Market. The study underwent several process namely, mixing, steaming, extruding, drying, frying, packing. For evaluation, prototype product was produced using standardized formulation and process such as physico-chemical analysis, sensory evaluation, microbial analysis, chemical properties, free-fatty acid determination, and shelf-life study. Result of the study showed that at the start of the analysis, the sample gave the following color values: $L^*=48.11$, $a^*=5.21$ and $b^*=34.42$ (May 25, 2016) and after twenty (20) weeks the sample gave the following results: $L^*=56.45$, $a^*=4.1$ and $b^*=24.2$ (October 11, 2017). The water activity value, on first and last week gave a result of 0.35 and 0.47, respectively. And for the moisture content of the noodles is 3.4% (May 25, 2017) to 5.51%(October 11, 2017). Using the 9-point Hedonic Scale Rating, the appearance, color, odor, flavor and general acceptability of the product was rated at 'like moderately' (7) while crunchiness was rated at (8) 'like very much'. The FFA Analysis only on the % free fatty acid of the fat content shall not be greater than 0.5 % (as oleic acid) as per Philippine National Standards for Pancit Canton. Result shows that on its 2nd month the % Free Fatty Acid content is greater than the national standard. The study recommends that the crispy noodles be produced in pilot scale to determine its feasibility for commercial production. The study also recommends the improving of method of noodle production so that it can be eaten as a soup. Furthermore, the study recommends to try different stabilizer so as to improve the body of the noodles.

Keywords: *RDE food, crisp noodle strip, protein, carbohydrates, malnutrition, DOST-FNRI, Food science and technology*

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2018,
(Filipiniana Analytics)

Effects of alum, urea and sodium tripolyphosphate on the physicochemical properties of mungbean, corn and cassava starches

Sabiniano, N. S. , Del Rosario, Ricardo R.

Mungbean, corn and cassava contained 37.44%, 28.69% and 15.49% amylose, respectively. Gelatinization temperature was 74C, 72C and 70.5C, respectively, for mungbean, corn and cassava starches and the least concentration endpoint 6%, 5% and 9%, respectively. Cassava starch had the highest swelling power, percent solubles and viscosity but had the lowest gel consistency. Effects of 0.15% and 1.0% alum, urea and sodium tripolyphosphate on the viscosity, swelling power and solubility of the three starches were determined. Viscosity of the starches was significantly decreased by all additives at both concentrations except that for urea which increased the viscosity of mungbean starch. Swelling power of all starches was significantly increased by 1% alum at higher than 80C. Sodium tripolyphosphate at 1% level significantly decreased the swelling power of cassava while both levels significantly decreased the value for mungbean. It had the same effect as alum on corn starch. Urea at both levels significantly increased swelling power only for mungbean starch. Both levels of alum and urea significantly increased percent solubles of corn and cassava starches while only 1% sodium tripolyphosphate significantly increased solubles for the three starches.

Keywords: *Physicochemical properties, Sodium tripolyphosphate, Mungbean starch, Corn starch, Cassava starch, Urea, Alum, Food science and technology*

The Philippine Agriculturist, Volume No. 69 Issue No. 3, 341-351
1986 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Effects of low-temperature and low-humidity drying on the physico-chemical, sensory and microbiological properties of dehydrated food (mango)

Tobias, Joyce R.

Most processes used to preserve food products involve drying. However, conventional high temperature drying decreases food nutrient content and acceptability. The high relative humidity in the Philippines (71-85% from March to September) also slows the rate of drying, resulting in long processing times. The study aimed to determine the physico-chemical, sensory and microbiological properties of the Low Temperature and Low Humidity (LTLH)-dehydrated product (mango). Specifically, it aimed to design and fabricate the LTLH dryer and test its effects on the properties of mango as test materials. A prototype LTLH drying system was designed, fabricated and tested on raw-ripe mangoes as test material using temperatures of 50-70°C and relative humidity of 10-25%. Samples were dried to constant weight and analyzed for vitamin C content, physico-chemical, sensory and microbiological properties. Experimental drying curves and moisture sorption isotherms were also determined. A prototype all-stainless steel dryer with two chambers controlled by a 2kW heater was fabricated. The first chamber is for the samples and the second chamber is for the desiccant. The flow of air inside the dryer is controlled by a 2kw centrifugal blower using 220V and 3-phase electricity. The LTLH dryer can maintain a temperature of 50°C even without using a heater. Mango pieces dried at 50°C and 20% relative humidity had a final moisture content of 14% (w.b.) after 6 hours of drying, which is half the drying time required by conventional hot-air systems (12 hours). Vitamin C content of the LTLH-dried mangoes was 239 mg/100 g (w.b.), which is 3.7 times higher than that in commercial dried mangoes. Since vitamin C is more easily degraded by heat compared to other vitamins, it is likely that most nutrients (e.g. Vitamin A) were retained in the LTLH-dried mangoes. Color analysis showed that b^* (yellowness) values of dried mangoes (43.09) were significantly different from the fresh values (53.09) at $p < 0.05$. The product was highly acceptable, having a sensory evaluation rating of 8 (like very much) using a 9-point Hedonic Scale. The moisture sorption isotherms of the dried samples had a Type II (J-shaped) isotherm which is typical for foods with high sugar content (Aqualab University, 2017). The aerobic plate count of the dried samples was within the acceptable range (< 250 CFU/gram). Dried mangoes with minimal nutrient loss, reduced color degradation, high acceptability, and microbiologically safe were obtained using the fabricated LTLH dryer. It is recommended to optimize the operation of the LTLH drying system and be tested on

other agricultural crops, particularly those sensitive to high temperatures. It is also recommended that further comparison of the efficiency of LTLH dryer and conventional dryers be done.

Keywords: *dehydrated food, mango, temperature, humidity, drying system, physico-chemical, sensory, microbiological, processed food product, prototype, DOST-FNRI, Food science and technology*

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2017,
(Filipiniana Analytics)

0331

Effects of rice variety and ageing on the properties of extruded rice

Saises, Marcela C.

The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) has been studying the technology on extruded iron rice premix and multi-nutrient extruded rice kernel (MNERK) to address vitamin and mineral deficiencies (VMD). However, the type of rice variety and the ageing of rice affect the quality of the extruded rice. The study aimed to determine the effect of rice variety according to amylose content and age on the properties of extruded rice. Specifically it aimed to (1) select a common rice variety in the market to be used for extrusion, (2) conduct production runs using the existing standardized process for extrusion, (3) determine the effect of ageing on grain quality and acceptability of extruded rice, and (4) identify the appropriate rice variety and age for extrusion process. Different varieties of newly harvested rice paddies samples with high amylose (Rc 10, Rc 214, and SL8-H), intermediate amylose (C14, C18, and Rumbled Rice), low amylose (Rc 160), and very low amylose content (Rc 15) were used in the study. Two equal portions of each variety were prepared. The first portion was immediately dehulled and extruded using a single screw extruder machine while the other portion was stored for twelve months prior to extrusion. Extruded rice samples were analyzed for grain quality in terms of amylose content, crude protein, gelatinization temperature, gel consistency, hardness (cooked), color (lightness), bulk density, pasting properties and sensory acceptability test. The grain quality characteristics and sensory acceptability scores of extruded rice samples of different varieties did not differ significantly in terms of variety and age. Rice extrusion using aged samples with high and intermediate amylose contents were easier handled and extruded as compared to those samples with low and very low amylose contents using the standardized extrusion process of FNRI. Aged rice varieties with high and intermediate amylose contents are more suitable raw materials for extrusion as compared to rice varieties with low and very low amylose contents. Rice variety did not significantly affect the quality of extruded rice. Aged rice with high and intermediate amylose varieties are suitable for extrusion. Porosity and compactness analysis of extruded rice using Scanning Electron Microscopy (SEM) and texture using texture analyzer need to be conducted to determine breaking strength and hardness respectively. Study on the use of these rice varieties with added micronutrients needs to be undertaken.

Keywords: *extruded rice, rice variety, rice ageing, amylose, vitamin deficiency, mineral deficiency, grain quality, micronutrients, DOST-FNRI, Food science and technology*

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2017,
(Filipiniana Analytics)

0332

Evaluation of apparent flavor intensity of canned fruit and blends with varying total soluble solids and acidity

Mabesa, Linda B. , Novero, Fe E. , Aquino, Emma P.

Apparent flavor intensity of canned individual fruit juices (papaya, guayabano and pineapple) and blends at different levels of total soluble solids and acidity (expressed as citric acid, %) was determined by a series of sensory evaluation. Addition of sugar can improve the flavor intensity of canned papaya and guayabano juices but not pineapple juice. The intensity of pineapple was enhanced more by the addition of citric acid.

The degree of blending of canned blends of pineapple, papaya and guayabano juices was found to be more dependent on the amount of juices present in the formulation. Apparently the blends should have almost equal parts of the juice (50-50 for two juices and 33-33-33 for three juices) regardless of total soluble solid content and acidity.

Keywords: *Canned fruit, Fruit juice processing, Soluble solids, Acidity level, Food science and technology*

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1982 July-September,
(Filipiniana Analytics)
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0333

Extraction and characterization of pectin from New Zealand grapefruit peel

Robertson, G. L. , Nisperos, Myrna O.

The effect of maturation of New Zealand grapefruit on pectin yield and quality was studied. Pectin recovery was highest in the early season fruit but low in the late-season fruit. The latter, however, yielded better quality pectin due to improved extraction and purification procedures, as reflected by the following characteristics: 8.9% yield; 1.3% moisture content; 1.9% ash; 759 equivalent weight; 9.2% methoxyl content; 82.2% anhydrogalacturonic acid; 63.2% degree of esterification; 4.2 intrinsic viscosity; 89,362 molecular weight and setting time of 0.55 min.

Keywords: *Pectin , Grapefruit peel, Moisture content, Methoxyl content, Citrus fruits, Food science and technology*

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Fil(S) S19 P53

0334

In vitro bioavailability of phytochemicals of selected pigmented rice, vegetables and fruits in the Philippines

Sagum, Rosario S., Ph.D.

Phytochemicals are naturally occurring compounds that are mainly found in plants. They act as antioxidants which can protect cells from oxidative stress and can help reduce cancer cells through inhibition of free radical formation. Bioavailability, on the other hand, refers to substances obtained from the ingestion of materials that reaches the circulatory/digestive system for further delivery to the designated tissues. However, the bioavailability of phytochemicals by which health benefits depend on are not well understood and investigated. The study was determined the *in vitro* availability of phytochemicals in fruits, vegetables and pigmented rice. Specifically, the phytochemicals analyzed for availability were total anthocyanidins, total polyphenols and total flavonoids. Various fruits (green mango, mangosteen, santol, soursop, mulberry, avocado, *tiesa* and Spanish plum), vegetables (raw and steamed eggplant, violet cabbage, violet winged bean, jute and string beans) and pigmented rice (raw and cooked variants of black, red, pink, yellow, and violet rice) were analyzed for phytochemical contents and availability. Total phytochemical content and availability was evaluated using colorimetric methods and *in vitro* method simulating conditions in the small intestine, respectively. Among the fruit samples analyzed, avocado (59.9±2.7%), mulberry (68.6±0.7%) and Spanish plum (76.5±0.9%) have the highest bioavailability for anthocyanidins, polyphenols and flavonoids, respectively. For vegetables, anthocyanidin, polyphenol and flavonoid availability were highest for steamed eggplant (76.8±1.7%), steamed jute (97.1±0.3%) and raw violet cabbage (87.5±0.5%), respectively. For the pigmented rice, polyphenol availability was highest in the raw violet rice (52.3±0.6%) and cooked red rice (30.2±1.0%). For the pigmented rice, only polyphenols were found to be available *in vitro* while majority of phytochemicals analyzed in vegetables and fruit samples were available for absorption in the small intestine. The results could be affected by various factors such as the plant tissue material of the samples, the processing method introduced (cooking/heating) and the limitations of the *in vitro* method.

Validation studies on the physiological functions of phytochemical content in the selected samples should be pursued.

Keywords: *in vitro*, phytochemicals, pigment, rice, vegetables, fruits, anthocyanidin, polyphenol, flavonoid, Food science and technology

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2017,
(Filipiniana Analytics)

0335

Innovation in drying technology for fruits and vegetables

Engr. Adona, Charlie E.

One of the advantages of drying is that it can extend the shelf-life of fruits and vegetables by removal of water. However, high temperatures adversely affect the quality and nutritional content of the product. In 2015, DOST-FNRI with Dr. JMRA C. Arquiza, conceptualized a drying system that operates on a low temperature and low humidity (LTLH) environment. The prototype dryer was evaluated in drying different agricultural products such as mango, papaya, pineapple, saba banana, cabbage, carrots, and red bell pepper. To determine the shelf-life of LTLH dried fruit mix and veggie pack. Specifically, to estimate the LTLH dried products' shelf-stability and compare the effect of three (3) different packaging materials on shelflife of LTLH dried products. Specific combination of fruits (mango, papaya, pineapple) and vegetables (carrots, cabbage, red bell pepper) were prepared using the standardized method for fruit mix and veggie pack. Samples were dried using the LTLH and were packed using three packaging materials namely: Polyethylene terephthalate/Polyethylene(PET/PE), Polyethylene terephthalate/Aluminum foil/Polyethylene(PET/ALU/PE), and Kraft/Vacuum Metalized Polyethylene terephthalate/Polyethylene (KRAFT/VMPET/PE); and were subjected to shelf-life study. At specified time, samples were assessed for their physico-chemical, nutritional, microbiological and sensory properties. The use of different packaging materials on evaluation of shelf-life of LTLH dried products showed significant difference on physico-chemical properties. LTLH dried fruit mix in PET/ALU/PE has lower moisture content (7.20%) than in PET/PE (9.20%) and KRAFT/VMPET/PE (8.30%). The water activity of samples showed no significant difference among samples (0.489-0.501). LTLH dried veggie packed in PET/ALU/PE has lower moisture content (8.51%) and water activity (0.495) versus PET/PE and KRAFT/VMPET/PE - packed dried vegetables. This can be attributed to the moisture barrier characteristic of aluminum packaging. LTLH dried fruits and vegetables were shelf-stable for 6 months and 4 months, respectively. Sensory evaluation of LTLH dried products received an average rating of 7 (like moderately) for all samples. All prototype products were within safe range for microbial load. LTLH drying method is a new technique to preserve fruits and vegetables. Moreover, with the right type of packaging material, the shelf-life of these highly perishable products can be extended. It is recommended to fabricate larger capacity of the LTLH dryer to increase production of nutritious dried fruits & vegetables.

Keywords: *drying technology, fruits, vegetables, DOST-FNRI, low temperature, low humidity, moisture content, shelf-life, packaging materials, Food science and technology*

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2019,
(Filipiniana Analytics)

0336

Innovative food products from sweet sorghum (*Sorghum bicolor* L. Moench) flour

Engr. Adona, Charlie E.

The Philippines have seen an increasing dependence on rice and wheat importation over the years. Now, we are burdened on finding an alternative supply of carbohydrate source. Sweet sorghum is eyed as a vital crop in addressing food security because of its drought-tolerance, high production yield, ease to cultivate and versatility to produce various products. Sorghum is a great source of energy, protein, phenolic compounds and is gluten free. It is cultivated in the country as source of feed and bioethanol, however it's suitability for food application has not been fully explored. The project aimed to develop four products utilizing sorghum flour as main ingredient.

Specifically it aimed to determine the physico-chemical properties, microbiological properties, nutrient content, sensory acceptability and shelf-life of the food products developed. Four products were developed utilizing sorghum flour: Rice-Shaped Kernel (RSK), Pasta Noodles (PN), Extruded Snack Food (ESF) and Biscuits (B). The RSK and PN were produced using indirect-expansion extrusion technology and the process optimization was carried out through variations in flour mixture moisture content, barrel temperature and product formulation. ESF was produced using direct-expansion extrusion and the process was also optimized through variations in flour mixture moisture content, barrel temperature and product formulation. Biscuits were produced using usual baking methods and product formulation is optimized. All samples were analysed for physico-chemical properties, microbiological properties, nutrient content and sensory evaluation using 9-point hedonic scale. Results showed that the physico-chemical properties and microbiological load of RSK, PN, ESF and Biscuits complied with the Codex standard of each product category and is safe for human consumption. For sensory acceptability, RSK, PN (plain) and ESF received a “like moderately” rating, PN (with sauce) and Biscuits received a “like very much” rating. The nutritional content of the products developed are comparable with products existing on the market with higher amount of dietary fiber (RSK:7.0g; PN:10.8g; ESF:3.3g; B:8.0g), protein (RSK:9.0g; PN:9.0g; ESF:10.0g; B:8.0g), and iron (RSK:1.9mg; PN:6.66mg; ESF:3.3mg; B:1.4mg). Results of the shelf-life study of the products showed that the RSK and PN are shelf-stable for 9 months, whereas ESF and Biscuits are shelf-stable for 6 months. The research findings affirm that sorghum flour is a suitable raw material for the development of rice shaped kernel, pasta noodles, biscuit, and snack food. For future research, the development of other nutritious food products using sorghum flour is recommended.

Keywords: *innovation, innovative food product, sweet sorghum, flour, carbohydrate source, rice-shaped kernel, pasta noodles, extruded snack food, biscuits, Food science and technology*

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2019,
(Filipiniana Analytics)

0337

Investigation of rice bran protein as adjunct in the preparation of β -carotene coacervate *Tuaño, Arvin Paul P. , Flores, Floirendo P. , Magnaye, Maria Jannell Feliz A., Mopera, Lotis E.*

β -carotene (BC), a vitamin A precursor, is widely distributed among fruits and vegetables but has low bioavailability and stability. As such, encapsulation methods for BC may be employed. Rice bran protein (RBP) has good emulsifying capacity, regarded as hypoallergenic, and was reported to be beneficial to health. This study aimed to encapsulate BC in gum arabic and gelatin by complex coacervation using RBP (crude protein $\approx 65\%$) as an adjunct for rice fortification. BC coacervate was produced by complex coacervation followed by freeze-drying. Powder characterization and determination of *in vitro* release properties were performed. Encapsulation efficiency and yield were 92% and 91%, respectively. Moisture content and water activity were 7.35% and 0.43, respectively, indicative of maximum stability. DPPH radical scavenging activity was 60% at 10 mg/mL. SEM, DSC, and FTIR suggested successful encapsulation. Product storage stability was tested under different conditions (26, 37, 55 °C and to light exposure). All conditions are significantly different from one another. BC degradation rate was observed to follow the order: light exposure ($t_{1/2}=3.52$ weeks) < 26°C ($t_{1/2}=3.07$ weeks) < 37°C ($t_{1/2}=1.49$ weeks) < 55°C ($t_{1/2}=1.27$ weeks). Higher BC release was observed in the gastric phase (15-30%) than in the intestinal phase (5-14%). BC release was lowest when the product was added to rice before cooking (5%) and highest without rice (14%). Based on BC release properties, 0.31 g of the product should be added to cooked rice to follow common fortification levels. The inclusion of RBP had been beneficial since an oil component was no longer necessary in the formulation which can be attributed to the emulsifying property of RBP.

Keywords: *Beta-carotene, Coacervation, Encapsulation, Rice bran protein, Food science and technology*

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2019 July,
(Filipiniana Analytics)
NP

Mungbean beverage from "sotanghon" (bean) washing

Del Rosario, R. R. , Maldo, O. M.

A process of utilizing protein in "sotanghon" (bean noodle) washing was developed by hot water grinding at 55C, 65 C and 75 C to obtain less beany flavored liquid waste of the beverage formulation. The effects of different grinding time of the starch yield, washing yield and protein content were determined and the amount of recovered protein calculated. Vanilla and sarsaparilla flavors were added to the beverage formulation and the samples were submitted to the panelists for sensory evaluation. The panelists preferred the beverage formulated from the washing of mungbean ground at 75 C and which contained 2 ml vanilla per 100 g washing to the samples from the washing of mungbean ground at lower temperature. Starch yield, washing yield and protein content were almost the same at different grinding time. Based on the protein content and the washing yield, about 52.23% of the protein was recovered in the beverage.

Keywords: *Mungbean beverage, Sotanghon, Hot water grinding, Protein content, Starch yield, Food science and technology*

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1982 January-March,
(Filipiniana Analytics)
Fil(S) S19 P53

Note: Microwave preheating of fruit and vegetable samples cuts down total time for moisture determination

Mabesa, Linda , Novero, Fe E.

Moisture content of selected fruit and vegetable samples was analyzed by the conventional method and the microwave preheating method. Results indicated that the moisture content of the samples using these two methods were significantly correlated ($r=0.99$). Total moisture determination time was decreased by 50% in the microwave preheating method.

Keywords: *Microwave preheating method, Moisture determination, Conventional method, Moisture content, Moisture content, Food science and technology*

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1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Physico-chemical properties of some Philippine root crops starches

Madamba, L.S.P., Aurellana, B.H., Rodriguez, J.B., Gutierrez, I.

A physico-chemical study conducted on the following different minor root crops, gabi, yam, pongapong, arrow root and yabyaben, showed that all the sample root crops are potential sources of industrial starch, they being all rich in carbohydrates and low in other constituents like fat, ash, crude protein and crude fiber content. They, therefore, could be substituted for corn starch and other high value crops whose release from industrial use will improve the food economy of the country.

Keywords: *starch, Gabi, Yam, Yabyaben, Food science and technology*

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1980 March,

Pilot scale production and shelf life study of complementary foods with fruits rich in antioxidant using high-pressure high-temperature (HPHT) extrusion

Adona, Charlie E.

Antioxidants are substances that prevent or delay some types of cell damage and health diseases. Tomatoes can be added to cereal-legume based complementary foods to improve the nutritional content of the product because of its antioxidant activity. The present study aimed to conduct pilot scale production and shelf-life studies of complementary foods with tomatoes using high-pressure high temperature (HPHT) extrusion. Linear programming was conducted to determine base formulation of rice-mongo complementary food. Tomatoes were added to the base formulation to increase the antioxidant activity of the products. The antioxidant activity and nutritional content of the products were determined. Process was optimized, standardized and scaled up. The effect of packaging on the shelf life of the product was conducted. Product and production cost and feasibility study was also determined. The addition of tomatoes increased the antioxidant activity of snack curls and baby food blend from 73.4% and 78.26% to 88.86% and 88.36% respectively. Snack curls packed in laminated foil and PE packaging are shelf stable for eight months and six months, respectively. The proposed selling price of snack curls is P 7.80/30 grams. With a capital investment of P 12,809,244.00, the payback period of snack curls was estimated at 2.53 years with a return of investment (ROI) of 39%. For baby food blend packed in laminated foil or PE packaging, the shelf life is twelve months. The proposed selling price is P 5.20/30 grams. With a capital investment of P 10,577,798.00, the payback period of baby food blend was estimated to be 3.09 years with an ROI of 32%. Complementary foods with antioxidants were produced in pilot scale using HPHT extrusion. Snack curls packed in laminated foil and PE packaging were shelf stable for eight and six months respectively. Baby food blend was shelf-stable for 12 months, whether packed in laminated foil or PE packaging. The proposed selling price for snack curls and baby food blend is P 7.80/30g and P 5.20/30g respectively. Nationwide transfer of these food technologies to entrepreneurs and other food manufacturers for commercial production is recommended. In-depth studies on antioxidants are also suggested to identify and determine the amount of antioxidant present in the snack curls and baby food blend.

Keywords: *shelf-life, pilot scale production, complementary food, fruits, antioxidants, HPHT extrusion, DOST-FNRI, Food science and technology*

43rd FSS Book of Abstracts 2017, Volume No. Issue No. , 25
2017,
(Filipiniana Analytics)

Pilot scale production and shelf life study of the FNRI-developed extruded sweet potato fries

Engr. Ermac, Karl Patrick J.

Sweet potato is a good source of dietary fiber, copper, manganese, antioxidants, vitamins and minerals and is low in calories and fat. Due to its nutritional benefits, the demand of this agricultural product is increasing and a growing market has created a variety of sweet potato food products. The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) developed a ready-to-fry (RTF) extruded sweet potato fries in laboratory scale. A pilot scale production study is necessary to ensure that the developed technology will proceed to a successful product commercialization. It addresses possible change in the product characteristics such as quality, stability and uniformity during production scale up. The conduct of pilot scale studies served as a bridge between the R&D phase and commercialization phase of the food technology process. The project aimed to conduct a pilot scale production and shelf life study of the DOST-FNRI developed RTF extruded sweet potato fries. Specifically: 1) to standardize the production process; 2) to conduct a shelf life study; 3) to determine the production yield, manpower and overhead requirement and product cost and 4) to conduct feasibility study through a 5-year financial projection analysis. Raw and packaging materials were purchased from one specific supplier to ensure consistency and quality. The pilot scale production of the RTF sweet potato fries uses the

formulation and set of process steps from the previous laboratory scale study. The processes involved were washing, peeling, slicing, steaming, mashing, weighing and mixing of raw materials, extruding, cutting, blast freezing and packing, then freezing until use. Several standardization runs were conducted to check repeatability of the process and its yield. A 5-year financial projection report and Technology Transfer Manual was prepared. Results showed that the pilot scale standardized production process of the RTF sweet potato fries produced a stable product as shown in its physico-chemical, sensory, and microbiological properties with a shelf-life of six (6) months. One shift production operation can produce 24 packs at 1 kilogram per pack with two (2) production helpers per shift as direct labors. The pilot scale production process has an average overall yield of 84.3% for raw sweet potato. Based on the 5-year financial projection, with an initial capital of PhP 1.7 million, the return of investment is at 27.51% or a payback period of 2.67 years. With the price of PhP 251.96 per 1 kg pack, the Net present value and Benefit-cost ratio are PhP 163,000.00 and 1.31 respectively. The pilot scale production of RTF sweet potato fries was technically feasible and the product was found acceptable in terms of physical, chemical and microbiological properties. The product cost was higher compared to commercially available potato French fries. However, sourcing cheaper raw materials supplier, using high capacity equipment and with two (2) shifts production per day may reduce the product cost.

Keywords: *sweet potato, pilot scale production, shelf-life, dietary fiber, ready-to-fry, extruded snack food, commercialization, DOST-FNRI, Food science and technology*

46th FSS Book of Abstracts 2020, Volume No. Issue No. , 21
2020,
(Filipiniana Analytics)

0343

Pilot scale production of flour made from Philippine-grown sweet sorghum (*Sorghum bicolor* L. Moench) Engr. Adona, Charlie E.

Sorghum flour production technology is not well developed as wheat flour. Most available flour in the market is made from wheat grains. This study is an off-shoot of the DOST-FNRI's Research and Development Program on Sorghum Utilization as Food which aimed to develop shelf-stable and consumer-acceptable sorghum flour. The developed sorghum flour showed promising properties that can be used as a potential alternative ingredient to wheat flour especially for gluten free products. The study aimed to scale-up the production of sorghum flour developed from the previous study. Specifically it aimed to determine the production yield, product cost and manpower requirement for commercialization. It also aimed to standardize the production process and conduct feasibility study. The pilot scale production of flour made from sorghum grains was conducted following the basic steps performed during first phase of the study with modification. Sorghum grains from Ilocos were purchased and brought to FNRI Pilot plant for processing. The grains were sorted for impurities and washed 3-4 times until wash water was clear. The cleaned grains were processed into flour. Several production runs were performed to check the repeatability of the process and yield. A technology transfer manual for sorghum production was prepared. Trial runs of 100kg, 150kg, and 250kg pilot scale sorghum flour production were conducted. The trial runs indicated that the 250kg production is the most efficient and least expensive production run. The 250kg production run had an average yield of 75.5% with production cost of 90.00 pesos per kilogram. From the data gathered, a five-year projection feasibility study was done. With an initial capital of 3.2 million for sorghum flour production, the return of investment is 40.72% or a payback period of 2 years with 4,719.00 packs (1kg/pack) production per month. The modified technology for the production of sorghum flour increased the yield and helped reduce the cost of the finished product. Promoting the benefits of the gluten-free sorghum flour will help increase the demand for its use. Conducting several food product research & development utilizing sorghum flour is recommended.

Keywords: *pilot scale production, sweet sorghum, DOST-FNRI, flour, sorghum utilization, research and development, gluten-free, Food science and technology*

45th FSS Book of Abstracts 2019, Volume No. Issue No. , 4
2019,
(Filipiniana Analytics)

Preparation of milk coagulants from adult carabao, cattle and goat abomasa

Davide, C. L. , Peralta, C. N. , Cruz, L. L.

Milk coagulants were prepared from abomasa of mature carabao, cattle and goat by extracting with a solution containing glacial acetic acid or vinegar (Del Monte) and table salt in water. The coagulants were characterized according to their physical, chemical and microbiological properties and compared with an imported commercial rennet. The crude extracts had a sour odor, their color varying from pale yellow to brownish yellow with different degrees of turbidity, and Ph ranging from 3.38 to 4.98. The control rennet was odorless, clear, pale yellow and had a pH of 5.85. Average milk-clotting period of the crude extracts (8.93 to 16.17 min). Extracts from cattle did not differ significantly from the control rennet in milk-clotting time; however, those from carabao and goat differed significantly. Proteolytic activity of the crude extracts was slightly better at onset of clotting but significantly weaker after 24 hr than that of the control. Although glacial acetic acid extracts had lower total bacteria, coliform and yeast and mold counts than those with vinegar, all crude extracts had inferior microbiological quality. Abomasal extracts from mature carabao, cattle and goat can be further improved as an inexpensive milk coagulants. Cattle abomasal extract is the most promising substitute for imported rennet.

Keywords: *Milk coagulants, Enzyme extraction, Abomasal extracts, Carabao, Cattle, Goat, Milk-clotting, Food science and technology*

The Philippine Agriculturist, Volume No. 65 Issue No. 2, 131-145
1982 April-June,
(Filipiniana Analytics)
Fil(S) S19 P53

Promising flour and starch from sago palm tree

Scientists are extensively tapping sago palm to help address food security. The sago grows in underutilized swamps and wetlands with minimal competition from other crops for land and water. The challenge is producing enough sago flour and starch that is acceptable and safe using standard and efficient process of extraction. The project aimed to develop and standardize sago flour and starch in a pilot scale production. The study included improving the color, characterization of functional properties, and determination of shelf-life of said product. The study was conducted in Kalibo, Aklan and Argao, Cebu through the assistance of the DOST Regional Offices VI and VII. The pilot scale production conducted trials using different treatments (meta-bisulfite, ascorbic acid and citric acid), varying concentrations (0-0.5%), different drying methods (sun, oven, and air drying), and water (distilled water, purified and waterworks and deep well). The experiments were conducted using factorial design and products were evaluated by color using Minolta Chromameter. Color values were analyzed by Design Expert Software to determine the optimized set conditions with optimum whiteness adopting the existing method of the farmers. The product was characterized and the shelf-life was determined by measuring the color and moisture content for 12 months. Results of the experiments showed that combination of 0.33% metabisulfite and 0.165% ascorbic acid have high color desirability score of 0.93. Analysis of Variance (ANOVA) showed that treated sago flour and starch using purified water with air-drying were significantly whiter (high L-values) compared to the other products. Study on sago flour's functional properties showed that the product can be used for making biscuits and pizza dough in combination with wheat flour. Shelf-life data for sago flour and starch showed that the color and moisture content changed overtime. The sago flour and starch produced using the optimized set of conditions have higher L-values of 88.53 and 93.65, respectively with a shelf-life of one (1) year. Data generated will be used as basis for continuing studies on flour and starch for improving the product for wider food application.

Keywords: *sago palm, sago flour, sago starch, shelf-life, DOST-FNRI, Food science and technology*

41st FNRI Seminar Series Abstract, Volume No. Issue No. , 9
2015,
(Filipiniana Analytics)

Protein quality of flours from germinated legumes

Mabesa, Linda B. , Castro-Sandoval, Ma. Evangeline , Atutubo, Evelina O.

Soybean [*Glycine max* (L.) Merr.], rice bean (*Phaseolus calcaratus* Roxb.), cowpea (*Vigna sinensis* Linn.), pigeon pea (*Cajanus cajan* Linn.), yard long beans, red variety (*Vigna sinenses sesquipedalis* Fruw.) and white beans (*Phaseolus vulgaris* Linn.) were germinated at room temperature and 30 C at different periods. Flours were prepared from the germinated legumes and then analyzed for moisture, protein and relative nutritive value (RNV). RNV of germinated legumes was significantly higher than that of ungerminated legumes. Maximum RNV was achieved after germinating some of the legumes for 48 hr at room temperature except for rice bean where highest RNV was obtained at 30 C after 24 hr and for white bean at room temperature after 24 hr. RNV increased from 23 to 167% after germination. The protein content of germinated legumes tended to be higher than that of ungerminated legumes.

Keywords: *Protein content, Legumes, Germination process, Relative Nutritive Value, Flour, Food science and technology*

The Philippine Agriculturist, Volume No. 65 Issue No. 3, 265-251
1982 July-September,
(Filipiniana Analytics)
Fil(S) S19 P53

Refined exposure assessment of Filipinos to sodium benzoate in commonly consumed bakery wares, water-based beverages, and cereal-based pastas and noodles

Apilado, Ruby J., Ph.D.+

In 2013, results of screening (Tier 2) exposure assessment of DOST-FNRI on commonly used additives in foods showed that the theoretical maximum daily intake (TMDI) of Filipino children to sodium benzoate (SB) exceeded its acceptable daily intake (ADI) of 5mg per kg of body weight daily. This result identified the need for a more refined exposure assessment study on SB by analyzing its actual content in foods. Excess intake of this preservative was found to provoke urticaria, angioedema, asthma and have been linked with childhood hyperactivity. This study assessed the dietary exposure and characterized the risk of the Filipino population groups to SB present in commonly consumed water-based beverages, cereal-based pastas and noodles, and bakery wares using refined (Tier 3) dietary exposure assessment approach. SB content of 56 food items was analyzed using validated reversed-phase HPLC method. The obtained concentration data was combined with the food consumption data from the 2008 Philippine National Nutrition Survey (NNS) to estimate the dietary exposure to SB. Exposure estimates were then compared with the ADI of SB to characterize the risk of the exposed population to its adverse health effects. Results have shown that 13 of 17 water-based beverages, 12 of 18 cereal-based pastas and noodles, 17 of 21 bakery wares, contained SB with ranges of 1.23-285.69mg.kg⁻¹, 12.72-257.77, and 2–131.79mg.kg⁻¹, respectively. Exposure estimates of Filipinos to SB through these food groups were found to be within its ADI for both average (11-37% ADI) and high consumers (26-95% ADI) with elderly >70.0 years old and children 3.0-5.9 years old having the lowest and highest risk, respectively. From the results, high-level consumers among children ages 1.0 to 5.9 were most exposed to SB at 4.76 mg SB per kg body weight daily (95.13% ADI). The Filipino population groups were below the ADI for daily sodium benzoate intake considering only the beverages, pastas and noodles, and breads and rolls analyzed in the study. For a better estimate, it is recommended to extend the scope of the dietary exposure assessment to other food groups (sauces, cakes, and biscuits) known to contain SB.

Keywords: *refined exposure assessment, sodium benzoate, consumed bakery wares, food additives, water-based beverages, cereal-based pasta, acceptable daily intake, maximum daily intake, DOST-FNRI, Food science and technology*

46th FSS Book of Abstracts 2020, Volume No. Issue No. , 28
2020,
(Filipiniana Analytics)

Relationship of frying temperature with frying life of selected oil types

Sigue, Alexandra Marie S. , Sagsagat, Maria Stephanie Jean D. , Malipot, Jessa Joy C. , Landicho, Venz Timothy Wesley C. , Romero, Kyle Maxinne R., Bullecer, Ernani R.

Cooking oils used for long periods of frying are subject to oil deterioration. Total polar compounds (TPC) is the general parameter used to quantify oil deterioration wherein the maximum allowable TPC of cooking oil is 25%. The time it takes to reach 25% TPC was defined as the frying life of oil. This study was undertaken to determine the effect of oil type and frying temperature on frying life. The frying lives of coconut, canola, and palm oil as well as the oils heated at 150°C, 170°C, and 190°C were determined. Spectrophotometric analysis was performed and TPC values were calculated from absorbance using the equation: $y = -2.7865x^2 + 23.782x + 1.0309$. The mean frying lives were 20.24h, 10.80h, and 13.49h for coconut, canola, and palm oil, respectively. Regardless of oil types, the mean frying lives were 16.23h, 11.93h, and 13.82h at the following frying temperatures namely; 150°C, 170°C, and 190°C, respectively. Two-way ANOVA showed a significant difference in the frying lives of the three oil types and those of the three frying temperatures. Coconut oil had a longer mean frying life than both palm and canola oil. In terms of frying temperature, the longest mean frying life was observed in the oils heated at 150°C, followed by the oils heated at 190°C. There was a significant interaction between oil type and frying temperature observed in the study.

Keywords: *frying life, oil type, coconut oil, canola oil, palm oil, frying temperature, Food science and technology*

*Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 2, 40-46
2019/06,
(Filipiniana Analytics)*

Removal of naringin and limonin from grapefruit juice using polyvinylpyrrolidone

Nisperos, Myrna O. , Robertson, G

Polyvinylpyrrolidone (PVP) significantly reduced naringin in grapefruit juice by 78.1% and limonin by 17.5%, depending on the amount and reaction time of the adsorbent. A loss of 23.1% in ascorbic acid occurred with 5% PVP with a reaction time of 1 hr.

Keywords: *Polyvinylpyrrolidone , Naringin, Grapefruit juice, Limonin , Chromatography, Food science and technology*

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1982 July-September,
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Fil(S) S19 P53*

Research and development program on sorghum utilization as food: Phase II: characterization and functional properties determination of flour, starch and modified starch of Philippine grown sorghum

Tobias, Joyce R.

Sweet sorghum (*Sorghum bicolor* L. Moench) is considered as a “smart crop” due to its climate-resilience, high production yield and versatility to provide the 4Fs of agriculture: Food, Fuel, Feed and Fiber. As food, sorghum grain is a great source of energy, protein, phenolic compounds and is gluten free -- an overall promising nutritional crop. Sweet sorghum is widely cultivated in the country as source of feed and bioethanol, however; there is lack of data to support its suitability on food manufacture. Thus, this research aimed to characterize and determine the functional properties of sweet sorghum flour (SF), unmodified starch (USS) and modified starch (MSS) and evaluate its potential on food application. The chemical, physical and functional properties were analyzed using

standard methods. Results were compared to existing food standards and published reports. Results showed that chemical properties of SF conform to Codex Standard 173-1989. The physical properties of the flour and starch were comparable to other crops and cereal grains; its protein and fiber generally higher. The functional properties showed content (SF:26.03, USS:32.04, MSS:32.42) and high water absorption capacities (SF:145.29%, USS:103.44%, MSS:96.25%). These indicate that sorghum flour and starch are suitable for processes that require severe heat treatment. On the other hand, gel consistency (SF:55mm, USS:25mm, MSS:100mm), swelling capacity (SF:3.04%, USS:2.80%, MSS:2.34%) and solubility (SF:2.91%, USS:0.94%, MSS:1.33%) of the samples are indicators of their food application and cooking quality. Sorghum flour is best used for porridge-type instant meals; unmodified sorghum starch for confectionary gum, thickener, and jelly-based products and; modified sorghum starch is best for free-flowing paste based -food (Zhu, 2014). The research findings affirm that sorghum flour and starch are suitable raw materials for various food applications thus providing additional value to sorghum. For future research, the development of nutritious food products using sorghum flour/starch is recommended.

Keywords: *Sorghum bicolor L. Moench, modified starch, flour, starch, functional property, characterization, sweet sorghum, nutritional crop, DOST-FNRI, Food science and technology*

43rd FSS Book of Abstracts 2017, Volume No. Issue No. , 23
2017,
(Filipiniana Analytics)

0351

Suitability of adult carabao abomasal extract as milk coagulant in making ripened soft cheese

Davide, C. L. , Frogozo, A. T. , Almazan, E. N.

The suitability of crude abomasal extract from adult carabao in the manufacture of ripened soft cheese from cows milk was compared with a commercial imported rennet tablet. The crude extract had a shorter setting time than the commercial rennet. Cheeses made from crude extract contained more fat and protein but less moisture and salt than cheeses from imported tennet. The coagulant used significantly affected moisture, protein and fat contents. The experimental cheeses had a higher pH but percentage yield was almost the same for both experimental and control cheeses. Sensory evaluation of body and texture indicated significantly higher mean scores for the experimental cheeses. For color, flavor and aroma, and general acceptability the differences between experimental and control cheeses were not significant. Experimental and control cheeses made with 2% starter and set at 40 C without previous ripening of the milk garnered the highest mean score for sensory evaluation. Consumer acceptability test showed that the cheeses compared favorably with the commercial unripened Dairy Training and Research Institute (DTRI) white cheese. This study proved the technical suitability of adult carabao abomasal extract in making ripened soft cheese from cows milk and showed that the cheese is highly acceptable and has a market potential.

Keywords: *Carabao abomasal extract, Cows milk, Soft cheese, Dairy Training and Research Institute , Food science and technology*

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Scolytid beetle (*Coccotrypes rhizophorae* Hopkins) and assisted natural regeneration approach regulate the ecological carrying capacity of protected mangrove forest in

Rizal, Gubat, Sorsogon

Dionisio-Sese, Maribel L. , Endonela, Leah E.

Mangroves are important non-renewable resources and coastal resource management is a complex problem across subtropical and tropical regions. In the Philippines, natural disturbances and anthropological interventions have irreversibly damaged the ecological functions of mangrove ecosystems. This situation has prompted government institutions to rehabilitate and restore denuded intertidal zones without critical understanding of potential impacts on associated biotic factors. For example, the unregulated harvesting and mono-specific planting of *Rhizophora* species may have direct effects on vegetation structure and associated biotic interactions on existing mangrove community. This study has conducted numerical simulation to determine the impact of *Rhizophora* sp.-*C. rhizophorae* interaction on host plant population structure and regeneration potential. Numerical simulations based on data generated from a three-year field monitoring and evaluation conducted in Rizal Mangrove Forest (RMF), Gubat, Sorsogon, Philippines showed that *C. rhizophorae* infestation at endemic level is sufficient to ensure that the forest has *Rhizophora* trees of varying growth stages. On the other hand, at epidemic level, it is necessary to gather and destroy infested propagules and seedlings to minimize damage on the succeeding reproductive cycles. Canopy gaps during typhoons or death of mature trees favour rapid regeneration rate of healthy propagules. Subsequently, however, mangrove forests need proper human assistance to continuously benefit from its environmental services. Hence, in the absence of destructive interventions such as deforestation, pollution and land-use, conversion mangroves could adapt and withstand biotic stresses while sustaining their ecological carrying capacity.

Keywords: *Coccotrypes rhizophorae*, *Rhizophora*, *Carrying capacity*, *Forestry*

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2019 July,
(Filipiniana Analytics)
NP

GENERAL WORKS

Assessing the state of professional practice of midwifery in the Philippines

Hipolito, Josephine H. , Canila, Carmelita C.

Midwives have been the country's frontline health care providers in communities. Their role was expanded from largely providing maternal and child care services in the 1920s to provision of basic Primary Health Care services since 1970s. Despite their extensive roles, there has been no comprehensive enquiry on the professional practice of midwifery in the Philippines since it formally started in 1901. This study was conducted to (1) describe the evolution of midwifery education and regulation; (2) describe professional practice of midwifery and the midwives' role in the local health system; (3) identify gaps in the current midwifery practice, and; (4) recommend to improve and standardize the competencies of practicing midwives.

The study is qualitative with a grounded theory approach using face-to-face Key Informant Interview (KII), Focus Group Discussion (FGD), and document review. The study, conducted from January to December 2015, purposively sought experts from different fields of midwifery, including midwifery-service providers, birthing home managers from public and private sector, academe, Department of Health (DOH), development partners, the country's three leading midwifery organizations, and the Board of Midwifery (BOM) of the Philippine Professional Regulation Commission (PRC).

Changes in midwifery education, scope of practice and standards were in response to the country's health challenges in maternal and child health. Public midwives were frontline implementors of 57 DOH programs. Despite their vital role and expanded workload, the tenure or plantilla positions of government midwives continued to have the same salary grade promulgated in 2000 while others, although the numbers are unknown, do not have security of tenure. There were no learning and development initiatives designed to enable midwives to become implementors of multiple programs. Regulation of midwifery practice was not cohesive. The standards of practice were program-based and were scattered in different policies.

The study recommends that the DOH, PRC, and midwives' organizations review and revise the scope of midwifery practice in line with global standards, as well as to implement a competency-based career development pathway that is integrated with the regulatory system.

Keywords: *professional practice, midwifery, primary health care, General works*

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2018/06,
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0354

Association of childcare practices and stunting among children beneficiaries of the Pantawid Pamilyang Pilipino Program: a nested case-control study *Develos, Maribel Montesa*

Childcare is a challenging task particularly for caregivers in urban slums. The Pantawid Pamilyang Pilipino Program (4Ps) aims to improve the beneficiaries' caregiving practices, which could compensate for the negative effects of poverty on children's nutritional status.

The study was conducted to determine the association of childcare practices (CCP) and stunting among children beneficiaries residing in Pasay City.

This nested case-control study included 7 to 9 year-old children cohorts who were enrolled in the 4Ps in 2008, comprising of 82 stunted and 97 normal children. The outcome and predictor variables were the child's height-for-age z score (HAZ) and household CCP, respectively. Multiple logistic and linear regression analyses were performed to determine the association between the desirability of HH CCP and stunting, and HH CCP score and HAZ, respectively.

Six out of 10 beneficiaries had “desirable” CCP. Stunting was more likely observed among children whose households have undesirable CCP; who were enrolled in 4Ps at a younger age; had low birth weights; male; whose primary caregivers are less than 40 years old; whose maternal heights are less than 151 cm; whose primary caregivers had less than 7 years of education; and whose monthly household income is less than PhP 9,000. Undesirable CCP is associated with stunting, and the HH CCP score had a positive relationship with HAZ score among children.

Desirable CCP decrease the likelihood of stunting among children. Therefore, improving the childcare practices of beneficiaries could decrease the prevalence of childhood stunting.

Keywords: *children practices, childhood stunting, pantawid pamilyang pilipino program, well-being, General works*

Philippine Journal of Health Research and Development, Volume No. 24 Issue No. 1, 1-10
2020/03,
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Citations searching in literature reviews

Antonio, Carl Abelardo T.

The burgeoning wealth of available scientific information aided in part by (a) expansion in the definition of literature, (b) dramatic increase in the scientific output available for the scientific community's perusal, and (c) ease of access afforded by various databases and search engines poses several challenges to researchers and to the credibility of their research findings. One method to discourage reference to fraudulent, incomplete, or obsolete data in the literature is citations searching. This paper presents a short overview of citations searching, its advantages and disadvantages, as well as its implications for stakeholders in the academic community.

Keywords: *Information storage and retrieval/methods, Research design, Review literature as topic, General works*

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 1, 71-74
2019/03,
(Filipiniana Analytics)

The comparison of the different adjustment factors for admission to the University of the Philippines College of Medicine

Ignacio, Katrina Hannah D. , Sevilleja, Jesus Emmanuel AD , Canal, Johanna Patricia A. , Ignacio, Sharon D. , Catabijan, Carlo G., Cruz, Maria Katrina Diana M.

Among the different criteria, the General Weighted Average Grade (PMGWAG) holds the biggest bearing on admission for the UP College of Medicine. However, GWAs are not comparable across different courses, different batches, different UP units and different schools. An Adjustment Factor is necessary to make PMGWAGs comparable and to level the playing field.

This study covering a 24-year period aimed to compare various proposed Admission Adjusted Factors of %PMGWAG (Pre-Med GWAG) in terms of Pearson's Correlation, Linear Regression Models and Mean Differences with %MGWAG (Medical GWAG), Class Rank and Board Rating as Outcome variables.

Various proposed Adjustment Factors were applied to %PMGWAG of medical students from Class 1990 to Class 2014 and Pearson's Correlation, Linear Regression Models and Mean Differences with %MGWAG, Class Rank and Board Rating were derived and analyzed.

Adjustment Factor A3 as applied to %PMGWAG correlates best with Board Rating and Class Rank while Adjustment Factor A6 with %MGWAG. On Linear Regression, A3 likewise bested other Adjustment Factors in predicting %MGWAG and %Board Rating while A6 on predicting Class Ranking. Among the various adjustments, A3 exerted the most impact on the outcome variables, based on mean differences.

The A3 Adjustment Factor is the preferred and most ideal among the various proposed adjustment factors. Its application on %PMGWAG, correlated best with, most predictive of and most influential to %MGWAG, Board Rating and Class Rating.

Keywords: *medical college admission, medical education, academic performance, UP College of Medicine, General works*

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Effective practices of research supervisors in handling postgraduate students

Yanilla, Niña F.

There were issues and dearth of studies on postgraduate research supervision across all fields and discipline. This study sought to describe the effective practices of university research supervisors handling postgraduate students in education and health sciences.

A descriptive qualitative design was used to understand the effective research supervision practices based on the experiences of 10 university research supervisors in handling postgraduate students in the fields of education and health sciences. All supervisors voluntarily accomplished an online questionnaire consisting of 10 open-ended items. Their responses underwent thematic analysis.

Evidence of expertise among the research supervisors was established. Data from the responses of the research supervisors were grouped into themes and analyzed according to the conceptual models of effective research supervision of Lee [7] namely functional model, emancipation model, relationship development model, critical thinking model, and enculturation model. Most of the responses on effective practices fall under the functional model wherein supervisors need to have directing and project management skills. Practices under this model were further categorized into communication, feedback, monitoring, managing and research process-related matters. Distinct findings in this study categorized under the other models include having dialogue with supervisees, respecting supervisees as thinkers, and showing respect to supervisees. Ineffective practices were also recognized. They included not reading the supervisee's work, imposing solutions to supervisees, pressuring them and not taking advising duties professionally.

Most of the effective practices of research supervisors in handling postgraduate students are founded on their supervisory functions particularly in their directing and project management activities.

Keywords: *postgraduate supervision, research supervision, research supervisors, conceptual models, functional model, General works*

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2020/06,
(Filipiniana Analytics)

Evaluation of the University of the Philippines Manila “awakening seminars”

Lingdas, Charmaine A. , Alto, Anne Marie D. , Javier, Richard S. , Villamor, Cynthia M. , Sana, Erlyn A. , Samaniego, Arlene A., Jemena, Fedelyn M.

Staff development is essential in sustaining organizational efficiency. In 2016, the University of the Philippines Manila started conducting the “Awakening Seminars” among administrative personnel to foster smooth interpersonal relationships and operational efficiency.

This study was commissioned to determine the value of the seminars. It evaluated the trainees' perceived reactions, learning, and overall change in behaviors towards their work at the university.

Out of 321 personnel who completed the seminars, 96 were calculated as sample size. Participants accomplished a survey questionnaire and 67 valid responses were collected. Data were analyzed using means and standard deviations according to Kirkpatrick's Evaluation Model from Level 1: Reactions, Level 2: Learning, to Level 3: Behavior. Different ratings were compared with selected variables using analysis of variance.

Seven seminars were conducted from March 2016 to January 2017. Mean ratings showed that the seminars were well organized, relevant, and helped them appreciate their work, colleagues, and their workplace environment. Participants have high morale and felt privileged being in UP. Analysis of variance tests showed that evaluation ratings did not differ significantly with monthly take-home pay, tenure, performance, and job category. While these ratings are not directly translated as operational efficiency, results suggest participants' commitment to the university's goals.

UP Manila personnel appreciated the “Awakening” staff development program and can be replicated to all support personnel of the colleges.

Keywords: *staff development program, awakening seminars, UP Manila as a workplace, General works*

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0359

Gaps in addressing road safety in the Philippines

Rivera, Adovich S. , Lam, Hilton Y.

Road traffic injuries were the second leading cause of death due to injury in 2003 in the Philippines. In 2011, the Philippine Road Safety Action Plan (PRSAP) was instituted. Five years into the program, latest data showed that the death rate due to road injuries continue to increase despite the presence of key legislation supporting road safety. This study was aimed at identifying the gaps in addressing road safety in the Philippines. Literature review and key informant interviews of representatives of the different agencies including the Department of Transportation and Communications (DOTC), Department of Public Works and Highways (DPWH), Road Board, Philippine National Police (PNP), Metro Manila Development Authority (MMDA), and Land Transportation Office (LTO) were conducted to identify gaps in the program. Key gaps include: weak leadership at the national and local level, limited material and human resources for enforcement of laws, and fragmented information system. These gaps should be addressed to improve the road safety situation in the country.

Keywords: *road safety, safety policy, Philippines, developing countries, General works*

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0360

Policy guidelines on management of externally-funded projects at DOST-Food and Nutrition Research Institute

Viri, Jester C.

This paper, which is both a case study and an action plan aim to address the challenges currently experienced by DOST-FNRI employees by developing a policy guideline on how to manage the financial and administrative requirements of externally-funded projects. This study used a purely qualitative research method of data analysis. The author conducted an analysis and textual evaluation of all secondary data such as the MOA between DOST-FNRI and the funding institutes as well as numerous issuances and circulars. Key informant interviews with the Accountant, accounting staff, project leaders of all externally-funded projects for the past five (5) years from 2014 to 2018 were also conducted. All externally-funded projects are to be considered as grants or trust receipts that are officially in the possession of government agencies or a public officer as trustee, agent, or administrator, or which have been received for the fulfillment of a particular obligation. Government rulings shall be followed when disbursing these funds. Section 84.2 of PD 1445 and Section 6 of the 2018 GAA state that trust receipts shall be disbursed in accordance with the purpose for which it is created, subject to the applicable special provisions and accounting and auditing rules and regulations.

Keywords: *policy guidelines, management, DOST-FNRI, externally-funded projects, financial requirement, administrative requirement, disbursement, General works*

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2020,
(Filipiniana Analytics)

Profiling "voluntary surrenders" of oplan tokhang in Marikina City, Philippines: an emic view

Estacio, Leonardo R.

This study was undertaken in response to the lack of contextualized and grounded description of surrendered drug offenders (e.g. voluntary surrenderers) provided to the media and to the public by the law enforcement agencies on the Oplan TokHang campaign of the Duterte administration.

This paper sought to provide a profile of "voluntary surrenderers" of Oplan TokHang in 4 selected barangays in Marikina City. Specifically, it aimed to describe their socio-demographic characteristics, drug use behaviors, underlying reasons for initial and continued drug use, severity of use, and the nature and reasons behind their participation to the Oplan TokHang campaign, respectively.

A total of 56 participants were surveyed and descriptive statistics was used in the presentation and analysis of data. These were triangulated by direct observation, local studies and international studies, data from national agencies and news reports.

Most of the voluntary surrenderers in the study were drug users rather than user-pushers and were predominantly single, male, high school educated and were observed to be in their most productive years yet unemployed. They abused shabu and marijuana and started to take drug in their mid-adolescent years. Although users for 1 to 2 years, more than majority of them were mild users, taking drugs on a weekly basis that were sourced from their friends and from drug pushers. Exposed to drug- using friends and relatives, most were initiated to drugs because of peer influence, personal and family problems. They continued to use drugs because they were not able to resolve these personal and social relations issues. Being jobless, most sustained their drugtaking behavior by committing petty crimes such as selling household goods, drug-pushing and theft. Afraid to be killed and wanting to be rehabilitated, they participated in the TokHang campaign for safety and for self-change.

Voluntary surrenderers in the study were not as violent and dangerous as generally reported by media and by law enforcers. As mild users, they were not those types that were considered as "beyond redemption" but were rather capable of self-change. These primary data were reflective of national reports that 90 percent of surrenderers were mild users. Policy-wise, the study suggests that government should, through the Oplan TokHang campaign, shift more focus in providing community-based treatment and rehabilitation program that is responsive, sustainable, protective, and rights-respecting of voluntary surrenderers.

Keywords: *war on drugs, oplan tokhang, voluntary surrenderers, drug users, user-pushers, responsive and rightsrespecting community-based treatment and rehabilitation program, General works*

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Reflections on a qualitative interview

Antonio, Carl Abelardo T.

Interviewing is one of the more commonly deployed data collection method in qualitative research. Textbooks and journal articles abound that describe the process for conducting various types of interviews. In this paper, I offer a short methodological and reflexive discussion of an interview I conducted as part of a course requirement, focusing on the potential impact of the interview process on the collection and interpretation of data. The purpose of this paper is to draw researchers' attention to some issues that may arise in the context of a qualitative interview, and to propose possible approaches to addressing these.

Keywords: *reflection, qualitative interview, data collection method, interviewing, General works*

Road safety performance index in Metro Manila, Philippines: 2011-2015

Lu, Sophia Francesca DP.

Road safety in the Philippines has been increasingly significant with the increasing level of industrialization and urbanization over the last decade. The main objective of the study is to determine the road safety performance for Metro Manila by computing for an index based on data and variables of road traffic over the past years.

The variables for index calculation included speed, alcohol, infrastructure, vehicle defect, and other unsafe driver behavior were drawn from the Metro Manila Development (MMDA) database complemented with literature review from several sources. Equal Weighting method was utilized, as this is the simplest yet least biased measurement suitable for the data at hand.

The Road Safety Performance Index for Metro Manila remains more or less constant over a five-year period, increasing and decreasing from 0.45 to 0.59 which means that Metropolitan Manila has fared poorly in all indicators. Metro Manila has a poor road safety performance as evidenced by the road safety index. There is a need to improve on all components of road safety identified in this study for the safety of road users.

Keywords: *road safety, road safety performance, Metro Manila, traffic condition, road mortality rate, General works*

Using participatory curriculum development for barangay health workers in a local community: a pilot study

Pangilinan-Behino, Cecil Margarette E., Sy, Michael P.

Reforms in health professions education in the past decade entails the development of effective curricula that impact and improve health outcomes. Along with health professionals, barangay health workers (BHW) are not spared from experiencing curricular mishaps when they undergo trainings for community health work. This article described the process of a participatory approach in curriculum development for BHWs in a local community in the Ilocos Region.

An exploratory sequential mixed method design was used for this pilot study. The method was framed from six (out of ten) steps in the Research and Development Cycle; these steps were categorized in three phases: 1) needs assessment, 2) participatory curriculum development, and 3) implementation of the curriculum and evaluation.

Our findings yielded both qualitative (Phases 1 and 2) and quantitative (Phase 3) data which were analyzed separately and sequentially. Phase 1 revealed findings based on the strengths, weaknesses, opportunities, and threats found in the community's health care context which were used to determine the four potential training topics to develop a curriculum. Phase 2 generated a curriculum on hilot wellness through the participation of the local government and curriculum experts. Phase 3 produced evaluative data on the reaction, learning, and behavior of BHWs towards the implemented curriculum on hilot wellness.

The participatory curriculum development process entailed the generation and analysis of data from the community that produces a curriculum for the community. This curriculum does not only offer sustainable and longitudinal health care services but is sensitive to the values and culture of the community while considering the notion that learning is not linear. This article demonstrated that a participatory approach in curriculum development within health professions education can be pursued to address the ever changing healthcare needs of local communities.

Keywords: curriculum, health workforce, community health service, health personnel, public health, General works

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0365

Using the ServQual scale to measure client satisfaction in a rehabilitation teaching clinic in the Philippines

Mendoza, Kristofferson G.

Teaching clinics provide low-cost health programs while offering valuable learning opportunities for student clinicians, which then contributes to increasing health care accessibility. To date, there is a paucity of literature exploring the satisfaction of patient seen in rehabilitation teaching clinics in developing countries. The Service Quality (ServQual) Scale is a valid and reliable tool that has been used to measure client satisfaction in different work settings and industries.

The aim of this study was to demonstrate the usefulness of ServQual in measuring the satisfaction of clients in a rehabilitation teaching clinic in a developing country.

A cross-sectional survey was conducted for three months among CTS-AA (Clinic for Therapy Services- Adult and Adolescent Section) clients who are at least 18 years old; have attended at least three sessions; and can read. Prior to administration in CTS-AA, the ServQual scale was translated to Filipino, validated and pilot tested for reliability.

Thirty-two respondents were included in the analysis. there was no statistically significant difference between the expectation and the perceptions of the clients for the domains of reliability ($z=1.799$, $p=0.0721$), responsiveness ($z=0.839$, $p=0.4013$), assurance ($z=1.914$, $p=0.0556$) and empathy ($z=1.772$, $p=0.0764$). However, there was a statistically significant difference between the clients' perception and expectation for tangibles ($z=4.117$, $p<0.0001$) and between the overall client perception and expectation ($z=4.086$, $p<0.0001$). The overall ServQual score for CTS-AA is -0.3782.

The ServQual has been shown to be useful in assessing the satisfaction of clients in rehabilitation clinics and the specific areas that needs improvement. The tool can still be further improved by including items on cost, relationship of students with supervisors and outcomes of treatment.

Keywords: client satisfaction, service quality scale, ServQual, quality of service, rehabilitation, teaching clinic, General works

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2018/12,
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GENETICS

0366

Estrus and conception in lactating does treated with a prostaglandin F₂ alpha analogue

Sabarez, M. T. , Rigor, E. M.

Twenty-five lactating anestrus does were assigned at random to a 3 x 2 factorial experiment with three levels of PGF₂ alpha given 61 days post-kidding (0mg, 10 mg and 2X 10 mg injected 10 days apart) and two breeds of goat (Anglo Nubian and native) to determine the effects of these two factors on estrus induction, interval from kidding to first estrus (first breeding), interval from (first breeding to conception, interval from kidding to conception

(service period), services per conception, percentage non-returns and conception rates. The mean intervals from kidding to the main estrus (first breeding) were 85.95 5.55, 94.25 6.75 and 100.52 13.22 days for the 0mg, 10mg and 2X10 mg PGF₂ alpha-treated groups (PGF groups), respectively. The mean intervals from first breeding to conception were 12.38 6.19 , 12.1 6.05 and 23.38 11.69 days for similarly treated does while the mean lengths of the service period were 98.32 7.92, 106.35 18.85 and 123.9 36.6 days, respectively. Services per conception were 1.12 0.12 for the 0 mg, 1.2 .2 for the 10 mg and 1.25 0.25 for the 2X 10 mg PGF groups, respectively. Overall conception rates were 93.76% for the 2X 10mg PGF₂ alpha-treated does. Anglo Nubian does had longer

Keywords: *Prostaglandin F₂ alpha, Lactating does, Estrus conception, Goat, Genetics*

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 1986 July-September,
 (Filipiniana Analytics)
 Fil(S) S19 P53

GEOLOGY

0367

Eocene in the Philippines *Grey, Roberto R.*

The Eocene sediments in the Philippines are very limited in geographical distribution and are unconformable on pre-Tertiary rocks. The Eocene has been recognized solely on large Foraminiferal contents of the formation. The ecological conditions under which the faunas live are mentioned and correlation of the Eocene in the Philippines with those Indonesia is made with the aim to give a true picture of Eocene in this part of the Pacific.

Keywords: *Eocene , Eocene sediments, Petroleum survey, Eocene rocks, Geology*

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 1954 June,
 (Filipiniana Analytics)
 Fil. QE1 P54

0368

Preliminary geologic report on the Mansalay District, Mindoro *Feliciano, Jose N. , Basco, Daniel M.*

The Mansalay Formation which was recently identified, is found in the southwestern part of Mindoro and named after the district of Mansalay where it was encountered. This same formation occurs in the region between the towns of Pinamalayan and Naujan along the east coasts in the island of Mindoro, and in at least one locality of Bulalacao in the south of the same island. It is largely made up of the oldest fossiliferous beds of dark shales containing Ammonites. De Villa placed these sedimentaries under the Jurassic. The chert beds which formerly assigned to Jurassic may have to be moved down to Triassic. It is quite probable that when the fossils of Mansalay are properly classified and their ages determined certain Triassic fossils may be contained therein. In the field, one thing was establish - that the Mesozoic beds are clearly overlain unconformably by the Tertiary. As shown in the cross-sections of the Geologic Map of the Mansalay District, these Mesozoic beds taken as a whole, appear to be an irregularly eroded crest of a broad anticline whose axis trends generally to the northwest with dips varying between 15° and 35° on the both sides. The Mansalay District subsided during the latter part of the Pliocene period, but started to emerge slowly, followed or accompanied by some faulting, after the Pleistocene glaciation. These movements may be responsible for the development of the irregular coastline and the presence of river- and marine- terraces.

Keywords: *Geologic report, Mansalay formation, Triassic fossils, Mesozoic beds, Pleistocene glaciation, Geology*

HEALTH AND WELLNESS

0369

Academic resilience among selected students of the School of Health Sciences- Baler, Philippines

Sana, Erlyn A. , Salvacion, Maria Lourdes Dorothy S. , Yanilla, Niña F.

Since 1976, the School of Health Sciences (SHS) in the Philippines has produced a broad range of health professionals serving depressed and underserved communities. Most researches about the SHS present the impact of its unique community-based ladder-type curriculum and only a few focus on the lived experiences of its students. This study described how the lived experiences of SHS students with their community-based curriculum manifested as academic resilience. This is an exploratory social research. Data were obtained from key informant and focus group interviews, observations of purposively chosen students, teachers, and alumni in Baler Campus, and document review. Data were analyzed using iterative terms and concepts describing respondents' patterns of activities that establish norms in SHS. Joint displays of these norms were constructed to describe the students' academic resilience. Admission in SHS requires students to undergo a stringent, often political recruitment process. While in the degree program, students go through constant financial constraints, demanding academic requirements, and challenging balance of hospital and community work with their personal and academic lives. The interplay between inner strength and external support promoted academic resilience. Studying in the SHS is a transformative learning experience. Students experienced multi-faceted problems requiring them to resiliently meet academic standards and maintain their own well-being. The culture of 'damayan' was an important source of psychosocial support. The SHS curriculum and culture are most instrumental in promoting academic resilience among its students.

Keywords: *academic resilience, School of Health Sciences, ladderized curriculum, community-based curriculum, Health and wellness*

0370

Coping mechanisms of Filipino parents with children diagnosed with leukemia: a case study

del Mundo, Jocelyn Chan, Pillado, Michael Ryan

Leukemia, though proven to be curable, still poses a serious problem for the country as the number of patients steadily increases every year. To address this concern, a number of studies were conducted to analyze not just the physical but also the psychological effects of diagnosis on patients. However, data are still lacking on the effects of this illness on parents of the patients, especially on how parents cope with the imminent distress brought about by the situation. The study aimed to explore the coping behaviors of parents of leukemia patients towards their children's illness and to determine the factors that affect the distress of these parents. The coping mechanisms of Filipino parents of leukemia patients and the factors that contribute further to their distress were investigated. A case study was conducted involving six parents from the Leukemia Indigent Fund Endowment in the Lung Center of the Philippines who qualified under the inclusion criteria set in the study. Participants were interviewed using a semi-structured interview guide. Their responses were recorded, transcribed, and assessed through thematic analysis. The major coping mechanisms gathered were: Denial, Acquiring Social Support, and Faith. The nature

of their coping mechanisms greatly depends on factors that induced their distress after diagnosis of their child. On one hand, for those whose distress was provoked by their knowledge that leukemia is fatal, their immediate coping mechanism was total denial followed by social support from other parents of leukemia patients. On the other hand, for those whose distress was prompted by the financial constraints that come along with the illness, while there is denial, the major coping mechanism was acquiring social support in terms of financial needs. Only after having these immediate actions that they become open to emotional and moral support, together with other coping mechanisms such as having faith, repression of other activities, being optimistic or being passive.

Keywords: leukemia, coping mechanisms, parents, distress, cancer, Health and wellness

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0371

DOST-FNRI and Robinsons' supermarket: a public-private partnership model in promoting wellness among Filipinos

Glorioso, Ma. Idelia G.

Promoting food and nutrition messages is part of the Food and Nutrition Research Institute's third mandate. Robinsons Supermarket on the other hand, is one of the largest supermarket chains in the Philippines that carries this philosophy "Eat Well, Spend Less". The FNRI and Robinsons Supermarket Corporation(RSC) thus partnered with a common goal to educate and empower customers to live healthy through the development of a desk calendar and green tag scheme classification. This study examined the public-private partnership through the development of a desk calendar and green tag scheme classification implemented by DOST-FNRI and Robinsons Supermarket for promoting wellness among Filipino grocery customers. A reader feedback survey form was developed and used to gather data on the profile of the participants and attributes of the 2013 full color desk calendar which featured fruits in season. Attributes included uses, relevance, simplicity and appropriateness of language, amount of information and general acceptability rating, consumers' level of awareness, and tendency to buy Green Tag products. The reader feedback survey form enclosed in the calendar was distributed among supermarket customers in all Robinsons Supermarket branches nationwide. A total of 2,011 customers from its branches in Luzon, Visayas and Mindanao were participants of the study. Data was analyzed using frequencies and percentages. For multiple responses, the total number of respondents was used in computing for the percentages. More than half of the participants perceived the FNRI (62.6%) and RSC (59.2%) as credible sources of food and nutrition data in the Philippines. The calendar was reported to have been used as a guide in planning family meals (34.4%), as reference material (34.2%), and as an update on food and nutrition topics in the Philippines (16.0%). In terms of layout design, majority of the respondents viewed that the calendar is "appropriate" (78.4%), with "relevant to very relevant" (86.9%) theme, with "just enough" information, used simple and appropriate language, and contained appropriate and easy to understand featured recipes. The green tag marks foods as "healthy" if they individually pass at least three or more conditions based on the Codex Guidelines for Use of Nutrition and Health Claims. The survey showed that more than half of the respondents were aware (63%) and have used (57.9%) the Green Tag products, but their knowledge on the health benefits of the products in the shelf was low (25.5%). A 20-page desk calendar and green tag classification scheme was developed and implemented by the DOST-FNRI and RSC in the Philippines. The results showed that the desk calendar is a potentially good vehicle in promoting nutrition among the general public. There is a need to improve the information campaigns for the classification scheme in order to improve the knowledge and attitude of consumers. The partnership with a large supermarket chain in the Philippines is a promising intervention that may increase the availability of and access to healthier choices and nutrition information among Filipino consumers.

Keywords: DOST-FNRI, Robinsons supermarket, wellness, public-private partnership, grocery customers, green tag, Health and wellness

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2015,
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A formulated sunscreen emulsion from the *Eucalyptus deglupta* (L.) leaves extract with antioxidant property

Rañola, Rey Alfred G. , Obinguar, Sarah Lou , Lao, Christine Dianne A.

The leaves of *Eucalyptus deglupta* or locally known as “Bagras” an endemic tree in the Philippines were utilised as a potential natural cosmetic ingredient. The methanolic leaf extract of *E. deglupta* shows the highest number of phytochemical constituents such as flavonoids, phenols, tannins and alkaloids. The total flavonoid and phenolic content of the extract were found at 170 ± 5 mg quercetin/g extract ($n=3$, RSD=0.33%) and 709 ± 1 mg gallic acid/g extract ($n=3$, RSD=1.37%), respectively. The antioxidant capacity was tested by 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay. The sample exhibited an antioxidant capacity of 88% ($n=5$, RSD= 2.21%) and a half maximal inhibitory concentration (IC₅₀) of 4.64 mg/ml ($n=3$, RSD= 2.60%). The in- vitro sunscreen protection factor (SPF) was found at 27 SPF and was later formulated as a sunscreen emulsion. Results on the fourier transform infrared attenuated total reflectance spectroscopy (FTIR-ATR) showed that the extract and the main raw materials for the sunscreen were compatible. The optimum amount of active ingredient that has a good and acceptable formulation was at 0.50% (w/w). The SPF of the formulated emulsion was 21. The SPF of the emulsion decreased by 29% based on accelerated stability testing (i.e. approximately one year).

Keywords: *Eucalyptus deglupta*, Crude extract, Antioxidant, Health and wellness

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NP

The Ibalois of Benguet as active agents in health negotiations

Achanzar-Labor, Honey Libertine

The Ibalois in La Trinidad, Benguet are witnesses to health negotiations that had been subjected to historical and material change.

To present indicators of resistance—the struggles, the apparent ambivalence, and the aspirations of the Ibaloi people in relation to health negotiations, as indicative of their being active agents in confronting change. Its ultimate objective is to show how the Ibalois have managed to not allow themselves be subjected to the biological reductionism of “medical gaze” as they assert the value of a number of traditional health and cultural practices amidst historical and material change.

A case study research design with Key Informants Interview (KII) as data collection technique is used as design for the study. To collect data, fifteen key informants were interviewed, eight from the folk medical sector and seven from the professional medical sector. Emic viewpoint was used in the presentation of data to analyze cultural phenomena from the perspective of one who participates in the culture being studied. Data from the folk medical sector were triangulated with data coming from local and international studies and with reports coming from the professional health sector: records from barangay and provincial health clinics managed by nurses and midwives as well as data coming from a local tertiary hospital and a national media news coverage.

The struggles of the Ibalois are acts of resistance as they confront both traditional health practice or change. Their ambivalent emotions manifest creative responses to the diurnal or apparently humdrum occurrences that they encounter. Their aspirations indicate their hope and constant desire for a better future, and particular to this study, better health conditions. Indeed, health negotiations in Barangay Bahong, La Trinidad, Benguet and the continued relevance given to the mambonong are not indicative of a petrified indigenous.

Amidst the various historic turns and power shifts in the Cordillera region, the Ibalois have portrayed themselves as human agents—not just as one objective force in society—who define their culture (i.e. health practices) themselves in as much as this gives meaning and relevance to their lives.

Keywords: *mambunong (manbonong), material shift, historic turns, cosmopolitan, Ibaloi (Ibaloy), folk health sector, Health and wellness*

Interdependent happiness is associated with higher levels of behavioral and emotional engagement among Filipino university students

Lizada, Gabriel Sebastian N. , Datu, Jesus Alfonso D.

In collectivist societies, individuals are likely to espouse a socially-oriented construal of happiness. Yet previous studies on the consequences of happiness and well-being have mostly concentrated on examining how a personal construal of happiness optimized positive academic and psychological outcomes. This research explored the association of interdependent happiness with the behavioral as well as the emotional domains of academic engagement and disaffection among 220 Filipino university students enrolled in a private university through a cross-sectional investigation. Results of the hierarchical regression analyses demonstrated that interdependent happiness positively predicted behavioral and emotional engagement even after controlling for demographic variables (i.e., age and gender). Interdependent happiness did not predict both behavioral and emotional disaffection. Furthermore, the effect sizes between interdependent happiness and engagement domains ranged from ‘relatively small’ to ‘typical’. The theoretical and practical implications of the findings are discussed.

Keywords: *academic engagement, disaffection, interdependent happiness, happiness, Health and wellness*

Mental health stigma among Filipinos: time for a paradigm shift

Antonio, Carl Abelardo T. , Rivera, Ana Kriselda B.

This paper aimed to provide a review of mental health stigma in the Philippines, its implications on policy and programs, and interventions on addressing the issue. Stigma towards people with mental illnesses in the Philippines is rampant; there seems to be lack of sensitivity in referencing mental health issues. Many forms of stigma affect people with mental illnesses. Stigmatizing attitudes and discriminatory behaviors are evident at home, school, workplace and healthcare settings. Stigma is a major barrier to the recovery of mentally ill persons. Increasing the awareness of the public on mental illnesses through health education and promotion is already an established intervention. Various strategies can also be done, such as integrating culture and arts, by providing incentives to companies which have mental health policies, and recognizing institutions and media agencies which promote positive portrayals of people with mental illnesses.

Keywords: *social stigma, mental health, mental disorders, Philippines, Health and wellness*

Microscopic identification of parasites on biosolids in different flood-prone areas in Caloocan

Cruz, Reyanne Marie , Juarez, Anne Krishia , Godio, Jessamin Jhoy , Abano, Ericka Patrice, Kok, Jake Fernando

Parasitic contamination could bring danger or benefits to the living organisms in the environment. This study identified the parasites which could be found in biosolids or sewage sludge in different flood-prone barangays in Caloocan, and the factors contributing to the contamination of it in sludges. This will help people to be more aware of the risks and diseases brought by the biosolids and to prevent and improve the sanitation of the community. One sewage sludge sample each from four barangays was collected and each sample was divided to make four replicates. Through Formalin-Ether Concentration Technique, the researchers were able to observe the parasites which could be seen in sludges with the help of LCD and compound microscope. The parasites found were the eggs of *Trichuris trichiura*, *Ascaris lumbricoides* (helminths), and *Entamoeba histolytica* (amoeba); other suspected ecological protists and some artifacts were also seen. Human or animal wastes, debris, run-off water, and floods are the possible factors that contributed parasites in the environment.

Keywords: *Sludges, Biosolids, Parasites, Caloocan, Health and wellness*

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Perceptions on abuse of Filipino older persons: their safety status and treatment of their social networks

Constantino, Rose E. , Urgel, Elvira L. , Dela Cruz, Dorothea C. , Barcelo, Teresita I. , Cuevas, Pearl Ed G.

Filipino older persons have four important concerns namely: security in old age, health status, impact of aging, and elder abuse. Elder abuse committed to older persons in their homes or their community is alarming. How their social networks (i.e., their family, friends, relatives, and significant others) treat them plays a crucial role to their well-being. The aim of this study was to explore the perceptions on elder abuse and safety status of Filipino older persons along with the treatment afforded to them by their social networks. The study also determined such perception to be able to devise cost effective, community-based interventions to address elder abuse.

The study used mixed methods design and the Experience of Abuse Suspicion Index (EASI) tool, a questionnaire along with the demographic profile of the participants. The results were tallied and analyzed using descriptive statistics. How social networks treat them, and their safety status was explored using researcher-made open-ended questions analyzed using the qualitative approach.

Findings revealed the perceptions of Filipino older persons on elder abuse, with participants from the 60-69 age group and predominantly female, with no work and have low monthly income. The major themes generated from the qualitative findings were relationship issues with self, environment, coping, abuses, and values. Several sub-themes were also discovered and were related to the findings. An awareness campaign on the issue of elder abuse in Philippine society was recommended. Educating social networks about the perils of abuse is crucial in maintaining the safety of older persons. A monitoring system must be developed at the barangay level and policies must be put in place to address the concerns of elder abuse.

Keywords: *elder abuse, Filipino older persons, safety status, social networks, Health and wellness*

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(Filipiniana Analytics)

Promoting wellness program in the government workplace: the DOST-FNRI experience *Gubat, Maria Julia G.*

Most office employees spend at least a third of their daily time at work with sedentary activities, thus, having a wellness program in the workplace can provide an opportunity to improve employees' health and well-being. To pilot test a workplace wellness program in support to the DOST-wide efforts in promoting healthy and active lifestyle among the DOST employees. The program was dubbed #GoforHealthierDOST to connote a positive and forward approach to healthy living among employees in the DOST. DOST-attached agencies were invited to participate in the program, and coordination meetings were done to facilitate engagement and partnerships. The designated wellness coordinator in each partner agency facilitated the promotion and implementation of the program. The program consisted of wellness education, physical activity sessions, and periodic nutrition assessment and counseling. Wellness education lectures on health and nutrition were conducted by the project team; physical activity sessions consisted of Zumba and yoga classes; and baseline, midline, and endline personal nutrition assessment and counseling were done. A total of 10 DOST-attached agencies participated in the program (Metal Industry Research and Development Center, Philippine Council for Industry, Energy and Emerging Technology Research and Development, National Research Council of the Philippines, Department of Science and Technology-National Capital Region, Department of Science and Technology-4B, Industrial Technology Development Institute, Philippine Science High School System, Philippine Council for Health Research and Development, Technology Application and Promotion Institute, Science and Technology Information Institute). There were 21 health and nutrition lectures conducted and 3 digitized infographics developed and disseminated to promote awareness on health, nutrition and wellness. Overall, a total of 840 employees attended at least one of the 32 Zumba and 17 yoga sessions. Aggregated nutrition assessment results indicated a slight decrease (42.0% to 38.0%), in the prevalence of overweight and obese employees, with a minor increase (55.0% to 58.0%) in the prevalence of normal-BMI among participants who completed baseline, midline and endline assessments. Participants expressed their desire to engage in positive behavioral changes (e.g. increased physical activity and healthy eating), but there is a need to integrate a coordinated and systematic approach for a workplace wellness promotion program to ensure effectiveness and sustainability. The program initiated the means for building a culture of health in the DOST. For workplace program to continually improve and encourage the commitment from the participants, it is recommended to integrate (i) identified organizational health needs, priorities, and resources; (ii) engaged management and key organizational stakeholders; (iii) clearly defined set of goals and action plans, with corresponding interventions; and (iv) suitable monitoring and evaluation mechanism. It is highly recommended that health and wellness program be integrated in the workplace.

Keywords: *wellness, government workplace, health and well-being, DOST-FNRI, DOST, nutrition assessment, BMI, Health and wellness*

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 2020,
 (Filipiniana Analytics)

Spiritual care, aromatherapy and its combination: their effects on fear and physiological status of women during labor *Bingcang, Angel Grace , Cosejo-Durano, Cherianne Love*

This quasi experimental study aimed to find out the effect of spiritual care, aromatherapy, and its combination on the fear level and physiological status of women during labor. Purposive sampling was utilized to select 120 women, ages 19-40 years old, in their 36-40 weeks age of gestation, with intact bag of water, and were in the latent phase of labor as participants of the study. Fear level was measured using fear scale questionnaire. Data on the physiological status such as temperature, respiratory and pulse rate, and blood pressure were measured. Pain intensity was measured using the modified visual analogue scale. The participants were divided into four groups—the spiritual care group, aromatherapy group, combination group, and control group. The result of the study revealed that all the participants, regardless of the group they belong, experienced fear. The group who received spiritual care experienced lower fear level and pain intensity. Aromatherapy group experienced lower pulse rate, systolic blood pressure and fear level. Combination group experienced lower systolic blood pressure, pain

intensity, and fear level. Control group experienced increased pain intensity. No other significant difference was found in fear level and physiological status among the groups when the participants' age, parity, and civil status were considered except for the temperature on the civil status. This study proved that spiritual care, aromatherapy, and its combination can lower fear level, reduce pain intensity, and minimally decrease the heart rate and systolic blood pressure on women in labor.

Keywords: *Standard precautions, Infection control, Student nurses, Hand washing, Health and wellness*

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NP

0380

A systematic review of health information exchange implementations in different practice settings

Sunga, Monica , Amoranto, Abegail Jayne , Ongkeko, Jr., Arturo M. , Sarmiento, Raymond Francis R., Angeles, Kristelle Ann

Health information exchange (HIE) facilitates secure access and electronic transfer of patient data across boundaries of the health system. In this review, we explore the landscape of health information exchange implementation in different practice settings, identifying HIE implementation models, their common features and limitations. A systematic literature search on HIE implementation from 2000 to 2018 was conducted in four databases (COCHRANE, EBSCO, ProQuest and Pubmed) following the PRISMA guidelines. Publications which passed the inclusion/exclusion criteria for selection were abstracted. Thematic analysis was done by identifying commonalities and patterns. A total of 4,748 articles were found on the topic, of which, 267 full-text articles were eligible for final review. Most HIE implementations documented are from developed countries (96%) with the majority executed in the United States (75%). HIEs in developed countries are often scaled to statewide implementation, using hybrid architecture, and practiced in ambulatory and emergency care settings. In contrast, HIE in developing countries are usually in their pilot stage or implemented locally. In both developed and developing countries, HIE is implemented for public health surveillance, clinical decision support and insurance claims reimbursements. Facilitating factors for sustained HIE adoption include government and organization support, cost savings, presence of IT governance structures, and operational efficiencies. Challenges remain in terms of data privacy protection, alignment with complex clinical workflows, use of system architecture and standards as well as technical support services. Evidence from literature suggests that HIE is a strategic opportunity for a more cost-effective, high quality and well-coordinated healthcare system. Developing countries have yet to scale HIE to maximize its purported benefits.

Keywords: *HIE, Health information exchange, Interoperability, Health and wellness*

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0381

TV viewing and healthy eating: moderators of the relationship between television exposure and daily vegetable intake

Bumanglag, Marietta M.

Malnutrition, particularly micronutrient deficiencies affected children aged 0-5 and 5-10 years, adolescents, adults, and pregnant and lactating women as shown in the 2013 FNRI National Nutrition Survey (NNS). The situation worsens when these vulnerable groups, especially the extended ones are affected by disaster, calamity and emergency. Hence, availability of recipes for feeding during natural or man-made disasters can address the need for nutritious and easy-to-prepare meals, in addition to donated commodities. This project aimed to develop

a calendar featuring nutritious recipes that are appropriate for use during extended emergency period of a natural or man-made disaster. The project has two (2) phases. Phase I included a Focus Group Discussion (FGD) among Taguig City Hall officials to gather insights, knowledge and practices on provision of food during disasters or emergencies in evacuation centers. Based on these preliminary data, recipe trial formulations, recipe development and sensory evaluation using the 9-point hedonic rating were done to determine acceptability of the recipes. Energy and nutrient content per serving were estimated using the FCT+ Menu Eval software (2002). Photo documentation of recipes was conducted. Recipes were quantified into 20 servings, with corresponding market order. Twelve monthly-7 day cycle menus were planned. Phase II entailed the preparation of calendar design, layout and printing. The 2015 FNRI MGC with the theme “Nutritious meals during extended emergency feeding” highlighted 15 one-dish meals with a yield of about 20 servings, serving size, estimated energy and nutrient content per serving, and market order. Recipes in the 12-monthly-7 day cycle menus are simple, affordable, easy-to-prepare and make use of locally available ingredients. The recipes can be prepared with the presence of water and fuel, necessities during emergency feeding operations in evacuation centers. In addition, a one-week cycle menu for extended emergency feeding was prepared. The Nutritional Guidelines for Filipinos (NGF) and Pangang Pinoy for adults, simple nutrition tips, and breastfeeding of babies even during emergencies were additional features of the calendar. The MGC highlighted recipes and nutrition guides in times of disasters and emergencies. The calendar may serve as a reference in planning and preparing meals in evacuation centers, and in households. Actual preparation of the recipes in an evacuation center should be done to test the feasibility of use of the recipes. The calendar may be uploaded in social networking sites to increase awareness for these recipes intended for extended emergency period during disasters.

Keywords: menu guide, menu guide calendar, nutritious meals, extended emergency period, malnutrition, micronutrient deficiency, DOST-FNRI, Health and wellness

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2015,
(Filipiniana Analytics)

INDUSTRY

0382

Create more, innovate further: perspectives from the three-year corporate strategy recommendations for DOST-FNRI

Nacis, Jacus S.

For years, the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) has built a momentum of growth. It has continually nurtured its intellectual capital, maintained its partnerships, and customized its research and services with the needs of its stakeholders. However, the Institute’s capacity to sustain its growth is being threatened by the inherently dynamic nature of scientific research and the swift shifts in technology. This capstone project aimed to outline the three-year (2020-2022), cross-functional strategic recommendations for DOST-FNRI using strategic management principles. This strategic management analysis was performed using the Industrial Organization (I/O) Economics for external audit and the Resource-based Theory for internal appraisal of DOST-FNRI. Data were generated by searching and reviewing four-year archival records (2015-2018), including Annual Reports, financial reports, and reviews from various sources. Five strategic management frameworks (Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis; Strategic Position and Action Evaluation (SPACE) Matrix; Boston Consulting Group (BCG) Matrix; Internal-External (IE) Matrix; and Grand Strategy Matrix) were utilized to generate strategic options. All these options were plotted and evaluated using the Quantitative Strategic Planning Matrix (QSPM). QSPM analysis revealed that product development and market penetration should be the focus of the Institute in the next three years, with total accumulated points of 5 and 3 units, respectively. When the QSPM results were merged with the SWOT matrix, the implementation of a new research portfolio emerged as the best alternative strategy (total aggregated score (TAS=3.67), followed by the establishment of an innovation marketplace (TAS=2.83). Strategic management tools reckon that the Institute can sustain its relevance by developing more science-based products (food technologies, nutrition tools, and evidence-based data). It is further suggested that the Institute may conduct large-scale interventional research programs such as longitudinal studies utilizing the technologies and package of

nutrition interventions that it has developed in recent years. This approach is recommended to generate a time-driven evaluation of the relationship between nutritional factors and the development of certain disease conditions, as well as to explore the outcomes of interventions over different lengths of time. When taken together, these approaches will uphold DOST-FNRI's niche in translational food and nutrition research.

Keywords: *corporate strategy, management principle, strategic management analysis, DOST-FNRI, SWOT, QSPM, Industry*

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2020,
(Filipiniana Analytics)

0383

Globalization as a component of the job demands-resources model on employee work-life balance in an American BPO in the Philippines

Arceta, Katherine B.

The sense of control that employees experience when they are able to remain competent and efficient in the workplace while enjoying a healthy personal life with enough time for leisure activities is referred to as work-life balance. In the workplace, while employees must remain focused and efficient amidst numerous tasks, it is imperative that they maintain a degree of satisfaction and contentment with regard to their personal life.

This study aims to examine the effect of globalization on employees' work-life balance in an American BPO situated in the Philippines. This was examined by testing whether the data obtained from Company X followed the Job Demands-Resources Model (J D-R Model).

Data were collected by administering an online survey using convenience sampling. Categorical Principal Component Analysis (CatPCA) was used for easier interpretation of the linear combinations of categorical variables. Cronbach's Alpha tested the reliability of the data. Bivariate relationships were then explored using the bivariate Pearson Correlation. Finally, the Path Analysis was utilized to determine how significant and to what degree are the causal relationships among the variables being investigated.

The study has proven that the J D-R model is a promising framework to establish the relationship between globalization and work-life balance. The data gathered in this study revealed that employees who are provided with increased job resources experience job satisfaction that result to positive work-life balance. Likewise, decrease in burnout is significantly related to work-life balance. Although globalization is not significantly associated with work-life balance, it is significantly correlated with role conflict, a component that is related to exhaustion.

Globalization has no direct effect to the work-life balance of employees working in Company X.

Keywords: *work-life balance, globalization, job demands, job resources, job satisfaction, burnout, Industry*

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(Filipiniana Analytics)

0384

Is PhilHealth reaching more Filipinos in 2015?

Patalen, Chona F., MPH

The Philippine health financing system is complex as it involves different financial sources, regulatory bodies and health service providers, according to the Department of Health (DOH). At the center of this health financing system is the Philippine Health Insurance Corporation (PhilHealth) which was established to provide health insurance coverage and ensure affordable, acceptable, available and accessible health care services for all Filipinos. Universal health coverage means ensuring all people get the quality health services they need, without experiencing financial hardship. But despite the enormous role that PhilHealth plays in the Philippines' health

care system, out-of-pocket expenses still are the main source of financing for medical care. With the establishment of PhilHealth, constant reforms in health care financing are undertaken to increase its membership and utilization. This study was conducted as part of the collaborative project with DOH which aimed to assess awareness, membership and utilization of PhilHealth and to determine barriers to enrolment. A total of 167,673 household members and 99,686 individuals (≥ 15 years old) were included in the cross-sectional analysis of data from the 2015 survey conducted by the Department of Science and Technology-Food and Nutrition Research Institute and were compared to the reports from the 2008 and 2013 National Demographic and Health Surveys and the 2013 National Nutrition Survey. The survey tool used was a pre-tested questionnaires adapted from the 2008 and 2013 NDHS Health Care Utilization questionnaires and 2013 NNS questionnaire. Membership was determined in terms of being enrolled as a principal or dependent member whereas utilization was based on health care fees covered by PhilHealth. Descriptive statistics were generated using Stata version 12.0. Majority (94.0%) of Filipinos were aware of PhilHealth. An increasing trend of membership in PhilHealth (from 37.7% in 2008 to 67.6% in 2015) was also noted. The main reason for not enrolling in PhilHealth was the inability to afford premium contributions (32.5%) Results also showed that 32.9% had no access to any PhilHealth offices. Utilization of PhilHealth for in-patient care decreased from 75.2% in 2013 to 56.8% in 2015, support value or the percentage of total PhilHealth reimbursement by the total value of the claim increased from 46.9% in 2013 to 66.3% in 2015. Study results showed that PhilHealth membership has increased but utilization of its benefits needs improvement. Results revealed the barriers in PhilHealth enrolment which include Filipinos' lack of knowledge of PhilHealth location (offices), application procedures, and services or benefits processes. Easing the requirements for enrolment and application procedures, as well as benefits availment processes will increase coverage and utilization. While the primary goal of improving the performance and service delivery of PhilHealth is to achieve universal health coverage and address existing gaps in the actual implementation, inability to afford the premium contribution is a key deterrent according to survey respondents. Actions must be taken by the government to evaluate the country's financial protection program and expand PhilHealth membership through information campaign, providing affordable premiums, and increasing the number of PhilHealth accredited health providers.

Keywords: *PhilHealth, social contribution, health insurance, Filipino members, premium payments, Industry*

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0385

Product innovation on selected traditional food products

Tobias, Joyce R.

The Department of Trade and Industry (DTI) launched the "One Town, One Product" (OTOP) Program to improve the quality and safety of traditional Philippine food products and to enhance their marketability and global competitiveness. However, there are more traditional food products that should be included in the OTOP program which need innovation to meet world-class standards. The study aimed to innovate traditional food products by improving product appearance, determine their sensory acceptability and providing appropriate packaging materials and label designs. Ten popular pasalubong food products from different regions that need improvement were selected. These included Moron, Binagol, Sagmani, Piñato, Tupig, Molido, Pili Tart, Tambis-tambis, Bukayo and Palagsing. Focus group discussions (FGD) participated in by FNRI employees, market observations, visits to native food delicacy processors and pasalubong centers were conducted. Consultations with a group of food designers to solicit ideas on the latest trend in food packaging were conducted. The concepts and suggestions were consolidated and applied for innovation in the products. Product innovation included reducing the serving size into bite size in different forms and improving appearance through addition of toppings. Packaging in boxes, stand-up pouches, vacuum packing and the original native packaging material like banana leaf were likewise considered. Sensory evaluation was conducted among 20 FNRI pool of sensory panelists to determine the acceptability of the product using the preference test. Results were analyzed using ANOVA and Duncan's New Multiple Range Test (DNMRT) product. The most preferred innovations for Sagmani and Binagol were single serve, individually- wrapped in banana leaf, vacuum-packed and placed in brown paper bag. While single serve packed individually in glassine paper, by tens in clear plastic stand up pouch for Molido, Tupig, Tambis-Tambis, and Bukayo were the most preferred. For Piñato, the most preferred is in ball form in fluted wrapper by the dozen placed inside a brown box. Moron on the stick and Palagsing wrapped individually in banana leaf, packed in stand up clear plastic pouch were the most preferred. Individually-packed pili tops in a box of ten was the most preferred. Each product packaging came with colorful label designs. Ten selected traditional food

products were innovated in terms of appearance, form, packaging materials and label designs. Shelf life of the products and costs of the innovation should be considered for actual product cost. Presentation and technology transfer of the innovated products to concerned food processors should be considered.

Keywords: *traditional food products, innovative food products, OTOP, food packaging, DOST-FNRI, DTI, Industry*

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(Filipiniana Analytics)

INFORMATION AND COMMUNICATIONS TECHNOLOGY

0386

Bringing food and nutrition information to every Juan and Juana in just a click of the finger through iFNRI

Technology is propelling us forward into digital world and Information Communication Technology (ICT) is important to boost virtual access to crucial health and nutrition information in the Philippines. The study aimed to develop, pre-test and implement the Philippine-based online site of cutting-edge nutrition information, database and services called iFNRI. The study involved website development, pre-testing and implementation. The pre-testing utilized online questionnaire accomplished by 87 respondents, soliciting information on visual appeal, content, navigation and overall impression. Descriptive statistics like frequencies and percentages were used to analyze the data. iFNRI website was developed with six components: iAssess, iServe, iPromote, iBusiness, iLearn and iAdmin where each has specific ICT projects. The site can be accessed via i.fnri.dost.gov.ph. For ease in navigation, projects were further grouped under Services, Database and Partnership. Of the 11 ICT projects: four were under Services, five are under Database, 2 were under Partnership. iFNRI offers electronic Food Composition Table, menu evaluation, nutrition counseling services, nutrition surveys results, food consumption database for dietary exposure assessment, service laboratory, and technology transfer activities. The iFNRI is an ICT initiative that boosts virtual access to crucial health and nutrition information in the country. The DOST-FNRI established and implemented this web-based technology that serves as an online tool for food and nutrition information. After 11 months from its launch on February 2016, the site recorded a total of 222,101 hits, with Menu Evaluation Plus and the electronic Food Composition Table (PhilFCT) topping the list of those programs frequently visited by clients. Based on pre-testing, users found the site accessible (87.4%), useful (89.7%) and had an average (71.3%) downloading capability. Users suggested additional information and user-friendly language. Constant exposure to food and nutrition information and data delivered through iFNRI is crucial in bringing “food and nutrition data” to everyone’s fingertips. The website can be further promoted online and offline to increase nutrition knowledge and awareness among users. Further improvement of the website is needed to cater to the needs of the users and keep pace with evolving trends in technology.

Keywords: *Information and Communications Technology*

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2017,
(Filipiniana Analytics)

Design, development and implementation of educational and entertainment mobile robots utilizing arduino microcontroller

Cuasito, Sr., Ruvel J.

This paper provides fundamental insights on academic initiatives undertaken by Mindanao University of Science and Technology (MUST) in Cagayan de Oro City, Philippines in addressing some issues relative to the declining academic interests in science and technology (S&T) among students in the secondary schools in the country. While academic interventions were implemented both public and private efforts, career preference continue to persist in favor of the medical service programs. This notion motivated the pursuance of this study in an effort to entice students toward science and technology. The study features the design and implementation of educational and entertainment mobile robots with variety of control concept applications. The control design implemented follows pre-established parameters set forth by MUST as basis for the students in their respective robotic designs. The basic criteria sets the prototype to be light weight, "Arduino" microcontroller-based, programmable in C-Language, powered by internal battery, and a choice of DC or servo motor prime movers. The control designs are guided by the discrete truth table where input and output devices interact via programming through appropriate electronic interfacing. The outcome of the study is perceived to influence career interest and direction of students towards science and technology through high impact advocacy using the educational and entertainment mobile robots as the primary pedagogic tool and attraction. The survey results yielded positive affirmation on the performance of the educational and entertainment mobile robots as evidenced by the high to very high mean ratings on pre-established evaluation parameters.

Keywords: *Mechatronics, Mobile robotics, Ultrasonic sensor, Embedded system, Servo-motor, Information and Communications Technology*

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2013,
(Filipiniana Analytics)
NP

Development of PhilFCT® mobile application and enhancement of PhilFCT® online database

Nacionales, Kristine B.

Nowadays, smartphone applications are being used to support nutrition strategies. Hence, the Institute developed a mobile version of the Philippine Food Composition Tables Online Database (PhilFCT®). This nutrition tool provides detailed information on the chemical/nutritional composition of foods and can be downloaded and installed in a mobile device rather than being rendered within a desktop or mobile browser. The project aimed to develop the PhilFCT® mobile application version and enhance features of PhilFCT® Online Database. The methodology included the preparation of the PhilFCT® mobile application icon, wireframe, and user interface (UI), and prototype. The PhilFCT® mobile application icon was prepared and submitted for a trademark application. Wireframe and user interface were referred to the mobile application developer for development and enhancement. Modifications were recommended by the mobile application developer to further improve the user experience of the PhilFCT® mobile application. Enhancement of the administrator and users page of PhilFCT® Online database were done by the programmer. The trademark application for the PhilFCT mobile application icon was filed and is expected to be approved by October 2020. The PhilFCT® Mobile Application will be launched by end of November 2020. The mobile application is for Android users only and can be downloaded through Google Play Store. For the PhilFCT® Online database, additional functions, and features such as improved data entry and photo upload were prepared and executed by the developer. The PhilFCT® Online database has a total of 270,138 hits for the year 2019, the second most frequently used among the Institute's available databases. The development, enhancement, and maintenance of the PhilFCT® Mobile App and online database are necessary to meet user's needs. Furthermore, the dissemination of PhilFCT® throughout the country should consider informing other possible users like nutrition educators, students, and international users. Regular updating of PhilFCT® to adapt to the continuous change and innovation on information and communication technology is recommended.

Keywords: *PhilFCT, mobile application, online database, DOST-FNRI, Information and Communications Technology*

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0389

DOST-Food and Nutrition Research Institute's integrated repository systems for translating genomics data to application in nutrigenomics (FIRST-GENE database)

Rodriguez, Marietta P.

Genome databases are organized collection of information from the mapping of genome (sequence) or genome product (transcript, protein). The process of developing a genome database involves taking information that researchers have generated and organized into a database that leads to biological inferences. The value of genome databases is dependent on the integrity of genomic information derived from genetic and experimental studies. Human genomic databases are online repositories of genomic variants described for one or more genes or which may be population or ethnicity specific, to support diagnosis at the DNA level. To design and create a database that is capable of providing the public (or users of the database) with significant information on genetic and environmental risks to nutrition-related non-communicable diseases (NCDs) and micronutrient deficiencies (MNDs). Specifically, determined the risks and protective alleles of SNPs related to NCDs and micronutrient deficiencies. About 1160 DNA samples collected from anonymized respondents from the National Capital Region (NCR) of the 2013 National Nutrition Survey (NNS)) together with the demographic, biochemical, clinical and dietary data constitute the development of the Food and Nutrition Research Institute's Integrated Repository Systems for Translating Genomics Data to Application in Nutrigenomics (FIRST-GENE) database. A Waterfall model was utilized for the development of the FIRST-GENE database. This model is a classic SDLC (Software Development Life Cycle) model also referred to as the heavyweight process. The model consists of five phases namely Requirement Analysis, Software Design, Software Development, Software Testing and Software Maintenance. This study designed and created the Food and Nutrition Research Institute's Integrated Repository Systems for Translating Genomics Data to Application in Nutrigenomics (FIRST-GENE) database which served as the repository of extracted, identified, and sequenced DNA data. FIRST-GENE also provided important information in terms of risks (both genetic and environmental) to nutrition-related NCDs such as diabetes mellitus, hypertension, obesity, osteoporosis and micronutrient deficiencies like vitamin A deficiency and vitamin D as well as the normal genotypes present among Filipinos with normal health conditions. Recognizing the importance of having a basic understanding of the management of large volume of genomic sequences and parallel information, the database is developed with user-friendly mechanism allowing uncomplicated maintenance, query and review by researchers and other administrators. This will harmonize DOST-FNRI's initiative in the economic landscape in terms of advanced nutrigenomics research and development.

Keywords: *DOST-FNRI, repository system, genomics data, nutrigenomics, Waterfall model, genome mapping, genome product, non-communicable disease, micronutrient deficiency, Information and Communications Technology*

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(Filipiniana Analytics)

0390

eFCD-DEA online food consumption data for dietary exposure assessment

Gironella, Glen Melvin P.

Different channels for information dissemination are now being harnessed to fully utilize the data results from the Philippine National Nutrition Surveys. Apart from press conferences, pamphlets, and publication of Philippine Nutrition Facts and Figures - Results of the National Nutrition Survey or Updating of the Nutritional Status of the Filipinos, the individual food consumption component of the 2008 national nutrition survey can now be viewed

at the FNRI website (www.fnri.dost.gov.ph). An additional mode to access data was developed to reach more food and nutrition stakeholders who need food consumption data for exposure assessment or nutrient intake assessment. The eFCD-DEA or online statistical tables of the food consumption data includes different database formats and information requirements as recommended by the World Health Organization Global Environmental Monitoring System (WHO-GEMS) and Association of Southeast Asian Nations (ASEAN). To present the statistical tables of the food consumption data for dietary exposure assessment studies online as additional mode to access the dietary survey results. PHP and MySQL were used as web-programming tool to present the statistical tables online. The eFCD-DEA have different population groups (children <6 years old, women of child-bearing age (15 to 49 years old) and general population), three levels of food categories and food intake statistics (mean, SE, median, maximum consumption, percentiles-P1, P2.5, P5, P10, P90, P95, P97.5 and P99). The statistical tables of a specified food item or food groups analyzed by the statistics and informatics group of FNRI, are now available online at www.fnri.dost.gov.ph. The presentation of online statistical tables provided additional platform wherein the users of national nutrition survey can readily view the specific results based on their interest or need. This additional platform of online statistical tables can also extend to other components of the National Nutrition Survey (NNS) or the Updating of the Nutritional Status Survey. Nutrition indicators from the results of the Anthropometric, Biochemical or Health Component of the NNS can be seen in more detailed statistics like regional or provincial results or by wealth quintile of the households or characteristics of household head.

Keywords: *eFCD-DEA, consumption data, dietary assessment, information dissemination, nutrient intake assessment, DOST-FNRI, Information and Communications Technology*

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2015,
(Filipiniana Analytics)

0391

Enhancement of the healthy eating and lifestyle program (HELP) online

Preventive measures to reduce non-communicable diseases are continuously undertaken. However, this requires improvement in the health deliveries system and health promotion schemes for all age groups. In 2016, the Food and Nutrition Research Institute introduced to the public and information communication technology (ICT) – based umbrella program called iFNRI. Part of this program is the Healthy Eating and Lifestyle Program (HELP) Online, a nutrition website specifically created to provide nutrition counseling services and evidence-based information on non-communicable diseases (NCDs) to Filipinos. This study aimed to develop additional enhancement features on selected modules of the HELP Online website to cater to more age groups. An iterative process was followed in all stages of development of the additional enhancement features on the Fast Assessment and Screening Tools (FAST) and HELP Tracker. Nutrition experts together with the research team developed, reviewed and edited all technical and creative contents for validity and appropriateness in communicating information not only with adult population but also with children, adolescents and pregnant women. All prototypes also underwent multiple testing and revisions. The enhanced FAST, a collection of interactive nutrition calculators, can fast track the assessment of nutritional status and the risk for NCDs of pregnant women, children and adolescents. The enhanced HELP Tracker features an updated Food Tracker capable of evaluating the users' food intake using the Philippine Food Composition Tables database. In addition, it can also combine the outputs of the Food Tracker and the Physical Activity Tracker as well as monitoring of calorie intake and energy expenditure. Other updates in the website also focused on tightening security measures and validity of accounts to further protect the confidentiality of the users' database. Enhancements on the website were developed to address the age-group limitation of the existing website. The HELP website supports modernized delivery of health and nutrition assessment and counseling for Filipinos.

Keywords: *Information and Communications Technology*

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2017,
(Filipiniana Analytics)

Fractionation and quantitative analysis of different lipid components of *Schizochytrium* sp. (POL01 Strain)

Oclarit, Jose M. , Apao, Monabel May N.

The culture of DHA (docosahexaenoic acid)-rich thraustochytrids, a common microheterotroph that is taxonomically aligned with heterokont algae, is seen as one alternative source of polyunsaturated fatty acids (PUFA) since there is a decline of fish stock that cannot sustain conventional PUFA extraction. Fatty acid compositions and lipid components of *Schizochytrium* sp. POL01 were studied. Lipid class composition and distribution of fatty acids of *Schizochytrium* sp. POL01 harvested were studied, with special emphasis on the distribution of docosahexaenoic acid (C22:6 n-3, DHA). The isolate obtained 4.8 g/L of oven-dried cells in 100-mL medium after 72 hours of incubation. Lipid components were collected into several fractions. Fraction two and three were among the highest in percent proportion and content in DHA content according to gas chromatographic analysis. Fraction two, composed of neutral lipids, has the highest in DHA content and accounted for 47.6% of the total fatty acids which is 16.1 mg DHA/g of dried cell. Neutral lipids were the major lipid constituents in which triacylglycerol (TAG) was the predominant component. Fraction three, composed of glycolipids, mono- and diglyceride, also indicate significant value of DHA, 35.4%, 7.5 mg DHA/g dried cell, followed by fraction four of phospholipids and polar lipids, 25.1%, 1.8 mg DHA/g dried cell as DHA yield, respectively. However, the DHA content of fraction one of n-alkanes, nalkenes and free fatty acids had the least amount with a value of 3.3%, 1.1 mg DHA/g dried cell. DHA was found to be distributed in all lipid fractions and to be the major polyunsaturated fatty acid.

Keywords: *Thraustochytrids, PUFA, DHA, Information and Communications Technology*

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2012,
(Filipiniana Analytics)
NP

Integrated management and enhancement of the Philippine food composition tables (PhilFCT®) online database

Biona, Kristine T.

The Philippine Food Composition Tables Online Database, **PhilFCT®**, is the country's webbased nutrition tool containing nutrient data and information of over 1,500 commonly consumed food items in the Philippines. It was officially launched together with other **iFNRI** modules on February 2016. It is also an important nutrition tool used for most of quantitative human nutrition researches. Thus, enhancement of the **PhilFCT®** database is necessary and it needs to be constantly checked, updated, and expanded with inclusion of new data. This project aimed to enhance the developed **PhilFCT®** Online Database and prepare the integrated management system for the **PhilFCT®**. Specifically, to add food images/photo documentations and newly evaluated food data; conduct Focus Group Discussion (FGD) of the enhanced database; and identify, assess and add components needed for the preparation of the integrated management system. Food samples were collected in Metro Manila markets and nearby provinces. The samples were described, prepared and photo documented. New nutrient data were obtained from the generated and compiled food composition data of the Food Quality Unit. The photo documents as well as the new food data were thoroughly verified and checked prior to uploading to the database. FGDs were conducted to gather feedbacks from in-house and outside panelists to determine the improvements needed for the database and prepare the integrated management system protocol. Upgrades in the features of the database and corrections of programming errors in the database were done by the developer. Additional 494 food samples were collected and photo documented. The photo documents as well as the new 6199 food data for Total Dietary Fiber, Total Sugars, Sodium, Available Carbohydrate and Energy were checked and uploaded to the database. Series of FGDs with invited in-house and outside panelists were also conducted to further determine the improvements needed for the database. An enhanced database was developed based on comments obtained. A draft protocol of the integrated management system of **PhilFCT®** was also prepared including the documentation of the proposed additional features and the encountered technical glitches in the web design program. The copyright of **PhilFCT®** of web-based database was granted to FNRI on September 2016 and the official logo of

the database was examined and approved for trademark registration by Intellectual Property Office Philippines (IPOP HL) on November 2016. As of May 2017, hits for the enhanced **PhilFCT®** was over 115,901 with 1836 registered users. The enhanced database was also included in various events during the 42nd FNRI Seminar Series and 2016 National Science and Technology Week. Continuous enhancement and upgrading of the **PhilFCT®** is needed to fulfill the demands and challenges involved in the dissemination of food composition data in the Philippines. Furthermore, awareness and training programs about the **PhilFCT®** applications and uses among professionals and nutrition allied sector practitioners are also suggested to optimize the use of the food data as basis for food development, selection of cultivars, food supplementation and fortification, nutrition intervention, decision-making and policy formulation.

Keywords: *Philippine Food Composition Table, online database, nutrition tool, nutrient data, iFNRI, management system, DOST-FNRI, Information and Communications Technology*

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0394

A program visualization approach in developing an interactive simulation of java programs for novice programmers

Rojo, Jay Noel N. , Agno-Balatbat, Aurora Cindy G.

It is widely agreed that learning to program is extremely difficult. Beginning programmers tend to have serious difficulties in grasping the abstract concepts and notations that programming involves. To become an expert in programming, it requires a deliberate practice and the ability to comprehend a computer program, so to establish a valid mental presentation of the problem solved by the program. Because of the lack of knowledge and experience, novice programmers have problems with constructing the viable models of problems.

In this study, program visualization was designed meant especially to aid novice programmers in Java language. It visualizes the data and control flow of the program. The program visualization design used a modular approach that permits both internal and external extensibility, which consist of two systems, a visualization engine and a Java source interpreter.

Keywords: *Interactive simulation, Program visualization, Java programming, Information and Communications Technology*

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2012,
(Filipiniana Analytics)
NP

0395

Software framework for secure online transactions in academic institutions

Eder, Marylene S., Doroja, Gerardo S.

The rapidly growing interconnectivity of information system and the convergence of information technology that makes more pertinent data of the educational institutions generated and transmitted in the internet, allows wide distribution of digital data. It becomes much easier to edit, modify and duplicate digital information, therefore facing many threats. As a big security and privacy issue, it becomes necessary to find appropriate protection.

Universities and academic institutions in the Philippines encountered concerns about the security of its computing infrastructure and information resources; however, traditional security architectures are not effective for academic and research environments. This research aims to use a software development framework for integrating digital security requirements that is - practical and at the same time cost effective in the context of Philippine educational institutions.

In this study, software gateway was developed to address the four security issues namely confidentiality, authorization, non – repudiation and integrity. Results of the study show that adopting the software gateway enables colleges, universities, and other higher educational institutions in the Philippines to provide their clients with easy access to remote-transmitted, confidential documents through internet, ensures confidentiality and integrity of the transmitted data, ensures that only authorized persons or registered users can access the data, and that non-repudiation happens during transmission.

Keywords: *Software framework, Confidentiality, Authorization, Non-repudiation, Information and Communications Technology*

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2013,
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0396

Testing and maintenance of the menu eval plus

Menu Eval Plus is a web-based software developed to speed-up calculation of estimated energy and nutrient content and percentage contribution of recipes and menus or meals. Following the development process is the beta-site testing and maintenance of the software which is made available to users for testing in their work stations or at home. The study aimed to test and maintain the functionality of the Menu Eval Plus and gather feedback from users for further enhancements. Functionality was monitored based on the data entry (input) and nutrient evaluation (output) of the software. Communication system was created to facilitate feedback between users and software developers. It was managed by the project team through the use of an administrator account. Comments and inquiries were immediately addressed. A module was prepared for the training workshop on nutrient evaluation of meals using this software for use of nutritionist-dietitians, food service operators, students and individuals to evaluate their own recipes and menus. Menu Eval Plus was tested and maintained during its first year of implementation. The software registered 100,743 hits since the time it was launched in February 2016. Module for the conduct of training using the software was tested among the nutritionist-dietitians and food service workers of the Department of Social Welfare and Development-IVA (DSWD) feeding centers. The training received an adjectival rating of very satisfactory (4.82). Among the participants' positive feedback on the software were its user-friendly features and fast result of nutrient evaluation. The functionality of the Menu Eval Plus was tested and maintained. Feedback scheme served as communication system between administrator and users. Training module developed was made for easy understanding of the software's extensive use. It is recommended that continuous testing and maintenance be done to ensure its functionality. Administrators are recommended to provide timely response to users' inquiries.

Keywords: *Information and Communications Technology*

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0397

Upgrading of the analysis module of FNRI service laboratory integrated online system (FNRI-SL IOS)

Dumag, Rosemarie J.

The Food and Nutrition Research Institute - Service Laboratory (FNRI-SL) caters to the analyses needs of research institutions, academe, food industries and private individuals. The continuous expansion of the laboratory services is coupled with the need for management of information and data that leads to the development of the FNRI-SL Integrated Online System (IOS). The developed FNRI-SL IOS automated the laboratory process in which all transactions are linked and traceable which provides a faster monitoring of each process and better data management. The system replaced the existing paper-based transaction from receipt of sample, payment of fees up to release of test report. However, results of analysis are manually encoded to the system to generate report of

analysis. The study aimed to upgrade the Analysis Module of the FNRI-SL IOS, specifically to develop electronic worksheet with printable laboratory reports. The FNRI SL-IOS is a computerized system that centralizes the data related analysis requested by customers. The transition from paper-based laboratory process to the on-line system of laboratory services included test and refinements of the system to ensure the accuracy of data from sample receiving to encoding of results. The Analysis Module was upgraded by developing an electronic worksheet incorporating computation of results from encoded data. The system allows the analyst to: (1) input raw data to the system using the electronic worksheet, (2) project the result based on the inputs, and (3) raise the awareness of the analyst for the required tasks. All data related to the request are saved in a centralized data storage which can be accessed through the website i.fnri.dost.gov.ph/sl-ios by the analyst, checker, and laboratory manager. This lowers data redundancy, possible loss of data due to computer failure and increases security of the results, and increases the output. The electronic worksheets are undergoing the testing phase to assess the accuracy of the generated results. The developed FNRI SL-IOS increases the response time and output through the use of electronic worksheets for the computation of test results and generation of printable laboratory reports which is accessible to the customers. The analysis module is recommended to include the other component of the laboratory process such as inventories of laboratory supplies together with waste materials.

Keywords: *analysis module, FNRI-SL IOS, laboratory services, data management, automation, electronic worksheet, online process, DOST-FNRI, Information and Communications Technology*

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MARINE SCIENCE

0398

Physico-chemical analysis and morphometric variability within and between populations of *Pitar frizzelli* in Panguil Bay, Philippines

Demayo, Cesar G. , Hata-as, Liza T.

The study was conducted to determine variation within and between populations of a marine bivalve, *Pitar frizzelli*, based on fourteen significant biological characters of the shell by descriptive statistics, analysis of variance (ANOVA) and Tukey's post hoc test. The results revealed that there is significant difference within and between populations which may be phenotypical plasticity in response to different environmental and/or ecological conditions existing in the three areas. The physico-chemical parameters which included sediment salinity, pH, temperature and type of substrate, showed significant relationship with the morphological characters.

Keywords: *Physical parameters, Chemical parameters, Mollusk, Marine science*

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2011,
(Filipiniana Analytics)
NP

Comparison of two nature-inspired algorithms for parameter estimation of s-system models

Mendoza, Eduardo R. , Lucilo, Jayson A. , Pilar-Arceo, Carlene PC. , Cajayon, Raquel C.

Parameter estimation for models of biochemical systems is computationally expensive due to the nonlinearity and high dimensionality of the coupled systems of ordinary differential equations underlying the models. Hence, it is important to apply novel methods to the problem and evaluate their performance. We consider the Bat algorithm (BA) and the Firefly algorithm (FA) with respect to parameter estimation of S-system models. Using three S-systems of increasing complexity from the MADMan benchmarking framework, we assess and compare the relative performance of the two algorithms relative to various data sets, initial conditions, and noise levels. Simulation results show that both algorithms can be effectively used in estimating parameters of the S-system models. In particular, in all three S-systems used, the FA performed better than the BA based on the final cost function values and relative estimate errors. The introduction of noise to data significantly affected the convergence of both algorithms.

Keywords: *Bat algorithm, Biochemical systems, Firefly algorithm, Nature-inspired algorithm, Parameter estimation, S-system model, Mathematics*

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NP

0400

The Jordan canonical form of a product of elementary s-unitary matrices

Paras, Agnes T. , Gonda, Erwin J.

Let S be an n -by- n , nonsingular, and Hermitian matrix. A square complex matrix Q is said to be S -unitary if $Q^*SQ = S$. An S -unitary matrix Q is said to be elementary if $\text{rank}(Q - I) = 1$. It is known what form every elementary S -unitary can take, and that every S -unitary can be written as a product of elementary S -unitaries. In this paper, we determine the Jordan canonical form of a product of two elementary S -unitaries.

Keywords: *Elementary S-unitary matrix, Hermitian matrix, Jordan canonical form, Mathematics*

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2020,
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0401

The point biserial coefficient

Flores, Q.G.

For the selection of items in the construction of a test, a common method is to find the correlation between the scores and the scores on an item. The scores constitute the continuous variable. The scores on the item make up the dichotomous variable and may be passed or failed, or right or wrong. The point biserial coefficient is designed to measure the correlation between a continuous variable (scores) and a two-categorized or dichotomous variable (passed or failed) on the test item. Besides being commonly used to test for the correlation between a test item and the scores, the point biserial coefficient may be used in other situations. For example, the continuous variable

may be the scores and the dichotomous variable may be the scores of two groups (agriculture-education graduate; with seminar-no seminar; or mathematics major-English major).

Keywords: *Point biserial coefficient , Continuous variable, Dichotomous variable, Score, Test, Mathematics*

CMU Journal of Science, Volume No. 2 Issue No. 1, 76-81
1989 Jan.-June,
(Filipiniana Analytics)
Fil. Q1 C331

0402

Regular polyhedra associated with non-crystallographic coxeter groups

Aranas, Jonn Angel L., Loyola, Mark L.

A *polyhedron* \mathcal{P} is said to be regular if its automorphism group acts transitively on the set of flags (vertex-edge-face incidence structures). Consequently, it has a single type of regular polygons as boundaries arranged in a highly-symmetric manner (see figure to the right). The objective of this research is to enumerate all regular polyhedra whose automorphism group is abstractly isomorphic to $H_3=[3,5]$. These objects have the intrinsic property that they contain 5-fold rotational symmetries and, hence, are intimately related to aperiodic materials and models. The computational software GAP is used to handle group-theoretic computations and the computer algebra system Mathematica is employed to render 3D graphical illustration of these polyhedra. Physical skeletal models of these objects are also constructed using Zometool. The study reveals a list of 12 regular polyhedra associated with H_3 . This includes 2 convex types, 4 star types, and 6 skew types. Among these are those polyhedra that can geometrically represent real symmetric structures such as viruses, quasicrystals, and even nanomaterials.

Keywords: *Regular polytope, Geometric realization, Non-crystallographic Coxeter groups, String C-groups, Mathematics*

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(Filipiniana Analytics)
NP

0403

Small polyhedra of order 2^m with applications to geometric crystal modeling

Araune, Paolo B., Loyola, Mark L.

A *regular polyhedron* \mathcal{P} is a geometric object in 3-dimensional space that is bounded by regular polygons arranged in a highly-ordered manner. Its symmetry group is a *string C-group*, a special geometric group generated by reflections about mirror planes. A theorem in geometry establishes a correspondence between regular polyhedra and rank 3 string C-groups. The objective of this research is to enumerate all regular polyhedra whose symmetry group is of order 2^m , where m is a positive integer. The enumeration relies on an inductive algorithm that builds a bigger polyhedron from a smaller already existing one. The algorithm is implemented in the software GAP, which is capable of handling sophisticated group-theoretic computations. Polyhedra that are realizable as convex solids are graphically illustrated using Mathematica. The algorithm generated all polyhedra corresponding to $1 \leq m \leq 11$. Among the generated ones are those that can be used to model crystalline structures including toroidal materials such as nanocoils and nanotori.

Keywords: *Polyhedra, String C-groups, Order 2^m , Crystal, Nanotorus, Mathematics*

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Solid waste generation in National Capital Region: a spatio-temporal approach

Bautista, Lincoln A. , Urrutia, Jackie D.

Solid waste is one of the major problems in the Philippines especially in the National Capital Region (NCR) and population is one major factor. In this paper, the researchers aimed to predict and forecast the amount of solid waste in the next five years in the NCR by using spatio-temporal modeling. The researchers obtained the data from the Department of Environment and Natural Resources (DENR) spanning from the year 1965-2017. The researchers also wanted to determine if there is a significant difference between the actual and the predicted values of solid waste generated. For the spatial part of this study, the researchers used GeoDa for the map modeling and for the descriptive interpretation of data of the solid waste generation in relation to the counted population in the NCR. For the temporal modeling, the researchers used the ARIMA modelling to predict the values of the solid waste generation. The cities of Mandaluyong, Paranaque, and Pasig have the same ARIMA model that is ARIMA (1,1,6) while Marikina and Manila having ARIMA (1,1,0), also Caloocan and Malabon have ARIMA (2,2,3), Muntinlupa has ARIMA (1,0,9), Pateros has ARIMA (1,1,10), Pasay having ARIMA (1,1,11), Navotas has ARIMA (1,1,12). Furthermore, Taguig has an ARIMA (1,2,1), Quezon City has ARIMA (1,2,9), Valenzuela has ARIMA (1,2,10), San Juan has ARIMA (1,2,11), Makati City having ARIMA (1,3,3), and lastly the city of Las Piñas having ARIMA (1,3,5). These models were concluded based on the lowest Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) including the respective errors like RMSE, MAPE, MAE, MSE, NMSE was also computed. It was also concluded that Quezon City will produce the most amount of solid waste in the next five years.

Keywords: *Solid waste, Spatio-temporal modelling, NCR, Arima, Geoda, Mathematics*

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MEDICINE

Advanced prostate cancer management: proceedings of a scientific session, 20-21 July 2018, Manila, Philippines

Benedicto, Erwin G. , Torres, Aneliese H. , Torres, Chelseah Denise H. , Antonio, Carl Abelardo T.

Prostate cancer, the second most common cancer worldwide in 2012, poses a high public burden prompting the need to develop effective treatment strategies. To determine the progress made through the years, this paper documented the timeline of treatment strategies for advanced prostate cancer as presented in a scientific session held in July 2018. Two treatment strategies for metastatic prostate cancer were emphasized: the addition of docetaxel (chemotherapy) and abiraterone acetate plus prednisone to androgen-deprivation therapy (i.e. standard of care). Related clinical trials including but not limited to the CHAARTED trial, STAMPEDE trial, and LATITUDE trial showed that addition of either DOC or ABI led to a general increase in the overall survival of the patient. Furthermore, treatment strategies for non-metastatic castration resistant prostate cancer were also discussed. Evidence from clinical trials showed that addition of enzalutamide or apalutamide to ADT yielded better outcomes than ADT-placebo. These recent advancements have broadened the physician's options for treatment.

Keywords: *proceedings, prostate cancer, treatment, prostate cancer management, chemotherapy, abiraterone acetate, prednisone, Medicine*

Alpha-amylase inhibitory and *in-vitro* glucose-lowering property of *Clausena anisum-olens* (Rutaceae)

Lavarias, Ma. Katrina C. , Guiao, Carl Vincent R. , Cerdeña, Ria Lyka D. , Bautista, Anbel M. , Abaja, Patrick Jayson B., Reyes, Jowela O.

Diabetes mellitus is considered as one of the leading causes of morbidity and mortality worldwide. Several commercially available drugs are currently used to regulate blood glucose level. However, there are various undesirable effects associated with the use of these drugs. Among the endemic plants in the Philippines with possible medicinal properties is *Clausena anisum-olens*, more commonly known as Kayumanis of the family Rutaceae. This study will serve as a preliminary work in determining the possible role of the plant in the management of diabetes by inhibiting glucose absorption and lowering glucose levels. Phytochemical screening was performed using thin layer chromatography (TLC) followed by determination of total flavonoid content. The glucose uptake by yeast cell method was performed to determine the effect of *Clausena anisum-olens* on glucose level. Moreover, the alpha-amylase inhibition assay was done using commercially available kits. phytochemical screening revealed the presence of flavonoids. The quercetin equivalence (QE) per gram of sample was found to be 18.3 mg. The results showed that the crude ethanolic extract of *Clausena anisum-olens* in different concentrations (100 mg, 300 mg and 500 mg) promoted glucose uptake superior than the control, metronidazole. The crude ethanolic extract also exhibited an alpha-amylase inhibiting activity. The 75-mg concentration of the extract produced a 54.10% inhibition comparable to the standard drug Acarbose. The results strongly suggest that *Clausena anisum-olens* is a potential glucose-lowering agent due its ability to increase the velocity of glucose uptake in the cell as well as inhibiting the enzyme alpha-amylase. This is the first study that determined the effects of the endemic plant *Clausena anisum-olens* on glucose uptake and its inhibitory effect on alpha-amylase.

Keywords: *Clausena anisum-olens*, Hypoglycemic, Diabetes mellitus, Glucose uptake, Alpha-amylase inhibition, Medicine

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NP

Analysis of the medication turnaround time in a tertiary government hospital

Segaya, Kenaz Duane Peter A. , Lim, Antonie Kyna S. , Garcia, Kristine Eves S. , Loquias, Monet M. , Salazar, Lucina Concepcion E.

Medication turnaround time (MTAT) is the time interval from the time a medication order is written to the time the medication was administered. Literature showed that delays in MTAT were found to cause medication errors which can result in patient harm. At present, there are limited studies conducted about MTAT in the Philippines. This study aimed to evaluate the MTAT of Medicine and Surgery Departments and dispensary turnover time of new and stat medication orders of the Central Block (CB) and Payward Pharmacies and identify the common factors associated with delays in MTAT and dispensary over time of the hospital. MTAT was collected using MTAT forms distributed to the Medicine and Surgery Departments while time and motion logs were used for the dispensary turnover time of CB and Payward Pharmacies. Interviews with pharmacists and watchers were conducted to gain their insights on the factors and effects of MTAT delays. The MTAT in the Medicine and Surgery Departments were 303.53 and 114.35 minutes, respectively. Administrative, protocol-based and personal factors that led to delays were identified. The average dispensary turnover time of the CB pharmacy was 35.37 minutes while the dispensary turnover time for non-stat and stat medication orders of the Payward Pharmacy were 31.78 and 10.93 minutes, respectively. Dispensary turnover time of both pharmacies were significantly different from the protocol times. The short range and low variability of the dispensary turnover time observed suggest that

protocols can effectively reduce MTAT. Administrative, protocol-based and personal factors that led to delays were identified which could serve as possible targets for process improvement.

Keywords: medication turnaround, MTAT, dispensary turnover, pharmacy, Medicine

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2017/12,
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0408

Antimutagenic effects of L-ascorbic acid

Lim-Sylianco, Clara Y., Brion, Lourdes C.

L-ascorbic acid (vitamin C) exhibited antimutagenic effects on alkylating agents (ethylmethane sulfonate and dimethylnitrosamine), on intercalating agents (acridine and quinacrine), on amine derivatives (hydrazine and hydroxylamine and dipyrone), and on sodium nitrite. With ethylmethane sulfonate and dimethylnitrosamine, it was most effective when orally administered an hour before the mutagen. This was also observed with sodium nitrite, and also with intercalating agents, acridine and quinacrine. With amine derivatives, it was most effective when administered at the same time as the mutagen. For dilyrone, the effectivity was maximal when administered either an hour before or the same time as the mutagen. For all mutagens tested, ascorbic acid reduced the excretion of mutagenic urine metabolites. Except for sodium nitrite, the antimutagenic effect could not be attributed to direct binding of the vitamin with the mutagen. Also, its antimutagenic effect could not be attributed to increased activity of liver microsomal enzymes.

Keywords: Antimutagenic , Ascorbic Acid , Mutagen, Vitamin C, Medicine

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0409

Antioxidant capacity of soluble proteins and their peptic hydrolysates extracted from raw and cooked commercially available oatmeal

Tuaño, Arvin Paul P. , Lu, Ramon Jr. E. , Hernandez, Mia Bianca S. , Tan, Lance Aaron G.

Functional foods have become increasingly popular in recent dietary trends as they serve as an alternative to modern medicine such as their capability to serve as antioxidants. Proteins and their hydrolysates have potentials as antioxidants. Soluble proteins were extracted using saline extractant from raw and cooked commercially available oatmeal and hydrolyzed using pepsin for 4 hours in partially simulated gastric environment (Acidic condition). Cooked oatmeal yielded higher protein content (0.7 mg/mL) in the crude extracts than raw oatmeal (0.5 mg/mL) but had comparable protein contents in the crude protein (0.1 mg/mL for cooked vs 0.2 mg/mL for raw) using the Bradford assay. SDS-PAGE profile of the extracted proteins showed faint bands at 22-24 KDa and darker bands at 54-56 KDa indicating that there were two major proteins extracted. The proteins and corresponding hydrolysates were tested for their antioxidant capacity by 2,2-diphenyl-1-picrylhydrazyl (DPPH) and potassium ferricyanide reducing ability of plasma (PFRAP) assays. Antioxidant capacities were expressed as radical scavenging activity (RSA) and ferric reducing ability (FRA). The hydrolysates showed higher RSA (64.6% to 89.5%) than unhydrolyzed proteins (3.4% to 3.6%). A different trend was observed for FRA which yielded 31.8-48.2% FRA for unhydrolyzed proteins, significantly higher than their corresponding hydrolysates (5.3-9.3%). In summary, intact proteins may exhibit greater FRA while their hydrolysates exhibit greater RSA.

Keywords: Antioxidant capacity, Oatmeal, Peptic hydrolysates, Protein SDS-PAGE profile, Soluble proteins, Medicine

Application of electropolymerized conducting polymer as sensor of dengue biomarker

Nuesca, Gerry M. , Sabido, Portia Mahal , Zulueta, Marjorie , Lorenzo, Lizette , Ysulat, Catheleen Anne, del Mundo, Florian R.

Dengue fever and dengue hemorrhagic fever are leading causes of child mortality in the Philippines. The lack of early diagnosis has led some people to mistaken the symptoms of dengue fever to common colds. In this study, the potential of a molecularly imprinted electropolymerized polymer (MIP) as an early detection tool has been explored. It took advantage of the fact that at the onset of fever, the concentration of the dengue biomarker, nonstructural protein 1 (NS1), is at its highest; making it an ideal template for biosensors. We utilized the epitope-imprinting strategy which made use of a small and exposed section of the protein instead of whole protein as templates. Using synthesized epitope of NS1, we fabricated electropolymerized molecularly imprinted polyethylenedioxythiophene/polystyrene sulfonate polymers. Surface characterization techniques were done by atomic force microscopy (AFM) and Raman spectroscopy. Calibration and detection of DENV NS1 was done by electrochemical means. A linear relationship between the DENV2 NS1 concentration in buffer and the electrochemical signals was obtained, which ranges from 1 µg/mL to 20 µg/mL. The fabricated dengue MIP sensor was also found to be selective towards DENV2 NS1 protein compared to the non-imprinted polymer with an imprinting factor of 3, making the system a potential biosensor for dengue infections.

Keywords: *Dengue, Molecularly imprinted polymer, Sensor, Medicine*

Association of sleep duration with high fasting blood glucose in Filipino adults

Patalen, Chona F., MPH

The prevalence of high fasting blood glucose among adults continues to rise in the Philippines. Ageing, obesity and unhealthy lifestyle are generally considered to be risk factors for diabetes. However, an increasing number of studies also confirmed the association of sleep deprivation and the occurrence of diabetes. The study aimed to determine the association between self-reported sleep duration and the prevalence of high fasting blood glucose among Filipino adults, 20 years old and above. This cross-sectional study utilized data from the 2013 National Nutrition Survey (NNS). Filipinos, 20 years old and above, with data on fasting blood glucose and other non-communicable disease (NCD) risk factors were included in the analysis. Sleep duration was obtained through face-to-face interview and measured by average hours of sleep with categories of ≤6 hours (h), >6 to <9h and ≥9h. Prevalence of high fasting blood glucose was assessed using the World Health Organization (WHO) cut-off (≥126mg/dL). Descriptive statistics of the study population were determined using descriptive and bivariate analyses while association of sleep duration and high fasting blood glucose was tested using logistic regression analyses. Prevalence of high fasting blood glucose among Filipino adults increased from 3.4% in 2003 to 5.6% in 2013. It was higher among males (5.8% vs 5.4%), among urban dwellers (6.4%) and noted to increase with socio-economic status. The average sleep duration for study participants was 7.56 ± 1.58 hours, with 54.8% of the participants having a sleep duration of >6 to <9h. Prevalence of high fasting blood glucose was 4.6%, 3.9% and 2.9% in adults who slept for ≤6h, >6 to <9h and ≥9h, respectively. Adults with sleep duration of ≤6h (OR 1.2, 95% CI 1.0 to 1.4) were significantly more likely to have high fasting blood glucose, but it was less likely for long sleep duration of ≥9h (OR 0.8, 95% CI 0.6 to 0.9). The study provided evidence that short sleep duration was associated with high fasting blood glucose in Filipino adults. Future studies should include assessment of sleep quality and sleep patterns.

Keywords: *sleep duration, high fasting blood glucose, Filipino adults, unhealthy lifestyle, obesity, ageing, DOST-FNRI, Medicine*

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0412

ATR-FTIR spectral discrimination between malignant and non-malignant thyroid tissues

Ramos, Maria Cristina , Fellizar, Allan , Gomez, Maria Honolina , Bangaoil, Ruth , Lopez, Rolando , Santillan, Abegail, Guevara, Jr., Leonardo , Albano, Pia Marie

The gold standard for diagnosing thyroid cancer, which is the histopathologic microscopic examination of hematoxylin and eosin (H&E)-stained tissue, is prone to intra- and inter-observer biases. Hence, this study aimed to evaluate the potential of ATR-FTIR as a more objective and highly efficient method in discriminating malignant from non-malignant thyroid tissues. Three (3) 5µm-thick sections of each histologically-confirmed malignant (n=50) and non-malignant (n=50) thyroid tissues were prepared – the outer sections were stained with H&E and evaluated by a pathologist to locate the tumor, and the inner section was deparaffinized and then subjected to ATR-FTIR analysis. Spectral profiling of the FFPE tissue sections was carried out and multivariate analyses such as principal component analysis (PCA) and hierarchical cluster analysis (HCA) were performed. The fingerprint IR region showed distinct variations in several peak patterns, particularly at bands 1634cm⁻¹, 1533cm⁻¹, 1452cm⁻¹, 1395cm⁻¹, 1236cm⁻¹, 1032cm⁻¹ and 882cm⁻¹, representing the nucleic acids and carbohydrates. The increased peak intensity in cases reflects the enhanced replication of nucleic acids and uncontrolled cell growth due to malignant transformation by sugar chains. PCA evidently separated the malignant cases from non-malignant controls. HCA resulted into two (2) clusters of malignant and non-malignant tissues, and a third cluster which showed a degree of heterogeneity between the two groups. Results of the present study indicate that ATR-FTIR fingerprint analysis, in conjunction with chemometric data, is potentially a more objective and specific new method for diagnosing malignant thyroid tissues, prompting more timely onward referral of patients for further testing.

Keywords: *Thyroid cancer, ATR-FTIR, PCA, HCA, Cancer diagnosis, Medicine*

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NP

0413

BAG6 Variant rs805303 is nominally associated with ACEi-induced cough among Filipinos

Bejarin, Adrian John P. , Agustin, Charlene F. , Abrahan, IV, Lauro L. , Aherrera, Jaime M. , Tiongco, II Richard Henry P. , Santos, Lourdes Ella G. , Punzalan, Felix Eduardo R. , Ona, Deborah Ignacia D. , Magno, Jose Donato A. , Llanes, Elmer Jasper B. , Taquiso, Jezreel L. , Aman, Aimee Yvonne Criselle L. , Cutiongco – de la Paz, Eva Maria C. , Nevado, Jr., Jose B. , Reganit, Paul Ferdinand M., Sy, Rody G.

Cough is a common side effect of angiotensin converting enzyme inhibitor (ACEi) therapy. The incidence of ACEi-induced cough has been shown to correlate with genetic variation among different populations. This study aimed to determine the association of candidate genetic polymorphisms with ACEi-induced cough among Filipinos. Two hundred twenty (220) participants on ACEi therapy pressure-lowering in an unmatched case-control study (82 cases with ACEi-induced cough and 138 controls). Genomic DNA samples were extracted and genotyped for selected genetic variants. The association of genetic variants and clinical factors with ACEi-induced cough was determined using regression analyses. Univariate logistic regression showed that the *BAG6* variant rs805303 is nominally associated with ACEi-induced cough among Filipinos, at a per-comparison error rate (PCER) of 0.05 (OR 2.10, $p = 0.016$). The association of the variant with ACEi cough was statistically significant

after multiple regression analysis (adjusted OR 2.09, $p = 0.022$) while adjusting for confounding clinical factors (sex, alcohol intake, and diastolic blood pressure). Further studies are needed to validate these findings.

Keywords: Chitosan, Curcumin, Fluoride, Immobilization, o-nitrophenol, Sensor, Medicine

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NP

0414

Bioactive components, cytotoxicity studies and pharmacognostic evaluation of the crude drug from *Broussonetia luzonica* (Moraceae) Blanco leaves
Castillo, Agnes L. , Casuga, Franelyne P., Corpuz, Mary Jho-Anne T.

For standardization, plants undergo pharmacognostic evaluation, phytochemical analysis and toxicity studies before they are developed into drugs. This is the first report on the pharmacognostic evaluation of *B. luzonica* leaves, their anatomical sections, determining their macro- and microscopic features as well as quantitative analysis of the crude drug for their chemical characteristics. Three different extracts of *B. luzonica* were obtained by sequential extraction using solvents of increasing polarity namely n-hexane, ethyl acetate and methanol. The extracts were subjected to gas chromatography-mass spectroscopy (GC-MS) analysis to determine the possible bioactive compounds. Cytotoxicity against normal fibroblasts compared to a standard chemotherapeutic agent using MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium bromide) assay was determined. Microscopy of the cross section of lamina revealed presence of rosette, prismatic and cystolith crystals. Analysis of the powder revealed 15.55% total ash, 1.9% acid insoluble ash, 2.5% alcohol soluble extractive and 5% water soluble extractive. GC-MS confirmed the presence of lupeol, squalene, γ sitosterol, tetracosane, tricontane, phytol, and propanetriol-monoacetate. MTT assay revealed that the three extracts did not exhibit cytotoxicity against normal cell lines compared to Doxorubicin. The study established the pharmacognostic profile of the leaves of the plant and revealed no cytotoxic effects of the *B. luzonica* leaf extracts on normal cell lines.

Keywords: *Broussonetia luzonica* Blanco (Moraceae), Cytotoxicity, Pharmacognostic evaluation, Gas chromatography-Mass Spectroscopy, Medicine

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0415

Blood transfusion practice in the management of dengue hemorrhagic fever in 0 to 19 years old at a private tertiary medical center
Ty, Florentina U. , Madatu, Sitti Nur-en R.

Dengue virus and virulent Dengue Hemorrhagic Fever (DHF) represent an international health issue that remains untreatable with traditional antiviral and vaccine therapy. A Cross Sectional Descriptive study was conducted to review blood transfusion (BT) practice in the management of Dengue Hemorrhagic Fever in MCU-FDTMF Hospital from year 2006-2008 to assess the outcome of patients with or without transfusion. There were a total of 80 patients from 0-19 years old admitted due to DHF. Diagnosis was confirmed according to WHO criteria for DHF. From a total of 80 patients, 11 were given BT comprising 14% of total population; 43 patients presented as grade 1 (54%), 28 grade 2 (35%), 4 as grade 3 (5%) and 5 patients presented as grade 4 (6%). Most common indication for blood transfusion is bleeding followed by decreased platelet count. It was shown that there were a significant number of cases who developed bleeding such as melena, hematemesis and pulmonary hemorrhage given blood transfusion compared to patients who were not given blood transfusion. The length of hospital stay is longer in the patients with blood transfusion compared to those without blood transfusion. Complications of DHF were mostly observed in patients given blood transfusion compared to those not transfused. All of the

mortalities belong to the group who underwent blood transfusion. Urticarial rash and intravascular volume load are the adverse effects that were observed after blood transfusion.

Keywords: *Dengue Hemorrhagic Fever (DHF), Dengue shock syndrome (DSS), Disseminated Intravascular Coagulation (DIC), Medicine*

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0416

A case of a young female with fever, rashes, and a previous diagnosis of thrombotic thrombocytopenic purpura *Haldos, Juzy*

Systemic lupus erythematosus (SLE or Lupus) is an autoimmune disorder that involves multisystem microvascular inflammation with the generation of autoantibodies, which can damage every organ system of the body. Worldwide, a conservative estimate states that over 5 million people have lupus, roughly 15–50 per 100,000 people per year. The constellation of several physical findings reflecting multisystem involvement suggests the diagnosis of SLE. Thrombotic thrombocytopenic purpura (TTP or Moschcowitz disease) is a rare thrombotic microangiopathic disorder, causing extensive microscopic blood clots to form in the small blood vessels throughout the body. The incidence of TTP is about 4–6 per 1,000,000 people per year. The classic “pentad” of microangiopathic hemolytic anemia, thrombocytopenia, neurologic abnormalities, fever, and renal dysfunction is indicative of TTP. Thrombotic thrombocytopenic purpura (TTP) and systemic lupus erythematosus (SLE) are distinct entities that share many overlapping features. The two diseases rarely coexist. This is a report describing a case of a young female with SLE preceded by TTP by an interval of five years. In 2002, K.L., 18F presented with pallor, fever, easy bruisability and seizures, Hb:5.8, APC:23, LDH:383. She was diagnosed with TTP and treated with blood transfusions, Corticosteroids, and Anti-convulsant. In 2008, K.L., now 23y/o, presented with fever and rashes. She had Malar rash, Palatal ulcers, photosensitivity, ANA positive, and Lymphopenia. She was diagnosed with SLE and received steroids. SLE is an autoimmune disorder and TTP is a coagulation disorder. They are distinct diseases and they vary in their therapeutic approach. Therapy mainly consists of plasma exchange and blood transfusions in TTP and corticosteroids and immunosuppressants in SLE. However, the diagnosis between them is challenging because TTP and SLE share many similar characteristics. TTP and SLE have been known to occur simultaneously. The onset of SLE may precede TTP and in some cases, TTP may appear first. SLE is caused by gene-environment interactions while TTP is caused by a vWF protease (ADAMTS-13) deficiency. Acquired TTP occurs with the production of autoantibodies inhibiting ADAMTS-13 activity. This may be the link between SLE-an autoimmune disease, and TTP-an ADAMTS-13 deficiency disorder, and may explain the occurrence of both entities in our patient. In conclusion, a high clinical suspicion for TTP and SLE is warranted in patients with anemia, low platelets, fever, and neurologic as well as renal deficits. TTP and SLE may precede each other or occur simultaneously. Appropriate management rests on accurate diagnosis.

Keywords: *Systemic lupus erythematosus, Thrombotic thrombocytopenic purpura, Thrombotic microangiopathic disorder, Medicine*

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2010,
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NP

Challenges and opportunities in environmental and occupational health: highlights of the first national environmental and occupational health forum

Nique, Jem Erika A. , Tambiloc, Ruby D. , Molina, Victorio B. , Fadrilan-Camacho, Vivien Fe F. , Enoveso, Rose Abigail D. , Decena, Katherine Mae M. , Quizon, Romeo R. , Marian Fe Theresa C. Lomboy,, Ramos, Chester C.

Environmental and occupational health are interconnected disciplines of public health that are concerned in maintaining a symbiotic relationship between the ecosystem and humans. This relationship is under threat by the continuous and alarming increase of the Earth's temperature causing climate change that impacts not just health but also the economy and the safety of the population. The First National Environmental and Occupational Health Forum was organized by the Department of Environmental and Occupational Health, College of Public Health, University of the Philippines Manila to address and discuss the complex issues that the Philippines is currently experiencing when it comes to environmental and occupational health by providing a space where stakeholders from different sectors can actively participate in mapping out challenges and opportunities. The organizer's long-term vision is to catalyze and build a network of collaboration that is geared towards the improvement of health and safety in the workplace that involves mitigating the effects of climate change. The discussions in the forum gave a comprehensive insight into the different challenges we face for being one of the most vulnerable countries to natural disasters: how this affects health, workplace, and environment. These challenges created new opportunities for the country to build resilience and formulate adaptive strategies to decrease the vulnerability of the population especially the workforce who are constantly exposed to different hazards that are exacerbated by changes in the environment.

Keywords: *climate change, workplace hazard, one health, agriculture, displacement, emergency response, Medicine*

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Changes in attitudes towards professionalism among medical students during clinical clerkship

Atienza, Melflor A. , Abu, Cherry T.

Professionalism is a core competency of physicians, identified as one of the learning outcomes for the Doctor of Medicine program. In all the efforts geared towards supporting students develop high standards of professionalism through the 4-year course of medical education, perhaps the greatest gap is in assessment.

The study aimed to determine how attitudes towards professionalism among medical students change during clinical clerkship, which attitudes change, and if these changes are associated with certain demographic factors and specific clinical rotations.

This is a cohort study with a baseline and three consecutive measurements of attitudes towards professionalism among students in a medical school as they rotated in the different clinical departments for the first semester of AY 2018-2019. A 36-item questionnaire based on a validated instrument was used. Frequency counts, means, percentages, paired t-tests, analysis of variance, and chi-square were used to analyze the data.

Overall, the attitudes towards professionalism among medical students were positive at baseline and did not significantly change through three consecutive clinical rotations. The scores were highest and most stable for altruism, accountability, and excellence. No association was found between any change in attitudes and certain demographic factors including age, gender, and pre-medical course, and specific clinical rotation.

No significant change in attitudes towards professionalism was found among fourth year medical students as they rotated through three consecutive clinical rotations. While many factors should be considered, this finding should prompt a comprehensive look at how clinical clerkship experiences actually educate for professionalism.

Keywords: attitudes, professionalism, clerkship, clinical rotation, Medicine

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0419

Clinical experience of Filipino clinicians on the use of bedaquiline for treating multi-drug resistant tuberculosis

Lao, Stephanie M. , Torres, Aneliese H. , Lofranco, Vivian S. , Torres, Chelseah Denise H. , Antonio, Carl Abelardo T. , Bermudez, Amiel Nazer C. , Benedicto, Erwin G.

The Philippines is among countries globally with high multidrug-resistant tuberculosis (MDR-TB) burden. An operations research on Bedaquiline (BDQ), a new drug for MDR-TB, was launched by the Department of Health (DOH) in 2016. This paper aimed to gather the opinions and first-hand experiences of clinicians in the Philippines regarding BDQ. A facilitated roundtable discussion among nine clinicians included in the operations research on BDQ in the Philippines was conducted in June 2018. Topics covered included: (a) considerations in the use of BDQ, (b) outcomes of patients given BDQ, and (c) perceptions on effectiveness and safety of BDQ. Recordings and field notes from the discussion were subjected to framework analysis. Participants gave BDQ an overall positive feedback due to the effectiveness, less toxicity, and ease of administration compared to other anti-TB drugs. Issues on BDQ included the novelty of the drug that caused doubts at first use and the limited application of the drug as dictated by the inclusion criteria within the context of the operations research, among others. The significant number of patients lost to follow up and ways to address this challenge were also discussed.

Keywords: bedaquiline, multidrug-resistant tuberculosis, clinical experience, physicians, Philippines, Medicine

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0420

Comparative toxicological analysis of metformin (biguanide) and glibenclamide (sulfonylureas), using zebrafish embryotoxicity test (ZFET)

Navarrete, Ian , Flores, Erika Louise, Lapuz, Bianca Louise , Hallare, Arnold V.

Type 2 (T2DM) and gestational diabetes mellitus (GDM) among pregnant Filipinos have been increasing over the years because of lifestyle westernization. While insulin has been the safe mainstay when dietary measures fail to maintain normoglycemia during pregnancy, recent studies have suggested oral hypoglycemic agents (OHAs) such as metformin and glibenclamide, may offer cheaper and efficacious alternatives. The problem however, is the passage of these drugs through the placenta which may pose possible danger towards the development of the growing embryo. The proposed study aims to evaluate and compare the embryotoxic and teratogenic potentials of the varying concentrations of the two PhilHealth covered oral hypoglycemic agents in the Philippines, namely metformin (biguanide) and glibenclamide (sulfonylureas).

In this study, a comparison on embryotoxic potentials of metformin and glibenclamide was conducted using zebrafish embryotoxicity test (ZFET) across concentrations found in fetal (10, 20, 100, 500, 1000, 2000µg/L) and maternal serum (10, 20, 100, 500, 1000, 2000mg/L).

Results revealed that metformin showed no significant ($p > 0.05$) lethal effects, but revealed significant risk for teratogenicity, specifically decreased head and tail lengths and advanced hatching. Conversely, glibenclamide revealed significant potential for lethal (e.g., coagulation) and teratogenic effects including pericardial and yolk sac edema, spinal deformity and increased tail length. Comparative evaluation between the two OHAs reveal that glibenclamide has significantly ($p < 0.05$) higher lethal and teratogenic effects. Together, our results suggest that the use of metformin over glibenclamide is favorable for safety testing in pregnant women suffering T2DM and GDM for the benefit of expanding treatment options for these diseases.

Keywords: *embryotoxicity, glibenclamide, metformin, teratogenesis, zebrafish, oral hypoglycemic agents, Medicine*

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0421

Comparison of fecal post-collection storage methods for microbiome analysis targeting the V3-V4 regions of the 16s rRNA gene

Nacis, Jacus S.

It is becoming common to study the human fecal microbiota using genomic approaches targeting the V3-V4 hypervariable region. These regions of the 16s rRNA gene have shown higher phylogenetic diversity and increased specificity for bacterial reads. While immediate freezing is the “gold standard” for the storage of samples for human microbiome studies, it is essential that appropriate alternative methods for the storage of sample materials is in place to avoid post-collection bias. This study evaluated the agreement of three alternative fecal post-collection storage methods with immediate freezing in terms of diversity and distribution of the predominant phyla. Fecal samples collected from six apparently healthy school children (8-10 years old) were stored under the following conditions: (1) immediate freezing at -20°C, (2) immediate freezing at -20°C with stabilizing solution, (3) standing at room temperature (average 24.7+/-0.75°C) for 4 hours without stabilizing solution then freezing at -20°C, and, (4) standing at room temperature (average 25.2+/-1.1°C) for 24 hours without stabilizing solution then freezing at -20°C. A total of twelve biological replicates per storage conditions were extracted and analyzed. The PCR amplicons were sequenced for the V3-V4 regions of the 16s rRNA gene using the MiSeq (Illumina, San Diego, CA) at 2 x 301 paired-end format. Parameters included α -diversity, β -diversity and the distribution of predominant phyla. The agreement of the methods with the “gold standard” was evaluated by calculating the intraclass correlation coefficients (ICCs). Kruskal-Wallis test was applied to compare the differences in the α -diversity indices. Samples kept for 4 hours at room temperature before freezing had the highest ICCs as compared with the “gold standard” (ICCs=0.89 and 0.71 for Shannon and Chao-1 indices, respectively). There were no significant differences in α -diversity indices among the four fecal post-collection storage methods (all $P>0.05$). The β -diversity (unweighted and weighted UniFrac) indicated that inter-individual differences were responsible for the variability of microbial communities. It was found that all alternative fecal postcollection storage methods have high ICCs for *Actinobacteria* (>0.82 , $P<0.05$), but not for *Bacteroidetes* and *Firmicutes* (ICC <0.64). This study reported the feasibility of employing alternative fecal post-collection storage methods for microbiome studies that can address technical challenges of collecting stool samples while adapting to the tropical climate in the Philippines. Furthermore, this study indicated that standing the stool sample for 4 hours at room temperature before freezing is comparable with the gold standard for α -diversity metrics. All the alternative post-collection methods posed high concordance with immediate freezing for *Actinobacteria* but not for the other abundant phyla.

Keywords: *fecal post-collection, microbiome analysis, V3-V4 regions, 16s rRNA, fecal samples, Bacteroidetes, Firmicutes, Actinobacteria, schoolchildren, Medicine*

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2019,
(Filipiniana Analytics)

0422

Comparison of individual and group learning in different laboratory settings among third year medical technology students

Laude, Antonio F. Jr., Atienza, Melflor A.

To learn technical skills in Medical Technology schools, laboratory experiments are made individually or in groups. The nature of student participation and effect of group work in laboratory skills and attitudes of students have not been well studied. The study compared individual work, working in groups of three, and working in

groups of six in terms of skills and attitudes toward learning, motivation to learn, responsibility, helpfulness, and teamwork.

Experimental study was used that employed a counter-balance design among thirty-six thirdyear medical technology students who were instructed to learn laboratory skills in three settings and were rotated in six experiments. Performance examination and questionnaires were formulated by the researcher and used for gathering data. One-way ANOVA was used to determine the significant differences among practical exam scores of the three laboratory settings while Kruskal-Wallis H and Mann-Whitney U test were used to determine differences in rating scores of the attitude questionnaire.

There were no significant differences in students' skills $F(2, 213)=1.97$, ($p=.142$) and in their attitude toward learning, helpfulness and teamwork among the laboratory settings. Students have higher motivation when working in groups ($H(2)=14.413$, $p=.001$) and assumed more responsibility when working alone than when working in groups. When students worked individually or in groups of three, they perceived ending up doing most of the work.

Keywords: *working in groups, individual work, medical technology, learning outcomes, skills, attitude, Medicine*

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0423

Correlation between the duration of right lower quadrant abdominal pain and clinical stage of acute appendicitis among patients who underwent appendectomy at MCU-FDTMF Hospital

Batallones, Jr., Bonifacio H.

Right lower quadrant abdominal pain is the prime symptom of acute appendicitis. The surgical treatment of appendicitis is one of the great public health advancement of the last 150 years. The objective of this study is to correlate the duration of right lower quadrant abdominal pain with the clinical stage (Pathologic diagnosis) on patients who underwent appendectomy at MCU-FDTMF Hospital from January 2006 to December 2006. This is a cross-sectional study. There were one hundred and ninety four (194) patients who presented with right lower quadrant abdominal pain and underwent appendectomy. One hundred and eighty six (186/194) had acute appendicitis during surgery and eight (8/194) patients with normal appendix. The 3 most common diagnoses on patients with normal appendices were pelvic inflammatory disease, ovarian torsion and urinary tract infection. The total number of patients who underwent appendectomy surpassed the required sample size of at least 130 observations. A Chi-square test was used for univariate analysis of data. The study revealed that right lower quadrant abdominal pain of acute appendicitis 12 hours was either congestive or suppurative (94%) stage and for pain duration of > 24 hours increased the likelihood of a ruptured appendicitis (98.5%).

Keywords: *Abdominal pain, Appendicitis, Caudal limb, Medicine*

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0424

Corticosteroid therapy for ulcerative colitis

Buitizon, Rodel R.

This case report aims to show the clinical course and management of ulcerative colitis which responded to systemic corticosteroid therapy in a tertiary hospital. A 32 year old male was admitted with a chief complaint of diarrhea. On physical examination, patient was conscious, coherent, not in distress. He was febrile with temperature of 38C, tachycardic with pulse rate of 108. He was cooperative but weak looking. His abdomen was

flat, soft, normoactive, with direct tenderness on the left lower quadrant. Digital Rectal Exam showed no skin tags, non-tenderness, full rectal vault, with blood on tactating finger. Admitting impression was TB of the colon versus amebic colitis and inflammatory bowel disease. Colonoscopy was done which revealed nodular colonic mucosa with cobblestone appearance with multiple ulcers and erosions. Rectal biopsy was done and specimen was sent to the histopathology section which revealed ulcerative colitis. On the 4th hospital stay, still with abdominal pain, Tramadol was given which afforded slight relief. He was maintained on Prednisone 20 mg TID for 2 weeks as outpatient management. On the following day, patient was slightly relieved of symptoms and was discharged improved. He was maintained on Prednisone 20 mg tablet TID for 2 weeks and was advised to have repeat sigmoidoscopy after a month. On follow-up, endoscopy was done and revealed remission of the disease. Early diagnosis and classification of ulcerative colitis as to severity is necessary in the choice of medical management. Corticosteroids represent the first line therapy for moderate to severe ulcerative colitis. Newer agents are available as alternative to steroid management.

Keywords: *Ulcerative colitis , Systemic corticosteroid therapy, Corticosteroids, Medicine*

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NP

0425

Cytogenetic findings in women with infertility

Enriquez, Ma. Luisa , Abad, Celeste , Zimmer, Mary Christine Ma. , Briola, Brando

Infertility among women may arise from genetic anomalies which can be detected as chromosomal abnormalities through routine cytogenetics. Chromosomal studies have been proven useful for identifying the etiology of infertility as well as in genetic counseling for those with reproductive complications. The study aims to (1) describe clonal chromosomal abnormalities found among females with infertility (2) provide a baseline cytogenetic data for future molecular genetic studies. Sample population is composed of 362 females (age range 20 to 44 years old) referred to the lab as part of their fertility work up. Peripheral blood samples were drawn from patients and these were cultured and harvested after a 72 h incubation period with phytohemagglutinin (PHA) stimulation. Metaphase spreads were stained using GTG banding and at least 25 cells were screened and analyzed for each patient following The International System for Human Cytogenetic Nomenclature (ISCN) guidelines. Clonal chromosomal abnormalities (numerical and structural) were found in 26 patients (7.2%) among which 11 were mosaic while 336 (92.8%) showed normal karyotypes. A total of 29 abnormalities were observed including hypodiploidy (10.34%), polyploidy (6.90%), near-tetraploidy (3.45%), +mar (10.34%), qh+ (13.79%), translocations (13.79%), deletions (10.34%), inversion (3.45%), isochromosome (6.90%), and ps+/pstk+ (6.90%). We also report 3 novel translocations first seen in Filipino infertile females. Data from this study support the idea that infertility is not solely caused by mutations in genes of the sex chromosomes (X and Y). Autosomal genes also play a role in maintaining female fertility. Our results highlight the importance of cytogenetic studies in patients with infertility before the start of their treatment regimen (e.g. assisted reproduction techniques). Presence of chromosome aberrations may help clinicians determine the etiology of infertility and can guide them in their treatment approaches.

Keywords: *Infertility, Clonal chromosomal abnormality, Cytogenetics, Medicine*

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Determination of the nephroprotective effect of the ethanolic extract from *Carica papaya* (Caricaceae) leaves against gentamicin-induced nephrotoxicity in Sprague-Dawley rats

Migano, Avegail M. , Manuyag, Kyle Adriel R. , Migano, Maria M. , Del Valle, Eunice Mae D. , Calungsud, Karlo Jaime N. , David, Mary Coleen A. , Casuga, Franelyne P.

Studies suggest that *Carica papaya* (Caricaceae) has various biological activities such as antioxidant activity, diuretic, and anti-malarial. In addition, the antioxidant activity of plants is strongly correlated to nephroprotective property. This is the first investigation of the nephroprotective potential of the ethanolic extract from *C. papaya* leaves. Acute toxicity test was done to determine the approximate lethal dose of the extract. To determine this pharmacologic activity, the ethanolic extract at concentrations, 250 mg/kg, 500 mg/kg, and 1000 mg/kg body weight was given orally to different groups of Sprague-Dawley rats with Gentamicin-induced nephrotoxicity and compared to no treatment, the negative and positive control (Vitamin E) groups. Blood samples were collected before and after the treatment for the analysis of renal function markers namely: BUN (blood urea nitrogen) and creatinine levels. The investigation revealed that the approximate lethal dose of the extract is greater than 2000 mg/kg. At 1000 mg/kg dose, the change in serum creatinine and BUN levels are comparable with the positive control group (p-value: >0.005) which suggest that the 1000 mg/kg of the ethanolic leaf extract is the most effective dose in reducing gentamicin-induced nephrotoxicity in sprague-dawley rats. The ethanolic extract of *C. papaya* leaves is not toxic and has nephroprotective property in Gentamicin-induced nephrotoxicity.

Keywords: *Nephrotoxicity, Gentamicin, C. papaya, Antioxidant, Medicine*

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Development of a personalized risk predictor system to improve early detection and dietary management of hypertension among Filipinos

Zumaraga, Mark Pretzel P.

Hypertension is one of the leading risk factors for death and disability-adjusted life-years worldwide. In 2015, there were 1.13B people cases reported globally, with majority of them in low and middle-income countries, including the Philippines. Several published studies of variables (anthropometric measurements, blood parameters, genetics and even dietary intake) have long been reported to have direct link to hypertension. Such variables allow prediction for early targeting of “at risk” individuals for preventive interventions. The study developed a hypertension risk predictor using genetics, clinical and biochemical indicators of hypertension, anthropometry, and dietary intake from the 2013 National Nutrition Survey (NNS). This study followed a retrospective cohort study with 776 adults living in the National Capital Region (NCR) who participated in the 2013 NNS. Anthropometric, biochemical, clinical, dietary and genetics variables were used in determining the final model for predicting hypertension. Backward elimination method with α of 0.05 was used in model building. Binary logistic regression was used for model generation. Additional 100 respondents were used to test for predictive performance of generated models. Of the 776 adult respondents, 54% were hypertensive. Regression analysis generated at least 6 predictive models. Interestingly, Models 1-6 had food group 2 (rice and rice products) and food group 25 (beverages) as predictor variables. When stratified per age group, significant results of predictive performance were found on Model 2 for 20-39 age group. Model 2 had other predictor variables such as age, sex, BMI, serum Vitamin A and genetic variation (rs1800849 and rs2548861). Different results from the performance evaluation of each model concluded that Model 2 can be used for 20-39 age group, with normal BMI classification in predicting hypertension risk. Further external validation (independent-person cohort) to optimize and to generate more evidences of prediction efficiency is recommended.

Keywords: *risk predictor system, dietary management, hypertension, national nutrition survey, BMI, DOST-FNRI, dietary intake, Medicine*

Dissemination of health communication materials for the prevention and control of leptospirosis in the National Capital Region, Philippines

Guevarra, Jonathan P. , Gloriani, Nina G.

Dissemination of health communication materials is one of the most important strategies to increase awareness on the prevention and control of leptospirosis. One of the projects under the Program on the Prevention and Control of Leptospirosis in the Philippines (LepCon) is the dissemination of health communication materials. This study assessed the dissemination of health communication materials to 14 city and municipal health offices in the National Capital Region (NCR), Philippines. Specifically, this study determined: (1) how the health communication materials were disseminated by the city and municipal health offices; (2) the placement of the materials in the health facilities; and (3) the challenges encountered during the dissemination process. The city/municipal health offices used different approaches in disseminating the health communication materials and these are classified into distribution for public consumption, utilization as health education materials, and maintenance of supply by reproducing the materials in other forms. Eleven (11) out of the 14 city/municipal health offices (78.6%) still had leptospirosis posters. Seven (50%) of them posted the poster in the health facility. However, only four (28.6%) facilities placed the posters in locations where health facility clients can easily see and read them. Two of the 14 city/municipal health offices (14.3%) had an information, education and communication (IEC) display area where the LepCon fan is one of the health communication materials on display. The number of materials provided to the health offices was noted to be inadequate to reach the health facilities' target audiences. Finally, the monitoring and evaluation of health communication materials disseminated to facilities under health offices' jurisdiction was also a big challenge. Different approaches were used in disseminating the posters and fans to the health facilities under the jurisdiction of the city/municipal health offices. It was also noted that the number of materials provided to the health offices was not adequate to reach the health facilities' target audiences. Although three-fourths of the health offices covered still have health communication materials in their facility, only less than 25% of these facilities have posters placed in strategic locations in the facility. A formal scheme of monitoring the dissemination of the materials was expressed by the informants.

Keywords: *leptospirosis, prevention and control, health communication materials, IEC, Medicine*

Effect of forced-air blanket, warm blanket and its combination to post-operative hypothermic patients

Mergal, Beryl Ben C. , Galang, Dina D. , Reagan, Mandias

Incidence rate of postoperative hypothermic is still high. Many factors are causing postoperative hypothermia, but the main cause of hypothermia is the administration of anesthesia due to the impairment of the normal autonomic thermoregulatory control. The body temperature of a patient under anesthesia would fall up to 6C, with an average of at least 2C. This study determined the effect of warm blanket, forced air blanket and its combination to postoperative hypothermic patient. A quasi-experimental design was utilized and participants were chosen through purposive sampling to ensure the 63 participants met the criteria of the study. Randomization through cast lot was employed in dividing participants into three groups with 21 participants each group. Warm blanket, forced air blanket and its combination were effective in increasing body temperature of post operative hypothermic patients. However, forced air blanket is better in increasing body temperature than warm blanket. Further, the combination of warm blanket and forced air blanket was the best intervention in increasing the body temperature of hypothermic patients. Age did not affect the mean score of the participants' body temperature in all treatments.

Keywords: *Forced-air blanket, Warm blanket, Post-operative patients, Hypothermia, Medicine*

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0430

The effect of sodium bicarbonate abrasives in toothpaste on dental plaque removal: a pilot study

Garcia, Ma. Celina U. , Santiago, Maria Carmela S. , Velasco, Narecia J.

The role of dental plaque as the etiology of caries and periodontal diseases has long been established. Therefore, plaque control is central to the prevention and management of these oral diseases. Among the different means of self-performed plaque control, brushing is the most essential. Moreover, toothpaste is a common adjunct during tooth brushing, as its abrasive contents are believed to enhance plaque removal. This study aimed to compare the effectiveness of plaque removal when brushing with a sodium bicarbonate abrasive-containing toothpaste, compared to brushing using an abrasive-free toothpaste.

Twelve students from the University of the Philippines College of Dentistry participated in the study. The subjects discontinued all oral hygiene measures for a minimum of 48 hours. Using the Modified Bass technique, they performed tooth brushing for two minutes, using either an abrasive-free or abrasive-containing toothpaste. Toothpaste allocation was randomized via fishbowl method. Pre-brushing and post-brushing plaque scores were recorded using the Turesky modification of Quigley-Hein plaque index. A washout period of 11 days was implemented before crossover to the second round, wherein employed toothpastes were switched. The difference in plaque reduction between the two kinds of toothpaste was analyzed using Wilcoxon signed rank test.

Overall plaque reductions were 75% for the abrasive-free toothpaste and 73% for the abrasive-containing toothpaste. The difference between the toothpaste was statistically insignificant ($p=0.48$). Therefore, based on the study, brushing with a sodium bicarbonate abrasive-containing toothpaste resulted in similar levels of plaque removal, compared to brushing with an abrasive-free toothpaste. There is insufficient evidence that abrasives in toothpaste result in more effective dental plaque removal.

Keywords: *tooth brushing, toothpaste, abrasives, dental plaque, Medicine*

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0431

Facilitating factors and barriers to newborn screening uptake in the Cordillera Administrative Region and Region V

Tetangco, Joselito H. , Tetangco, Maria Elenita L. , Lelis, Myrah Joan H. , Silvestre, Catherine J. , Beltran, Frederick David E. , Padilla, Carmencita D. , Cordero, Cynthia P. , Mary Ann J. Ladia,, Torralba, Ernie B.

Republic Act 9288 or the Newborn Screening Act of 2004 was enacted. A multi-sector effort towards systematic screening of newborn disorders and built-in systems for subsequent confirmatory tests for positively screened as well as treatment for confirmed cases was likewise implemented. Despite multi-sector efforts and continuous quality improvement mechanisms, national newborn screening coverage remained low for several years.

The study determined factors that influence Newborn Screening (NBS) uptake from various perspectives: mothers, health providers, and program administrators.

Framework analysis of NBS program documents, 25 focus group discussions and 37 key informant interviews of mothers, health providers and program administrators were done in purposively selected communities in the Cordillera Administrative Region and Region V.

Findings showed the need to disseminate correct NBS procedures, especially upon obtaining positive results. Financing issues were addressed innovatively, but system administrators and health providers required a common understanding of program implementation. Monitoring geographically hard-to-reach areas remained a challenge. Barriers outside the system adversely affected filter cards availability, specimen transport, and release of results. Improved online and paper-based educational campaign, greater local government unit support, streamlined PhilHealth processes, a workload-based manpower complement for monitoring, and continuity clinics to handle positive findings can increase NBS uptake.

Keywords: *newborn screening, perceived merits, attitude and intent, facilitating factors and barriers to uptake, Medicine*

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0432

Factors associated with newborn screening compliance among mothers who gave birth in Quezon City lying-in clinics

Montemayor, Jen Adrian S. , Illescas, Elaine E. , Co, Margaret Francine P. , Ababan, Joshua Miguel B., Salazar, Jose Mario G. , Palatino, Maylin C.

Newborn screening (NBS) detects genetic and metabolic conditions that may be present in a newborn before clinical symptoms manifest. Early detection and treatment prevents catastrophic health outcomes. It was introduced into the public health delivery system with the enactment of the Newborn Screening Act of 2004. However, there still seems to be a trend of noncompliance. The study sought to determine the prevalence of NBS compliance in Quezon City lying-in clinics (LICs) between 2010-2015 and the factors that are associated with compliance of mothers with NBS. An analytic cross sectional study design was utilized. Records of 710 mothers who gave birth in Quezon City LICs were randomly selected. Multiple logistic regression was used to determine if the mothers' age, civil status, PhilHealth membership, gravidity, and parity were associated with NBS compliance. A 6-year prevalence of NBS compliance of 36.6% was found. PhilHealth members were more likely to comply with newborn screening (AOR=4.1; 95%CI: 2.9-6.0). Moreover, the odds of compliance among married mothers were higher than unmarried mothers (AOR=1.6; 95%CI: 1.1-2.3). Finally, primiparous mothers were more likely to comply than multiparous mothers (AOR=1.5; 95%CI: 1.0-2.1). Age and gravidity were not found to have statistical association with NBS compliance. The higher odds of compliance among PhilHealth members was expected since they can avail of NBS for free. Ninety-five percent of primiparous mothers included in the study were primigravid; they are more likely to go to prenatal checkups when NBS information is given, according to literature.

Keywords: *newborn screening, compliance, health insurance membership, maternal and child health, Medicine*

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0433

Formulation and evaluation of voriconazole-NLC *in situ* gel for fungal keratitis

Castillo, Agnes L. , Zulfakar, Mohd Hanif Bin , Gloria, Elisha D.

Fungal keratitis is an infective process of the cornea which can lead to blindness. A topical voriconazole (VCZ)-loaded nanostructured lipid carrier (NLC) in *in situ* gel can improve treatment outcome. Melt emulsification and high-pressure homogenization was employed in the production of the VCZ-NLC. The VCZ-NLC was immediately cooled and incorporated with a mixture of poloxamers 407 and 188. The formulation was subjected to 90-day stability test at $40 \pm 2^\circ\text{C}$ and $25 \pm 2^\circ\text{C}$ with $75 \pm 5\%$ and $60 \pm 5\%$ of relative humidity, respectively, in triplicate and tested for physicochemical properties monthly. Voriconazole was found to be compatible with the ophthalmic solution excipients. The VCZ-NLC had size of $130.87 \text{ nm} \pm 1.9137$, PDI of 0.2813 ± 0.0058 , and zeta

potential of $0.3441 \text{ mV} \pm 0.1353$. The VCZ-NLC had high encapsulation efficiency of $90.22 \pm 3.33\%$ and loading capacity of $1.70 \pm 0.10\%$. The VCZ-NLC *in situ* gel had a sol-gel transition of $32.17^\circ\text{C} \pm 0.85$ at less than 6 s. Percent recovery of VCZ in the final product was $94\% \pm 3.19$. The pH and osmolality were within the ocular tolerance limit. Antifungal activity was comparable to the voriconazole solution. Drug release was inconsistent in all of the batches. *Ex vivo* transcorneal permeation test revealed that only small amount of the drug crossed the cornea. Stability test showed that the formulation was not suitable to be stored in 40°C and 25°C , therefore, colder storage is recommended.

Keywords: Nanostructured lipid carriers, Voriconazole, Poloxamer, Fungal keratitis, Medicine

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(Filipiniana Analytics)
NP

0434

Formulation of a diuretic oral suspension from the ethanolic leaf extract of *Basella alba* L. (Basellaceae)

Tunod, Edmin Christian R. , Opelario, Melchi Esrom L. , Chavez, Noreen Mae E. , Limjoco, Bianca Mae G., Vega, Ma. Beatrice M. , Castro, Gina C.

The ethanolic leaf extract of *Basella alba* L. has been shown to possess diuretic activity owing to the presence of saponins. The study focused on the formulation of a diuretic oral suspension, as potential alternative to oral solid diuretic medications, using the ethanolic leaf extract of *Basella alba* L. as active ingredient. Presence of saponins in the prepared extract was confirmed using froth test. An oral suspension containing 50 mg/mL of the leaf extract was formulated with carboxymethylcellulose, citric acid, glycerin, sodium benzoate, sodium chloride, and saccharin. The appearance, viscosity, pH, and redispersibility of the formulated oral suspension were assessed. Using the Lipschitz method, diuretic activity was evaluated with twenty-four Sprague Dawley rats divided into four groups: Group 1 was treated with base suspension, Group 2 received 10 mg/kg Furosemide, and Groups 3 and 4 were treated with 250 mg/kg and 500 mg/kg of formulated *Basella alba* oral suspension, respectively. The formulated oral suspension at 500 mg/kg showed a comparable diuretic effect to furosemide with a diuretic index of 1, while the formulated oral suspension at a dose of 250 mg/kg produced mild diuretic effect. Both doses of the formulated oral suspensions gave significantly higher Na^+ and K^+ output than base suspension ($p < 0.05$). The results of the study show that the formulated oral suspension containing the leaf extract of *Basella alba* L. exhibits dose-dependent diuretic activity, and may be a suitable alternative to oral solid diuretic medications.

Keywords: *Basella alba.*, Diuretic, Furosemide, Oral suspension, Saponins, Medicine

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0435

Formulation study of antimicrobial ointment from Philippine *Punica granatum* L., (Lythraceae) fruit peel extract

Galvez, Catherine , Talavera, Jose Rennel M. , Jacinto, Anna Muriel T.

The purpose of the study is to formulate an antimicrobial ointment from fruit peel extract of pomegranate. Maceration was used for extraction and its physicochemical properties were evaluated using the methodologies of USP 31. Microbial assay was conducted using the paper disc diffusion and test tube dilution method. Compatibility of excipients was tested using differential scanning calorimetry (DSC). Mechanical incorporation was used for the manufacture and stability was determined using accelerated stability method. Results revealed the extract was most active even at the lowest concentration (25%) to *Pseudomonas aeruginosa* (31 mm), followed by *Aspergillus niger* (17 mm) and *Trichophyton mentagrophytes* (17 mm), *Staphylococcus aureus* (14 mm) and

inactive to *Candida albicans* (9 mm) at all concentrations (100%, 75%, 50% and 25%). DSC results showed that the lyophilized extract was compatible with excipients. The formulated antimicrobial ointments were brown in color, odorless, non-gritty, neutral (pH 6.6), with average spreadability of 30.55 mm, average viscosity of 64,000 cP and average sensitivity test of 0 for both water and oil based 60% formulations. It disclosed sensitivity to all test microorganisms. Formulated ointments were subjected to accelerated stability test that showed they were stable until the 6th month but on the 12th month, it showed instability like solidification of ointment, bleeding and crystallization. The results show that the lyophilized extract of pomegranate can be formulated into an antimicrobial ointment. However it needs further study in formulation as it manifested instability on the 12th month.

Keywords: *Antimicrobial ointment, Pomegranate, Peel extract, Medicine*

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0436

Gender comparison of cases of dengue fever and dengue hemorrhagic fever in Lapu-lapu City, Cebu, Philippines

Opena, Edward Laurence L.

This paper analyzes the difference on the cases of dengue fever and dengue hemorrhagic fever in Lapu-lapu City, Cebu, with respect to gender. Findings show that there were more males that are admitted for the two fevers. Monthly and yearly analyses of variance (ANOVA) showed significant difference for males for both fevers, while only the monthly data for females showed significance. Further, T-test result showed that there is significant difference for both dengue fever ($p=0.010$) and dengue hemorrhagic fever ($p=0.005$) when the genders are compared. Other factors are suggested to be included in the analyses such as age, locality and activities for further studies.

Keywords: *Dengue fever, Dengue hemorrhagic fever, Gender, Lapu-lapu City, Medicine*

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2016,
(Filipiniana Analytics)
NP

0437

Gut microbial diversity and diet-gut microbiota associations in selected children in Taguig City

Goloso-Gubat, Maria Julia

The human gastrointestinal tract consists of a diverse ecosystem of microorganisms collectively known as the gut microbiota. Its composition is known to be significantly influenced by the diet. This study aimed to characterize the gut microbial composition of selected Filipino children, and assess its association with their habitual diet. An 81-item semi-quantitative Food Frequency Questionnaire (FFQ) was used to determine food intake of normal-BMI children aged 7 to 11 years old ($n=44$) in Taguig City. Energy, carbohydrate, protein, fat and dietary fiber intakes were estimated using the Philippine Food Composition Tables database. Fecal microbiota was characterized by high-throughput 16S rRNA sequencing of the V3-V4 region. Microbial diversity was measured by Shannon Index and Simpson Index, and the association of macronutrient and dietary fiber intakes with the relative abundance of microorganisms was determined by Spearman's rank correlation test. Energy intake of the study participants (1787 kcal/day) is mostly from carbohydrates (295 g/day=66% of total energy intake). Protein and fat contribute 12% and 22% to total energy intake, respectively. Total dietary fiber intake (14.08 g/day) is mostly from the consumption of cereals and products and fruits. The gut microbiota of the study participants is dominated by members of the Bacteroidetes (48%) and Firmicutes (39%) phyla, with lower amounts of

Actinobacteria and Proteobacteria. Phylum-level analysis suggested that carbohydrate and dietary fiber positively correlated with Bacteroidetes, but negatively associated with protein and fat. Actinobacteria positively correlated with carbohydrate, protein, fat and dietary fiber. Firmicutes positively correlated only with fat. Participants' diet is characterized by high intakes of carbohydrates and dietary fiber, and their gut microbiota is dominated by species belonging to Bacteroidetes and Firmicutes. Findings indicate the role of diet in the gut microbial composition of selected Filipino children. Further research is needed to understand its role in shaping the gut microbiota of different Filipino population groups and geographical location, and consequential impacts on health and nutritional status.

Keywords: *gut microbiota, microbial diversity, diet-gut microbiota, gastrointestinal tract, Bacteroidetes, Firmicutes, DOST-FNRI, Medicine*

45th FSS Book of Abstracts 2019, Volume No. Issue No. , 25
2019,
(Filipiniana Analytics)

0438

Gut microbiota profile of normal-weight and overweight/obese Filipino adults *Golloso-Gubat, Maria Julia*

The present-day genomic platforms have generated substantial information on the composition and functional properties of the microbial strains of the human gut. However, information on the gut microbiota of the Filipino population remains largely limited. This study aimed to compare the predominant bacterial phyla in the gut microbiome of normal-weight and overweight/obese Filipino adult cohort. DNA samples were collected from 40 normal-weight and 26 overweight/obese adults, and were profiled via amplicon sequencing of the V3-V4 region of the 16s ribosomal RNA (rRNA) gene. Sequence analysis was facilitated by clustering the 16s rRNA sequences into operational taxonomy units (OTU). Energy, macronutrient, and fiber intakes were determined using a 125-item semi-quantitative Food Frequency Questionnaire (FFQ). Body mass index (BMI) classification was based on the WHO BMI cut-off criteria. Overall, the gut microbiota of the participants was dominated by *Firmicutes* (72.6%), *Bacteroidetes* (14.0%), *Actinobacteria* (10.4%), and *Proteobacteria* (1.9%). Average energy, macronutrient, and dietary fiber intakes did not differ significantly between the normal weight and overweight/obese groups, but the overweight/obese participants have a lesser population of *Bacteroidetes* in their gut. Conversely, a higher diversity of bacterial species was observed in the normal-weight group. The dominance of *Firmicutes* and the lower gut bacterial diversity in the overweight/obese participants support the findings of earlier studies. Studies exploring the microbiome altering effects of diet, probiotics, and synbiotics (a combination of probiotics and prebiotics) are recommended.

Keywords: *gut microbiota, normal weight, overweight, obese, Filipino adults, Firmicutes, Bacteroidetes, Actinobacteria, Proteobacteria, Medicine*

46th FSS Book of Abstracts 2020, Volume No. Issue No. , 34
2020,
(Filipiniana Analytics)

0439

Hashimoto's thyroiditis in a patient living in iodine deficient area *Utoyo, Husodo*

Hypothyroidism is a clinical syndrome resulting from a deficiency of thyroid hormones, which in turn results in generalized slowing down of metabolic processes. The clinical recognition is typically complicated by the insidious onset of nonspecific symptoms and signs that are often poorly appreciated by patients and initially misinterpreted by physicians. In most patient populations, the common prevalence of complaints potentially attributable to thyroid hormone deficiency makes it essential to maintain a high index of suspicion for hypothyroidism. This is a case of a 48 year old male who presented with symptoms and signs of hypothyroidism with decreased FT4, elevated TSH consistent with primary hypothyroidism and a positive titer of TMA indicating an autoimmune thyroid disease. Thus a diagnosis of Autoimmune Hypothyroidism (Hashimoto's Disease) was

entertained. The clinical history presented by the patient showed subtle manifestations of hypothyroidism such as dry skin, weakness, hoarseness, dysphagia, cold intolerance and somnolence. There was no evidence of bradycardia, weight gain, hyporeflexia, or other pertinent physical examination to support the diagnosis of overt hypothyroidism except for the presence of a goiter as documented by the thyroid scan. The thyroid function test is consistent with primary hypothyroidism and an elevated thyroid autoantibodies indicate an autoimmune thyroid disease as the etiology. Since the patient has no other setting for primary hypothyroidism such as neck surgery and denied exposure to endemic areas, the diagnosis of Autoimmune thyroiditis, the goitrous type (Hashimoto's disease) was the most likely cause of the primary hypothyroidism in this patient. The fact that hypothyroidism is more common in females than in males and, Autoimmune thyroiditis is more common in Iodine sufficient countries not like in our setting. In Iodine deficient countries like the Philippines, endemic goiters or Iodine deficiency goiter is the more common cause of hypothyroidism. Hypothyroidism like any other chronic conditions requires education and counseling. Patients with hypothyroidism may be inclined to discontinue medication once euthyroidism has been attained. Therefore, the following points must be stressed. 1. Thyroid hormone replacement therapy is life-long. 2. Insidious multiple organ deterioration occurs if hypothyroidism remains untreated 3. Any new physician must be informed of the patient's condition.

Keywords: Hashimoto's Thyroiditis, Hypothyroidism, Autoimmune Hypothyroidism, Medicine

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2010,
(Filipiniana Analytics)
NP

0440

HLA antigens in immunopathic diseases in Filipinos

Manahan, Lourdes A.

HLA typing was performed on patients satisfying the criteria for the diagnosis of rheumatoid arthritis, juvenile rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis, systemic lupus erythematosus, scleroderma, Hansen's disease and Grave's disease and 173 unrelated controls using the NHL Lymphocyte Microcytotoxicity method. Only the antigens of the A and B locus were tested for any disease association. The control population showed an increase frequency of antigens A9/w24, A11, B40, B15/w62 and a decrease of A29, B8, B18, and B37. A highly significant association of B27 with ankylosing spondylitis was demonstrated. This antigen was also significantly increased in psoriatic arthritis, scleroderma and rheumatoid arthritis. As this has not been reported in rheumatoid arthritis, further studies were needed. A significant decreased frequency of B16 was found in rheumatoid arthritis, systemic lupus erythematosus and Grave's disease and B15 in ankylosing spondylitis. No association of HLA antigen was noted on juvenile rheumatoid arthritis. In Hansen's disease A1 and A11 were significantly increased compared to an increase of A9 and B7 in Japan.

Keywords: HLA antigen, Immunopathic diseases, Rheumatoid arthritis, Juvenile rheumatoid arthritis, Ankylosing spondylitis, Psoriatic arthritis, Systemic lupus erythematosus, Scleroderma, Hansen's disease, Grave's disease, Medicine

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1982 September,
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0441

Identification of unique immunogenic epitopes of Zika virus

Guevarra, Jr., Leonardo A. , Tuazon, Lara Monique S.D. , Flores, Zyra Fem C. , Abuzo, Febby Anne T. , Go, Dionne Audrey G.

In 2016, the World Health Organization declared a Public Health Emergency of International Concern for Zika virus (ZIKV), an emerging flavivirus infection associated with microcephaly and neuropsychological disorders to unborn babies of infected pregnant women, because of the outbreaks in the Americas and Asia. This infection,

which is usually asymptomatic and is highly related to dengue, has become a public health concern because of the lack surveillance programs to prevent and control the infection and rapid and inexpensive diagnostic tools that can discriminate ZIKV from other flaviviruses. In this study, we aimed at identifying unique immunogenic epitopes of Zika Virus *in silico* and *in vivo*. Immune epitope prediction of ZIKV polyprotein was done based on the antigenicity, surface accessibility and hydrophilicity parameters using the epitope prediction tools available at Immune Epitope Database (IEDB) and Analysis Resources. Blastp was used to determine if the predicted epitopes is unique to ZIKV. Immunogenicity of the synthetic peptide comprising the immunogenic sequence was tested in White New Zealand rabbits. Immunogenicity as well as peptide-binding specificity were evaluated by Indirect ELISA. We were able to identify a unique immunogenic linear peptide sequence of ZIKV located at the 169th - 184th position of the polyprotein. Increase in the anti-peptide antibody in the sera prior to and after immunization was observed confirming the immunogenicity of the predicted epitopes in animal models. Anti-peptide antibody binding was observed only in the identified immunogenic sequence in the ELISA done using a panel of synthetic peptides as capture molecule. This suggests that the peptide specifically binds to the identified immunogenic epitopes.

Keywords: Zika, ZIKV, Peptide epitopes, Immunodiagnostics, Medicine

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NP

0442

Immunohistochemical profile, disease-free survival, and pattern of recurrence among non-metastatic breast cancer patients of the Philippine General Hospital during the first 5 years of implementation of the Department of Health-Breast Cancer Medicine Access Program
Cario, Clarito , Rosario, Rachel , Ngelangel, Corazon , Cacanindin, Jezraline Marie , Amante, Madeleine

This study determined the 5-year disease-free survival and patterns of recurrence of patients enrolled in the Breast Cancer Medicine Access Program (BCMAP) of the Philippine General Hospital. This is a retrospective cohort study of patients enrolled in BCMAP from January 2012 to December 2016. Kaplan-Meier survival analysis was used to determine the disease-free survival. Cox-Mantel Log Rank Test and Cox Proportional Hazards were used to determine factors that influenced survival. Of the 1,680 patients enrolled in the study period, 231 did not finish their treatment. The most common molecular subtype was Luminal A, and majority had High Risk St. Gallen Category. The most common site of recurrence was the bone. Only 612 patients were included in the analysis of survival due to incomplete data. Median disease-free survival had not yet been reached, but those who did have recurrence, did so in a median time of 17 months. Survival was found to be significantly influenced by comorbidities, lymphovascular invasion, ER and PR statuses, and molecular subtypes. Even though a lot of patients benefitted from the BCMAP, lacking data and a significant number of patients lost to follow-up limited the analysis of outcomes. Complete data collection and stronger follow-up is recommended.

Keywords: breast neoplasms, disease-free survival, immunohistochemical profile, pattern of recurrence, PGH, DOH, BCMAP, Medicine

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2018/09,
(Filipiniana Analytics)

0443

Improvement of the antibiotic and/or vitamin B₁₂- producing capacity of local *Streptomyces* strains by ionizing radiations and chemical mutagens
Santos, Patrocinio S., Lat, Betty S.

The study showed that exposure of local streptomyses strains S-70-39A and S-70-103A to ultraviolet rays showed a greater effect than exposure to gamma rays in increasing the antibiotic and vitamin B₁₂ producing capacity of

S-39A and S-70-103A, respectively. A marked increase in vitamin B₁₂ yield was also obtain when 2.5 mg&litter of cobalt chloride concentration was added in the medium.

Keywords: Antibiotic , Streptomyses, Ionizing Radiations, Chemical Mutagens, Vitamin B₁₂, Medicine

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Fil(S) Q179.9 N38

0444

***In silico* prediction and in vivo determination of immunogenic epitopes of dengue virus non-structural protein**

Guevarra, Jr., Leonardo A. , Sia, Michelle Joy G. , Imbao, Ma. Rio Lauren M. , Boado, Kathleen Joyce O. , Cenidoza, Fidel Bryan B.

One common problem in dengue immunodiagnostic kits is cross-reactivity due to the non-specificity of the capture antigen used in available immunoassays. In order to prevent misdiagnosis, there is a need for an identification of a unique immunogenic epitope that is specific only for dengue virus non-structural (NS1) protein. The study aims identify dengue-specific epitopes of NS1 using *in silico* approaches and validate it *in vivo*. Immune epitope prediction was done based on antigenicity, surface accessibility and hydrophilicity prediction parameters available in the Immune Epitope Database and Analysis Resources (IEDB). Exclusivity to dengue virus was determined using Blastp protein sequence alignment. Production of anti-peptide antibody in peptide immunized rabbits and peptide-antibody binding specificity were determined by indirect ELISA. We were able to identify a potentially immunogenic NS1 epitope specifically found in dengue located at 945th to 958th amino acid position of the dengue virus polyprotein. Anti-peptide antibody was predicted from the sera of the peptide immunized White New Zealand rabbits suggesting that the *In silico* predicted epitope is immunogenic. The antibodies produced specifically bind to the identified NS1 immunogenic epitopes when tested against a battery of synthetic peptides.

Keywords: Dengue, DENV, Peptide epitopes, Immunodiagnosics, Medicine

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NP

0445

Infectious mononucleosis in children

Ero, Lyzeil P.

To be able to identify cases of Infectious Mononucleosis and be able to differentiate it from other common illnesses in the Department of Pediatrics. A case of 13 year old, female, admitted due to fever and enlarged right lateral neck mass. The mass was noted 2 weeks prior to admission as firm, movable, non-tender, non-erythematous and no probable site of insect bite. No other signs and symptoms noted like fever, difficulty in swallowing, and difficulty of breathing. No consult was done, no medications were taken. Decreased appetite was also noted one week prior to admission Methisoprinol an immuno-stimulant and paracetamol for fever were given during consultation. It was persistent and fever became high grade. Mass was noted to be enlarged, thus admission. Patient presented with generalized lymphadenopathy hepatomegaly, persistent fever and pallor. Initial diagnostic evaluation also leads to malignancy. Further evaluation was done. Bone marrow aspiration was done revealing normal result. Other manifestations compatible with infectious mononucleosis appear in the latter part of the disease; It has a high result of EBV VCA IgM, one test to determine presence of infectious mononucleosis. Described above was the atypical presentation of Infectious mononucleosis and probably happens elsewhere and left undiagnosed. This case is reported because a lot of Infectious Mononucleosis case were left undiagnosed and presentation may confuse with other illnesses. Understanding its presentation may help us physician to choose what diagnostic evaluation to request.

Keywords: *Infectious Mononucleosis, Glandular fever, Cytomegalovirus, Toxoplasma gondii, Adenovirus, Viral hepatitis, HIV, Rubella Virus, Medicine*

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2010,
(Filipiniana Analytics)
NP

0446

Insights on maternal health in the Philippines from National Health Surveys and Maternal Health Policies

Ang-Bon, Rita Mae , Ricarte, Juan Antonio , Cagayan, Ma. Stephanie Fay S. , Llamas-Clark, Erlidia

The Sustainable Development Goal 3 (SDG) took effect after many of the world's developing countries failed to meet the previously set Millennium Development Goals (MDG). Despite advances in crucial maternal health metrics, the maternal mortality ratio in the Philippines is still increasing. This study aims to document the progress in maternal health in the Philippines and analyze the patterns in maternal mortality reduction in relation to various maternal health metrics and contextual factors.

Data from 36,664 livebirths were analyzed from the five published Philippine Demographic and Health Surveys. Direct estimation was used to project the different maternal health metrics within the 20-year period. Data from the Philippine Health Statistics (PHS) reports were also used to plot the maternal mortality ratio in the Philippines throughout the years. Correlation with contextual factors such as government budget, maternal health policies and reports was also done.

Despite the improvements in facility-based delivery and coverage of skilled attendants, there was no direct progress observed in the maternal mortality ratio. Relative inequalities in maternal health indicators between urban and rural settings have also shown considerable improvement. There were also notable milestones in maternal health, including the adoption of MDGs, development of various guidelines and policies, and the passing of the reproductive health law.

Findings indicate that the programs to improve maternal healthcare in the Philippines have not succeeded in improving maternal mortality. For the Philippines to meet SDG3, these programs should be designed to incorporate socioeconomic and contextual factors.

Keywords: *Philippines, maternal health, maternal mortality, MMR, Medicine*

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2018/12,
(Filipiniana Analytics)

0447

Isolation and structure elucidation of two new tetrasubstituted pyrone derivatives from the endophytic fungus *Sordaria* sp. with antifungal and cytotoxic activities

Macabeo, Allan Patrick G. , Stadler, Marc , Narmani, Abolfazl , Cruz, Allaine Jean C.

There is a growing need for new antibiotics, chemotherapeutic agents, and agrochemicals that are highly effective, possess low toxicity, and have a minor environmental impact. Endophytic fungi are a promising source of novel biologically active compounds, and have proven to yield a considerable hit-rate of novel compounds when screening larger strain numbers for biological activities. In this study, two new -pyrone derivatives, sordariapyrones A (1) and B (2), including four known compounds, were isolated from the endophyte *Sordaria* sp. Their structures were elucidated by extensive spectroscopic methods and single crystal X-ray diffraction. Both compounds feature oxidized functionalities at C-2 position not previously observed in other tetrasubstituted -pyrone structures. Compound 1 exhibited moderate antibacterial (vs. *Staphylococcus aureus*) and antifungal (vs. *Rhodotorula glutinis*) activities (MICs = 66.6 g/mL) and cytotoxicity against KB3.1 cells (IC₅₀ = 27 g/mL).

Keywords: -pyrones, *Sordaria sp.*, *Endophytic fungi*, *Antifungal*, *Cytotoxic*, *Medicine*

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NP

0448

Isolation of free-living pathogenic amoeba from human meningoencephalitis cases
Sy, Francisco S., Jueco, Nonette L.

Results show the absence of free-living pathogenic amoeba in 117 human meningoencephalitis cases studied, as were the cases reported in the literature reporting the difficulty of isolating these organism in life. These amoeba, however, were reported to be present in 10 canal areas in Quezon City, Manila and Marikina, Rizal.

Keywords: *Pathogenic amoeba*, *Meningoencephalitis*, *Quezon City*, *Marikina*, *Medicine*

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(Filipiniana Analytics)
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0449

A life away from home: pregnancy at the caesarean section scar
Teotico, Angelita R. , Manzanero-Galvan, Noe

Pregnancy of the caesarean scar is one of the rare types of ectopic pregnancy. It is a pregnancy implanted on a previous Caesarean Section (CS) scar. The case presented aimed to report the demography, pathophysiology, clinical presentation, most appropriate methods of diagnosis and management, with their implications in clinical practice for this rare case of ectopic pregnancy. This is a 30 years of age Gravida 3 Para 1 (1-0-1-1) who developed pregnancy of the CS Scar after full term delivery via the abdominal route. Patient wanted to save her uterus contemplating for future pregnancy. Bioethics committee was consulted. A conservative management thru methotrexate injection was done. After the first cycle of the drug, there was no resolution of the placenta and a live pregnancy was noted. Patient was scheduled for another course of methotrexate therapy, but opted to undergo surgical hysterectomy. A thorough study on the best management of Cesarean scar pregnancy is needed in order to preserve fertility and reduce morbidity.

Keywords: *Caesarean scar*, *Ectopic pregnancy*, *Myometrium*, *Fibrous tissue*, *Medicine*

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2010,
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0450

Lipoxygenase enzyme inhibition, anti-inflammatory and analgesic properties of the leaf extracts of *Syzygium lineatum* (Philippine cherry)

Castillo, Agnes L. , Morales, Adrian Ceasar C. , Ibana, Franklin V. , Mayo, Patricia Louis C. , Maranga, Lina Dae T. , Martin, Eunice Nicole A. , Manzano, Ryan B. , Macadato, Reham B.

Inflammation is a response of the immune system to harmful stimuli, including pathogens, irritants, and damaged cells. Lipoxygenase (LOX) is an enzyme which catalyzes oxidation reactions and plays a major role in the regulation of inflammation. The main purpose of the study is to determine the LOX inhibitory activity and the

anti-inflammatory and analgesic potentials of the leaf extracts of *S. lineatum*, an endemic plant in the Philippines. The dried leaves of *S. lineatum* were percolated then subjected to solvent partitioning and phytochemical testing. The obtained leaf extracts underwent LOX inhibitory assay and in vivo testing for the determination of its approximate lethal dose, analgesic and anti-inflammatory activities. Fifty-five (55) female Sprague-Dawley rats were randomly selected and were assigned to five (5) different groups. The butanol sub-extract was found to be the most potent having an IC₅₀ of 4.09 µg/mL. The doses of *S. lineatum* butanol extract (250 and 500 mg/kg BW) were found to have the same analgesic effect as the positive control ($p>0.05$) while the dose of 250 mg/kg BW exhibited anti-inflammatory activity comparable to that of diclofenac ($p>0.05$). In conclusion, the study provides sufficient evidence showing that the butanol leaf sub-extract of *S. lineatum* possesses 15-LOX inhibitory activity and exhibited both analgesic and anti-inflammatory activities.

Keywords: Analgesic, Inflammation, Lipooxygenase, *Syzygium lineatum*, Medicine

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NP

0451

Male involvement in maternal health

Antonio, Carl Abelardo T. , Austria, Rovea Ernazelle G.

Traditionally, programs related to maternal health are regarded as purely a woman's domain. Nevertheless, the role of the male as the decision maker in the household gave way to the recognition of the male's role in maternal and reproductive health. This paper aimed to provide a review on male involvement strategies and their impact on maternal health based on related studies, discuss the strategies in the Philippine context and suggest interventions given the current state of the Philippine health care system. These strategies utilize the decision-making role of the male by positing itself on the reproductive, sexual and maternal health aspects encompassing important factors, such as birth spacing, first pregnancy, family planning, utilization of skilled birth attendants (SBAs), and delivery in health facilities, antenatal and postpartum care and nutrition. However, negative repercussions include stigmatization of single mothers and reinforcement of the notion of a man's control over a woman's body. Given the current state of the Philippine health care system, the suggested interventions try to veer away from it as much as possible. These include integration of the male involvement strategy into the Pantawid Pamilyang Pilipino Program (4Ps), coursing it through a public-private partnership (PPP) and non-government organizations (NGOs), involvement of educational institutions, strengthening of the health service delivery at the grassroots level, reinforcement of existing laws, and research on its institutionalization. With carefully-planned strategies that recognize existing gender norms and other sociocultural factors, male involvement in maternal health could be a possible catalyst in decreasing the Philippine maternal mortality rate (MMR).

Keywords: male involvement, maternal health, reproductive health, Philippines, Medicine

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0452

Malignant melanoma of the nasolacrimal duct extending to the nasal cavity

Delos Santos-Garcia, Aileen S.

To report a rare case of malignant melanoma of the nasolacrimal duct that extends into the nasal cavity, its clinical manifestations, differential diagnosis, prognosis and management option in a tertiary hospital. A 61-year old male with the chief complaint of bloody epiphora on the right eye and intermittent epistaxis for 11 months was admitted. On physical examination, there was a 2x2 cm mass on the right lateral nasal dorsum, and nasal endoscopy was essentially normal. Orbital CT scan demonstrated a solid-cystic mass on the right lacrimal duct extending from the right medial canthus to the right inferior nasal meatus, which was confirmed by dacryoscintigraphy. Excision biopsy of the right nasal dorsum mass revealed malignant melanoma. The patient underwent 3 cycles of

chemotherapy, however, bloody epiphora and epistaxis persisted. Six months later, the patient was referred to ENT and nasal endoscopy showed a black friable mass emerging from the inferior meatus which revealed malignant melanoma on biopsy. A wide resection was done via medial maxillectomy with orbital preservation. Post-operatively, there were no complications. However, 5 months later, recurrence was noted over the nasal cavity which was confirmed on biopsy. Mucosal melanoma of the head and neck is a highly malignant tumor representing less than 1% of all melanomas. Prognosis is poor, with a 5-year survival rate of 10-15% and 10-50%, among nasolacrimal duct and paranasal sinus melanoma respectively. Chemotherapy, wide resection and radiation were done on this patient. However, despite aggressive management, the lesion recurs subsequently. The case presented underscores the importance of multispecialty collaboration between the ophthalmologist, otorhinolaryngologist and oncologist in managing this rare disease.

Keywords: *Malignant Melanoma, Orbital CT scan, Mucosal melanoma, Chemotherapy, Medicine*

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0453

Maternal mortality at the Philippines General Hospital: A ten-year survey (1971-1980)

Jalbuena, Julita R.

A total of 231 maternal deaths at the Charity Wards of the Philippines General Hospital for 1971 to 1980 were analyzed, with focus on the 156 deaths found directly caused by pregnancy-related diseases. The classic triad of hemorrhage, infection and hypertensive disorders claimed the most number of lives, followed closely by trophoblastic disease. About 65% of the 231 deaths were found preventable. Significant findings are discussed and recommendations are for the prevention of maternal mortality.

Keywords: *Maternal mortality, Philippines General Hospital, Hemorrhage, Infection, Hypertensive disorders, Medicine*

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1982 September,
(Filipiniana Analytics)
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0454

Metal organic framework as potential drug carrier for magnolol

Villaflora, Oliver B. , Lin, Chia-Her , Corpuz, Mary Jho-Anne T. , Santos, Joshua H.

Magnolol, a neolignan derived from *Magnolia officinalis*, has been reported to possess various pharmacological property. The neuroprotective property was further proven due to its ability to counteract the toxic effects of beta amyloid peptides on rat pheochromocytoma cells (PC12) making it a good candidate for the management of Alzheimer disease. However, the main limitation for the use of magnolol is its low bioavailability. The study is aimed to prepare a metal organic framework carrier for increased oral bioavailability of magnolol. Metal Organic Frameworks (MOFs) were synthesized using solvothermal method. MOF preparations were characterized and tested for their beta-secretase inhibitory potential, acute oral toxicity, bioavailability profile, tissue distribution behavior, and neuroprotective property. Percentage yields of the following MOFs were 19.72% for MIL-53(Fe), 71.99% for MIL-100(Fe), 53.03% for Uio-66(Zr), 26.29% for MIL-88A(Fe) and 11.15% for MIL-88B(Fe). Among MOF carriers, Uio-66(Zr) was found to load 72.16% magnolol (~0.721 mg magnolol/mg MOF) after 36 hours. Further characterization and analyses are still on going. Uio-66(Zr) MOF provided the maximal drug loading capacity for magnolol and can be of potential use in the oral treatment for Alzheimer's disease.

Keywords: *Magnolol, Metal organic framework, Drug delivery, Medicine*

Method validation and assessment of models to estimate 24-hr urinary sodium from spot urine samples

Dumag, Rosemarie J.

The gold standard for estimating the sodium intake in a population level is the 24-hour urine collection. In spite of being the gold standard, the method has its limitations. Several studies were conducted to correlate urinary sodium concentration based on 24-hour and spot urine collections. As a result, models such as Kawasaki and Tanaka use spot urine to estimate sodium concentrations. The study aimed to validate the method for determining urinary sodium from the 24-hour and spot urine sample. Assessment of Kawasaki and Tanaka models for the estimation of 24-hour urine was undertaken. Urine samples (24h and spot) for the conduct of method validation were collected from a volunteer. Urine sodium was determined using Atomic Absorption Spectroscopy and urine creatinine was measured using Cobas Clinical Analyzer. After method validation, urine samples, both 24-hours and three (morning, afternoon and evening) spot urine samples were collected from 78 adult participants aged 21 to 58 years, which was assessed using Kawasaki and Tanaka models. Results of analysis of urine samples were evaluated using paired t-test. For method validation, precision as repeatability was conducted, (n=10 days) for urine sodium that gave a Horwitz Ratio (HorRat) value of 0.4643 for spot urine and 0.4747 for the 24-hour sample. For urine creatinine, HorRat was 0.1046 and 0.1648 for spot and 24-hour urine respectively. Precision as intermediate was performed, (n=7days) for urine sodium and has a HoRat value of 0.2843 (spot), 0.3175 (24-hour) and for urine creatinine 0.4280 (spot), 0.4724 (24-hour). Accuracy of the method, was determined using a standard reference material (SRM) 2668 level 1 and 2 for urine sodium with means 1798.18 mg/L and 1784.71 mg/L, respectively, both within the acceptable range. Moreover, Precinorm and Precipath were used as reference materials for urine creatinine, with values within the range 96.46 mg/L and 49.28 mg/L respectively. Both models Tanaka and Kawasaki showed significant difference against the 24-hour urinary sodium with all the computed p-value less than the set p-value 0.05. With Tanaka model, three spot urine samples gave a p-value of <0.05. On the other hand, with Kawasaki model, all spot urine samples gave a p-value of 0.0000. The significant differences of the results can be accounted for variability of sodium consumption of the participants and the assurance of completeness of the 24-hour urine. To further assess the results, a correlation of sodium intake using the data from dietary intake is recommended.

Keywords: *method validation and assessment, urinary sodium, spot urine sample, sodium intake, atomic absorption spectroscopy, urine creatinine, Horwitz ratio, DOST-FNRI, Medicine*

Method validation and comparison study on the determination of blood lipid profile and blood glucose using clinical chemistry analyzer and point-of-care test (POCT)

Lipids and glucose play important roles in the energy metabolism of the body. However, abnormal levels of cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglycerides may cause heart-related diseases. Furthermore, in order to function normally, the level of glucose should be maintained. Nowadays, the development of self-monitoring point-of-care apparatus has been acceptable to use because of its convenience and speed. The study aimed to validate the capability of the FNRI Service Laboratory to analyze the blood lipid profile and blood glucose using the clinical chemistry analyzer and POCT. About 5mL blood sample were extracted from 79 adult participants. Prior to the analysis of samples, method performance characteristics of the Cobas Integra 400 plus were measured and evaluated using PreciControl Clinical Chemistry (PCCC). Whole blood and serum samples were analyzed using POCT and clinical chemistry analyzer, respectively. Measuring ranges and lower limits of measurement were determined by the manufacturer and were included in the Cobas

substrates brochure. Using PCCC1 and PCCC2 for the repeatability and intermediate precision, the method is said to be precise based on the acceptable HorRat value of ≤ 1.3 . In addition, POC controls were analyzed before and after analysis and were found to be within the acceptable control range. The two methods of analysis used were conventional and POCT which gave a statistically different result (P-value ≤ 0.05) for the lipid profile except for glucose with P-value > 0.05 . Moreover, the results of the Bland-Altman Plot showed a non-agreement of the results of the analysis. Variability of the results can be accounted for the lack of robustness of the POC meter during continuous analysis even in a small sample size. To preserve the integrity of the serum samples, analysis should be conducted in a shorter period of time.

Keywords: blood lipid profile, blood glucose, clinical chemistry analyzer, point-of-care test, low-density lipoprotein, high-density lipoprotein, triglycerides, metabolism, DOST-FNRI, Medicine

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0457

Method validation of serum/RBC folate using microbiological assay

Dumag, Rosemarie J.

Folates are water-soluble vitamins responsible for cellular development, metabolism and hematopoiesis. According to the DOST-FNRI's National Nutrition Survey (2008), the prevalence of folate deficiency among Filipino women of reproductive age was 38.7% and 20.9% based on serum and red blood cell folate, respectively, using radioimmunoassay kits. Since folate deficiency is associated with megaloblastic anemia and neural tube defects, it is necessary to continually assess the folate status of the population in order to initiate an intervention. However, production of the kit has been discontinued, thus, the validation of the microbiological assay (MBA) using *Lactobacillus rhamnosus* was conducted. The study aimed to validate the folate microbiological assay for serum/RBC folate. Microbiological assay of folate in serum and whole blood hemolysate was done by absorbance readings in a microplate reader at 590 nm. Cryoprotected *L. rhamnosus* (ATCC 2773) was prepared and dispensed in multiple vials for long-term storage. Several calibration and optimization runs were performed using 5-methyltetrahydrofolic acid (5MeTHF) and certified reference materials (CRM) for whole blood hemolysate and serum, respectively. Using the 35% coefficient of variation (CV) for serum and 50% CV for whole blood hemolysate, acceptable range for the CRMs were computed at 12.14–16.3 nanomole per liter (nmol/L) and 29.5–44.3 nmol/L respectively. Initial trial showed very minimal growth of the microorganism. Calibration curve was established after anaerobic incubation. Results from the trials showed mean values within acceptable range (16.02 nmol/L for serum and 40.35 nmol/L for whole blood hemolysate) but repeatability and reproducibility merits were not met. Related studies suggest the use of standardized critical reagents and effective heat sealing of the microplates to prevent leakage and to improve precision. Initial trials of the MBA showed unsatisfactory results. Data obtained for the CRMs were within the computed acceptable range but with high CV. Improvement on the conduct of assay to achieve better calibration curve and folate measurements will be implemented using the frozen assay kits provided by the Centers for Disease Control and Prevention.

Keywords: serum, microbiological assay, whole blood hemolysate, folate, *Lactobacillus rhamnosus*, anaerobic condition, hematopoiesis, DOST-FNRI, Medicine

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2019,
(Filipiniana Analytics)

Molecular bioexploration of three new dothideomycete fungi for drug discovery of novel antibiotic, anti-biofilm, nematocidal and anti-cancer agents

Stadler, Marc , Hyde, Kevin D. , Phukhamsakda, Chayanard , Pilapil, Luis Agustin E. , Garcia, Katherine Yasmin M., Macabeo, Allan Patrick G.

The phylum Ascomycota is known to be the most diverse group in the fungal kingdom with over sixty thousand species occurring worldwide. While many studies have reported the diversity of biologically active secondary metabolites in this group of fungi, little is known on natural products produced by plant-associated Ascomycota, especially, those belonging to the class Dothideomycete. In this study, we demonstrate the isolation and structure identification of new biologically active secondary metabolites from three new Dothideomycete fungi namely, *Sparticola junci*, *Rousella sp.* and *Pseudolophioblastoma mangiferae* with antimicrobial, bacterial biofilm inhibitory, nematocidal and cytotoxic activities. Large scale fermentation followed by preparative HPLC of crude fungal extracts allowed the isolation of sixteen compounds. These were spectroscopically identified as oxidized *nor-seco* bisnaphthalenes, abscisic acids, cyclodepsipeptides, phenolics and meroterpenoids. In general, the compounds exhibited potent antimicrobial activities against four fungi and three Gram-positive bacteria, inhibited *Staphylococcus aureus* biofilm formation, toxicity against *Caenorhabditis elegans* and cytotoxic activities against cancer cells. Our results show the promise of Dothideomycete fungi in drug discovery.

Keywords: *Dothideomycete fungi, Antibiotic, Biofilm inhibitor, Medicine*

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Molecular descriptors for drugs: a discriminant analysis

Billones, Junie B. , Gonzaga, Alex C. , Billones, Liza T.

The biological activity of a compound is assumed to be encoded in its chemical composition and geometric structure, from which physico-chemical, electrotopological, and graph theory-derived properties can be determined. This study aimed to identify molecular descriptors derived from Dragon® 6 software that can discriminate compounds as drug or non-drug. In this study, over 4000 molecular properties were obtained for approximately 2000 known drugs and 2000 non-drugs on which Linear Discriminant Analysis was performed. Compounds can be discriminated between drug and non-drug with 81% accuracy using only two molecular descriptors, the information index HVcpx and the topological index MDDD. A “Rule of Three” (HVcpx ≤ 3 and MDDD ≥ 30) seems to confer druglikeness in compounds. This rule can be used as additional filter in high throughput screening of compounds in any drug discovery research.

Keywords: *Dragondescriptors, discriminant analysis, druglikeness, topological, information index, drug discovery, Medicine*

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Mutagenic and clastogenic effects of chloroform

Lim-Syllanco, Clara Y., San Agustin, Jovenal

Chloroform was shown to exhibit DNA damaging capacity. However, its DNA damaging capacity is not a consequence of its direct reactivity with DNA. Directly, it did not affect base-pair and frameshift mutations. But chloroform is metabolized to a frameshift mutagen in the male mouse. Thus, chloroform is a pro-mutagen although

it is not a direct mutagen. It is only a pro-mutagen but also clastogen (chromosome breaking). Its clastogenicity and mutagenicity, however, is reduced in the presence of vitamin A.

Keywords: *Chloroform , Frameshift mutations, Base-pair mutations, Mutagenic effects, Clastogenic effects, DNA damaging capacity, Medicine*

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0461

Mutagenic and clastogenic effects of safrole containing natural products

Lim-Sylianco, Clara Y., San Agustin, Jovenal, Panizares, Imelda

Natural products containing high and trace amounts of safrole were used in this study. Oil of sassafras which is known to contain very high amounts of safrole exhibited very high DNA damaging capacity. Without metabolic activation, it induced base-pair mutations in *Salmonella typhimurium* mutants. Upon metabolism by the experimental mouse its tendency to induced base-pair mutations was still observed. It also exhibited chromosome breaking effects (clastogenic effects). Among those that contain trace amounts of safrole, only mace and nutmeg exhibited DNA damaging capacity. Without metabolic activation, these did not induced base-pair mutations or frameshift mutations. Upon metabolic activation mace and nutmeg induced base-pair mutations. Clastogenic effects were also shown by mace and nutmeg. Cinnamon, ginger brew, and black pepper were neither mutagenic nor clastogenic.

Keywords: *Mutagenic effects, Clastogenic effects, Safrole , Base-pair mutations, Medicine*

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0462

Mutagenic and clastogenic potential of some antihypertensive drugs

Lim-Sylianco, Clara Y., Pablo, Cynthia B., Panizares, Imelda

The DNA damaging interactions of reserpine was suggested by its inhibitory effect on the growth of recombination repair deficient strain of *Bacillus subtilis*. Without metabolic activation, reserpine include frameshift mutations in *Salmonella typhimurium* mutants. In the experimental mouse, reserpine was metabolized to a base-pair mutagen. Its tendency to induce frameshift mutations was still observed after metabolism in the mammalian system. In addition, reserpine exhibited clastogenic or chromosome breaking effects. All these properties were not observed when reserpine was in combination with bendroflumethiazide, mefrusside and inositol isonicotinate. On the other hand, its mutagenic and clastogenic effects were enhanced when it was in combination with hydralazine hydrochloride and hydrochlorthiazide.

Keywords: *Mutagenic effects, Clastogenic effects, Antihypertensive drugs , Reserpine , Frameshift mutations, Base-pair mutations, Medicine*

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Nanostructured lipid carriers (NLCS): a promising and state-of-the-art drug carrier for delivering antimicrobials

Castillo, Agnes , Zulfakar, Mohd Hanif , Alcantara, Khent

Mupirocin is a promising *broad-spectrum antibiotic* that is effective in treating MRSA infections. It has a unique structure and mode of action from most antimicrobials. However, due to its high protein binding, rapid elimination and hydrolysis following injection, current therapeutic use is limited to topical administration. Nanotechnology-driven innovations provide hope for patients and practitioners in overcoming the problem of drug resistance, facilitating drug transport and protecting the drug from degradation. Nanostructured lipid carriers (NLC) offer the advantage of improved drug loading capacity, release properties and targeted drug delivery. The objective of this research is to develop and characterize Mupirocin-Loaded Nanostructured Lipid Carriers (MNLC) for intravascular administration. The MNLC was produced by a combination of high-shear homogenization and high-pressure homogenization of solid (cetyl palmitate) and liquid (caprylic/caprylic acid) biocompatible lipids in 5 different ratios. The particles showed spherical shape under FESEM. The mean particle size, polydispersity index (PDI) and the zeta potential (ZP) of the MNLC formulations, as determined by dynamic light scattering (DLS), were between 99.8 to 235 nm, PDI lower than 0.164, ZP from -25.96 to -19.53 and pH ranging from 6.28-6.49. The MNLC formulation also enhances the antibacterial activity of mupirocin. All formulation showed sustained drug release and good physical characteristics during three (3) months storage under 25°C and 40°C. It also revealed that the MNLC is safe at 250 mg/kg dose in rats. The MNLC also showed a significant increase in plasma concentration in rabbits following IV administration thus demonstrating an enhancement on its pharmacokinetic profile as compared to free mupirocin.

Keywords: *Mupirocin, Nanostructured lipid carrier, Drug delivery, Medicine*

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Nonclonal chromosome abnormalities in Filipino patients with hematologic malignancies

Abad, Ma. Celeste , Pinuela, Cathlyn Leigh, Zimmer, Mary Christine , Enriquez, Ma. Luisa

Increasing reports on nonclonal chromosome abnormalities (NCCAs) in hematologic malignancies raise questions on their role in disease causation and progression and their relationship with clonal chromosome abnormalities (CCAs) and genomic instability. The objective of this study is to document nonclonal chromosome abnormalities specifically deletions in chromosome 9 in various hematologic malignancies. Peripheral blood or bone marrow aspirates from patients were obtained and cultured using standard cytogenetic protocol. G-banded chromosomes were analyzed and karyotypes were prepared based on International System for Human Genetics Nomenclature (ISCN). We present 643 various cases of hematologic disorders carrying NCCAs seen in the laboratory from 1995 to 2018. Of these, 44 (7%) cases specifically carried nonclonal deletions at various locations in the short (p) and long (q) arms of chromosome 9. Deletion in 9q12 was seen in 17 cases. The highest number of del(9) was found among patients diagnosed with leukemia (23%) that includes AML, CML CLL and Pre-B ALL followed by myelodysplasia (18%), cytopenia (14%), myeloproliferative disease (9%), multiple myeloma and anemia (7%). Single non-clonal del(9) were seen in 27 patients (61%) of 44 patients in hematologic cases while 17 patients (39%) had more than one non clonal abnormality. Published works have documented that chromosome 9 harbors several oncogenes and tumor suppressor reported to be involved in disease progression. The findings of this study underscore the role of NCCAs in the etiology and disease progression and thus must be studied further.

Keywords: *Chromosome 9, Nonclonal chromosome abnormalities, Medicine*

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Oral ramosetron in combination with dexamethasone versus oral ramosetron alone for post operative nausea and vomiting: A randomized controlled trial

Tanchoco, Ma. Lilybeth R. , Realubit, Elena B. , Yoingco, Monique M. , Guerrero, Julius Robert B.

To compare the therapeutic efficacy of a preoperative single administration of long-acting 5-hydroxytryptamine type 3 (5-HT₃) receptor antagonist (Ramosetron) in an orally disintegrating tablet formulation alone versus the effects of oral ramosetron with dexamethasone in post operative nausea and vomiting. The study was done in a tertiary hospital. Sixty patients, ASA I-II, aged 21-80 years old, undergoing elective surgery, were included in the study. They were randomly assigned to preoperative antiemetic prophylaxis regimen (A: Ramosetron with Dexamethasone [n=30] and B: Ramosetron alone [n = 30]). Anesthetic technique used was general anesthesia. Three hours before the surgical procedure, all patients were given oral ramosetron 100 mcg. Those patients assigned to the ramosetron and dexamethasone group were given intravenous Dexamethasone at cutting time. Postoperative analgesic management was standardized in all patients. Postoperative variables were collected in the recovery room (2 and 4 hours after the end of anesthesia) and in the ward (6, 12, and 24 hours after recovery from anesthesia). Episodes of nausea and vomiting were recorded. Thirty subjects were assigned to each group. Two patients in each group complained of nausea at 4 and 6 hours post anesthesia. Vomiting at 4 and 6 hours post anesthesia was reported by 2 patients in the Ramosetron with Dexamethasone group. Statistical analysis revealed that there was no significant difference in the efficacy of the two regimens as proven (p value >0.05). Postoperative nausea and vomiting was lessened in both prophylactic antiemetic regimes. However, there was no significant difference in the prevention of postoperative nausea and vomiting in patients given oral Ramosetron with Dexamethasone versus Ramosetron alone.

Keywords: *Ramosetron, Post operative nausea and vomiting, Dexamethasone, Medicine*

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2010,
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NP

Outputs and outcome of the pharmacy directly-observed treatment short-course (DOTS) initiative in the Philippines

Antonio, Carl Abelardo T. , Fabella, Ronald Allan M. , Mendoza, Eden C. , Manalo, Jorel A. , Agbon, Azar G. , Avelino, Michelle D. , Guevarra, Jonathan P. , Orolfo, Diana Dalisay A. , Bermudez, Amiel Nazer C. , Cochon, Kim L.

This is an evaluation of the effectiveness of the technical assistance package for the Pharmacy DOTS Initiative (PDI) in the Philippines. Five pre-identified implementation sites were included in the evaluation. A survey was conducted to ascertain pharmacies currently implementing PDI and the number of TB presumptive cases referred by these pharmacies. Data abstraction was performed to determine the change in the number of TB cases seen by local TB programs after its implementation. Findings revealed that the proportion of pharmacies actively referring presumptive TB patients is not significantly lower than 60% (p=0.1892). Furthermore, results showed that the average monthly referrals were not statistically lower than 20 clients per month (p=0.9159). Nevertheless, interrupted time series analysis found no statistically significant immediate effects (p=0.516) and long-term effects (p=0.3673) on the total number of new TB cases identified after the PDI was implemented in the year 2014. The PDI was able to achieve outputs related to pharmacy engagement and referral of TB presumptive clients. However, the PDI was unsuccessful in increasing the actual number of TB presumptive cases seen by local TB programs in its implementation sites.

Keywords: *tuberculosis, Directly Observed Treatment Short Course (DOTS), Innovations and Multi-Sectoral Partnerships to Achieve Control of TB (IMPACT), evaluation, Philippines, Medicine*

PCR-based detection of ruminant trematode metacercariae encysted in plants

Abella, Evaristo A. , Domingo, Clarissa Yvonne J. , Celestino, Ma. Theresa F.

The metacercariae of specific species of trematodes may encyst either alone or concurrently in the same plant. Their morphological characteristics is very similar leading to misidentification that constraints in dealing with the disease etiology and transmission in ruminants. Therefore, proper identification of these species is important and the most sensitive and accurate means of identifying them would be using molecular-based technique. PCR-based detection of *Fasciola gigantica*, *Fasciola hepatica* and *Calicophoron calicophorum* was performed to assess their presence from collected plants in selected barangays of Science City of Muñoz, Nueva Ecija. Their occurrences from specific plant species, types of water submerged areas and barangay origin were also determined. DNA sequence analysis revealed 1 out of 2 representative samples at 98% homology to *C. calicophorum*. The percentage occurrence based on PCR result revealed 6.1% for *C. calicophorum* and no occurrence for *Fasciola* spp. Plant samples with *C. calicophorum* were *Oryza sativa* L., *Melochia concatenata* L. and *Leptochloa chinensis* (L.) Nees. These were collected from three barangays namely: Brgy. Franza, Brgy. Bantug, and Brgy. Calisitan located in irrigation canals and rice fields. The knowledge of the distribution of the parasites at the target community coming directly from the source will help in the formulation of control strategies and in ways of educating farmers on the transmission of trematode infections affecting the ruminants.

Keywords: *PCR, Metacercariae, Encyst, Etiology, DNA sequence analysis, Medicine*

Pharmacy DOTS Initiative (PDI): a case study on integrating pharmacies in the tuberculosis directly observed treatment-short course (TB DOTS) network in the Philippines

Manalo, Jorel A. , Orolfo, Diana Dalisay A. , Cochon, Kim L. , Guevarra, Jonathan P. , Antonio, Carl Abelardo T. , Bermudez, Amiel Nazer C. , Avelino, Michelle D. , Agbon, Azar D. , Mendoza, Eden C. , Fabella, Ronald Allan M.

Tuberculosis (TB) is a disease that has continuously burdened Filipinos. Various programs have been launched by public and private sectors to decrease the incidence of TB and to scale up TB prevention and control in the country. In line with this, pharmacists have been contributing in the campaign against TB since 2004 through the implementation of the Pharmacy DOTS Initiative (PDI). Through the project Innovations and Multi-Sectorial Partnerships to Achieve Control of TB (IMPACT), PDI was relaunched in the country in 2014. This case study aims to evaluate the impact of PDI on TB prevention and control by assessing the effectiveness of the technical assistance package rolled out during program implementation. A review of documents was done to evaluate the achievement of the specific targets of PDI. Among the targets, the percentage of actively referring pharmacies and the number of referrals made throughout the program failed to meet the target. The remaining program targets such as the establishment of a referral system, training of pharmacy personnel, adoption of a TB DOTS curriculum in pharmacy schools, and presence of national legislation, policies, and guidelines relevant to PDI were satisfactorily met. PDI had a good response at the start of its implementation, but several issues resulted in the inability to sustain the interventions and achieve set targets.

Keywords: *tuberculosis, program evaluation, case study, Philippines, Medicine*

Preparation and characterization of PLGA/chitosan encapsulated quercetin
*Macalalad, Angelica A. , Comia, Erwin Raphael M. , Castor, Aubrey Kaye M. , Atienza, John-Jay C.,
Magoling, Bryan John*

In this study, quercetin which is a flavonoid widely distributed in many fruits and vegetables, which have unique biological properties which are known to have benefits to overall health and disease resistance but have poor solubility and availability, is encapsulated by chitosan (deacetylated chitin) and polylactic-co-glycolic acid (PLGA) to increase bioavailability. An emulsion solvent diffusion method in water method was used to encapsulate quercetin within PLGA/chitosan polymeric microsphere, with the aim to protect quercetin against degradation and enhance its biocompatibility. Encapsulation efficiencies ranged from 70-86%. Statistical analysis arrived to the optimum condition of the microsphere and it was subjected to characterization. Quercetin loaded microsphere exhibited the size and zeta potential of 1.3 μm and -14.00, respectively. SEM images showed scattered arrangement of the polymer and several irregularly shaped particles. FTIR analysis showed the absence of O-H stretch in the microsphere which may be associated with chitosan covering the microspheres. This unique drug formulation was considered to be successful based on the results gathered.

Keywords: *Encapsulation, PLGA/chitosan, Quercetin, Medicine*

**Prevalence of dengue fever (DF) and dengue hemorrhagic Fever (DHF): a description
and forecasting in Iligan City, Philippines**
Baguio, Mirasol L. , Opena, Edward Laurence L. , Guillena, Junge B.

This study presents the prevalence of dengue fever (DF) and dengue hemorrhagic fever (DHF) cases admitted at Mindanao Sanitarium and Hospital (MSH), Iligan City from the year 2000-2008. A total of 606 cases were reported to have DHF and 993 for DF. For DHF, 51.81% were males and ages 4-12 contributed 60.73% of the reported cases. In the 993 cases of DF, it has been noted that 55.09% were males; ages 7-34 showed higher DF susceptibility (72.21%). Majority of the dengue cases reported as of 2000-2004 are coming from Iligan City. Also, a possible alternating increase-decrease-increase pattern in the number of cases in each year has been noted to be consistent throughout the study period. Furthermore, this study tries to develop a univariate time series model forecasting the monthly occurrence of dengue cases at MSH. The results showed that the autoregressive integrated moving average forecast curves were consistent with the pattern of the observed values. Identification of the predominant dengue serotypes that are most common in Iligan city and nearby localities is one of the strongest recommendations of this study. Further recommendations include: (1) analyses of other patients' profile like blood type, stress factors, and diet, (2) dissemination of this study's result to the public via forums and (3) expansion of the research locale.

Keywords: *Dengue fever, Dengue hemorrhagic fever, Prevalence, ARIMA, Medicine*

Quality assessment of five selected food supplements containing ampalaya (*Momordica charantia*) sold in chain drug stores in Davao City

Pascual, Bernet Cyril Lois R. , Gringco, Merry B. , Bersabal, Kathleen G., Magdadaro, Charmaine A.

The most important challenge that arises in the use of food supplements is its incomplete assessment of quality and efficacy. A quantitative descriptive study was designed to conduct the quality of the commercially available food supplement products containing Ampalaya. This includes the physico-chemical and microbial analyses. The findings revealed that the appearance and weight uniformity of the capsules conformed to the standard. The disintegration time revealed wide variation among the test products. The moisture content of the five products was high but the four products conformed to the specification limit of 5%-12%. The ash content was also high and did not conform to the specification standard, which is 14%. The level of Cd and Aerobic Plate Count have exceeded the allowable limit however, Pb, Hg, yeast and mold conformed with the specifications set by Federal Drug Administration and so with the weight uniformity, disintegration and moisture content. There was no significant difference in terms of its weight uniformity, yeast and molds and APC analyses. But there is a significant difference in disintegration test, moisture, ash and mineral content and levels of heavy metals. This implies that there is a need for a continuous monitoring of the quality of the commercially available herbal supplements.

Keywords: *Quality assessment, Ampalaya food supplement, Physicochemical test, Microbial test, Medicine*

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2013,
(Filipiniana Analytics)
NP

Retention of basic and clinical concepts in anatomy and the effect of multiple testing

Atienza, Melflor A. , Reyes, Julius Ceazar H.

Clinical competency depends on student's knowledge of basic sciences including the learned concept in Anatomy. But what if students forget the learned knowledge of human anatomy?

This research investigated knowledge gain post instruction, knowledge retention (or loss) of basic and clinical concepts five months after. It also compared the effect of delayed-multiple testing and delayed single testing in the retention of acquired knowledge.

This is an experimental study conducted among first year medical students who underwent neuroanatomy module and later followed-up after five months using a 32-item test-retest. Items were categorized as basic knowledge and clinical correlation. Participants were randomly assigned into two groups; delayed-multiple and delayed-single testing. Mean difference in scores between the 2 testing periods (end of module and terminal delayed test) were analyzed using paired samples t-test while mean difference between basic and clinical correlation were analyzed using independent samples t-test. The degree of knowledge loss was determined using the computed Knowledge Loss Percentage (KLP).

Knowledge gain was noted at the end of instruction (p value < 0.001). Knowledge loss is higher among basic knowledge (p value < 0.001) and demonstrated a higher computed KLP. Repeated testing demonstrates a higher retention (KLP=4.34) compared to those administered with a single test only (KLP=26.73).

Knowledge loss occurs post instruction and more pronounced among basic concepts. Clinical correlation and frequent testing demonstrate a significant retention capability. To reduce the effect of knowledge loss among basic concepts, this study recommends the implementation of multiple testing.

Keywords: *knowledge loss, clinical correlation, assessment, Medicine*

A review of the regulations on interchangeability of generic medicines and comparability of biosimilars in the Philippines

Quizon, Paul Marvin T.

The access to quality, safe, effective, and affordable medicines, such as generics and biosimilars remains to be one of the strategies of the Philippine government to achieve its health agenda, as seen in various legislations and policies. In order to ensure the interchangeability of generic medicines and comparability of biosimilars with their respective reference products, regulations to assure these characteristics have been implemented by the national regulatory authority. This narrative review aimed to compare the current regulations on interchangeability of generic medicines and comparability of biosimilars in the Philippines with those of selected international regulatory agencies and organizations, and identify research opportunities that can address some of the challenges in complying with these regulations. Local regulations related to interchangeability and comparability were obtained from the official website of the Philippine Food and Drug Administration. Similarly, international regulations and guidelines which were selected based on a set of inclusion criteria were reviewed and compared with the local regulations. The internet search was conducted from 01-15 September 2017 and no statistical calculations or techniques were involved in the thematic content analyses. The current regulation to ensure the interchangeability of generic medicines in the Philippines is based on the ASEAN and WHO Guidelines, and recognizes both in vivo and in vitro methods to demonstrate therapeutic equivalence. For the *in vitro* method, drug substances classified as BCS Class 1 and 3 are the only ones eligible for the biowaiver approach. For biosimilars, the Philippines adopted the WHO Guidelines which recognize comparability exercises as the approach to ensure the similarity of biosimilars with their respective reference products. The current regulations on the interchangeability of generic medicines and comparability of biosimilars in the Philippines are aligned with those of international guidelines particularly of the World Health Organization (WHO). Research opportunities to address some of the identified challenges include permeability testing methods, development of biowaiver monographs, and practice research on biosimilars interchangeability, safety, and nomenclature.

Keywords: *generics, biowaivers, biosimilars, interchangeability, comparability, regulations, Medicine*

Risk factors to non-communicable diseases (NCDs) in the Philippines

Acuin, Cecilia Cristina S., M.D., Ph.D.

For the past decades, prevalence rates of major risk factors to non-communicable diseases (NCDs) in the Philippines continue to rise and are now the leading causes of death in the country. According to the World Health Organization (WHO), NCDs account for 67% of total deaths that occurred in 2012, and nearly 35% of the global burden of disease has its origin in adolescence. This study on the assessment of selected risk factors to NCDs among adolescents, 10 to 17 years old and adults, 18 years old and above, was conducted as a component of the 8th National Nutrition Survey (NNS) in 2013. With the launch of the WHO Global Action Plan for the Prevention and Control of NCDs 2013-2020, the Department of Science Technology-Food and Nutrition Research Institute has provided data to help track the prevalence of selected NCD risk factors in the Philippines. The 8th NNS employed a multistage stratified random sampling design and covered all 17 regions of the Philippines. It was a household-based survey and used a de jure approach in enumerating individuals or survey respondents. Data from all adults, 18 years old and over, and adolescents, 10 to 17 years old, were analyzed using Stata version 12.0. Data on blood pressure, obesity, smoking, and alcohol drinking were analyzed among adolescents and adults while data on blood glucose, lipid profile, physical activity, and unhealthy diet were analyzed among adults. Urinary sodium excretion were analyzed only among adults in the National Capital Region. Results of this study showed that NCD risk factors were present among Filipino adolescents and the prevalence was higher among adults. Preventive

measures to reduce the prevalence of NCD risk factors are urgently needed and should not only focus among older population. Preventing NCDs at an early age may benefit not just the adolescents of today but also their future adult lives. The government should invest in monitoring and evaluating the effectiveness of implemented programs and assess if these initiatives are reaching the targeted population groups. Lifestyle change-focused programs and policies concerning alcohol consumption, unhealthy diet and sedentary lifestyle need to be given more emphasis.

Keywords: *risk factors, national nutrition survey, hypertension, obesity, smoking, alcoholism, DOST-FNRI, Medicine*

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2018,
(Filipiniana Analytics)

0476

Rotavirus and afebrile seizure... the missing link found *Caro, Glovelyn S.*

To raise awareness on the neurologic manifestations of a common gastrointestinal pathogen. This is a case of a 2-year old girl admitted due to upward rolling of the eyeballs and stiffening of extremities. Four days prior to admission, she had four episodes of non-projectile vomiting of previously ingested milk. There was no other associated sign or symptom. Three days prior to admission, she was no longer vomiting but had 4 episodes of yellowish to greenish, non-mucoid and non-blood streaked watery-based stools. She was brought to a private physician and was advised oral rehydration solution which she tolerated. The diarrhea persisted, prompting another consult one day prior to admission. She had normal urinalysis and was told to continue the ORS as needed. A few hours prior to admission, she had upward rolling of eyeballs and stiffening of all extremities lasting for 2 minutes. She was to the ER and was subsequently admitted. She had 2 previous admissions for seizures: benign febrile convulsion secondary to acute gastroenteritis at 11 months old and an afebrile seizure at 2 years during another bout of gastroenteritis. She was seen by a neurologist and was worked up. However, her EEG, blood count, stool examination, urinalysis and electrolytes were all normal. This 2-year old girl had a history of recurrent seizures associated with diarrhea. She had no neurological deficit after each occurrence. Above case presented with afebrile seizures during episodes of diarrhea. Patient did not have significant electrolyte disturbance and the stool was positive for rotavirus antigen. The first report of central nervous system involvement after rotavirus infection was made in 1978. Since then, this association has been described by several authors. Studies have reported various frequencies of CNS involvement in children with acute rotavirus gastroenteritis. This case was reported with recurrent seizures associated with diarrhea on a 2 year old girl. The physical and neurologic examinations were normal. The stool exam was positive for rotavirus antigen. In the evaluation of afebrile seizures, we must be aware of common pathogens with rare manifestations.

Keywords: *Rotavirus, Afebrile Seizure, Neurologic manifestations, Medicine*

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2010,
(Filipiniana Analytics)
NP

0477

Screening, characterization, and evaluation of cholinergic activities from Philippine *Theraphosidae* spider venom

Mayor, Anna Beatriz R. , Guevarra, Jr., Leonardo A. , Dupo, Aimee Lynn B. , Devanadera, Mark Kevin P. , Sarmiento, Lance Ehrold D. , Estrella, Mitzi Rain R. , Lao, Angelic Gayle J. , Fernandez, Jerene Bashia B. , Aguilar, Jeremy S. , Lopez, Simon Miguel M., Nuñez, Olga M. , Santiago-Bautista, Myla R. , Santiago, Librado A.

Cholinergic hypofunction via acetylcholinesterase (AChE) activity alterations is essential for Alzheimer's disease (AD) progression. Thus, this prompts the study to explore the AChE inhibitory effects of Philippine

Theraphosidae spider venom peptides for cholinergic studies. The crude venom was fractionated by C18 RP-HPLC which was monitored at 215 and 280 nm followed by BCA assay. Then, modified Ellman method was conducted *in vitro* on crude and fractionated venom followed by exploration of putative inhibition sites of AChE *in silico* and evaluation of cholinergic impact *in vivo* using *Zophobas morio* larvae. Results showed that 16 venom peptide fractions were collected as validated by UV and BCA assay. Eleven out of 16 fractions exhibited anti-AChE activities *in vitro* with F1, F3 and F16 exhibiting the highest inhibitory activities in comparison with crude venom, donepezil (400 µg/mL) and untreated AChE reaction (n=3) (p=9006). Furthermore, competitive inhibition was observed on crude venom, donepezil, and F3 while F1 and F16 displayed uncompetitive inhibitions (n=3) (p= 0.008) which were supported *in silico*. Finally, downward trend in locomotion *in vivo* was observed on the same samples which manifested cholinergic impact (n=3). The results indicate that Philippine *Theraphosidae* spider venom peptides may have potential therapeutic leads for AD studies.

Keywords: Spider venom, Acetylcholinesterase, Alzheimers disease, Cholinergic, Theraphosidae, Medicine

Transactions of the National Academy of Science and Technology, Volume No. 41 Issue No. 1, 245
2019 July,
(Filipiniana Analytics)
NP

0478

Serological survey and isolation of *Toxoplasma gondii* in rodents and humans *Jueco, Nonette L., Garcia, Edito G.*

2,100 out of 2,276 subjects were tested for toxoplasmosis. There was a sharp rise in the infection rate in the 0-10 year old bracket and a decline between the ages 21 and 50 years. Most of the positive re-came from Manila and the southern Tagalog region, the Bicol region, Mindanao province and the Eastern Visayas region. Apparently, cats, rodents and pigs are generally sources of infection for humans.

Keywords: *Toxoplasma gondii*, Toxoplasmosis, Infection for humans, Medicine

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(Filipiniana Analytics)
Fil(S) Q179.9 N38

0479

Standardization of *Tinospora rumphii* (Menispermaceae) stem extracts through HPLC assay of berberine and LOX-15 stimulatory activity

Sanchez, David Anthony L. , Ramos, Jelsy Rose C. , Lim, Hans Christian M. , Guce, Jezreel Nadine C. , Icamen, Olivia S. , Galamiton, Euredel S., Solana, Johannica Darryl D. , Castillo, Agnes L.

Tinospora rumphii is known to have anti-inflammatory activity due to the active secondary metabolites like alkaloids, specifically berberine. This study aims to determine the amount of berberine in the *Tinospora* stem extracts and the potential activity against 15-lipoxygenase. The *Tinospora* powdered stems were subjected to exhaustive percolation and rotary evaporation. The dried ethanolic extract was then subjected to solvent partitioning using solvents of increasing polarity namely hexane, ethyl acetate, and methanol. The collected sub-extracts were tested for the presence of tannins in which the hexane and methanol sub-extracts turned positive and were detannified. The subextracts were assayed for berberine content and Lipoxygenase (LOX) inhibitory activity using High-Performance Liquid Chromatography (HPLC) and LOX-15 inhibitory assay kit respectively. The assay showed that the ethyl acetate extract exhibited a SC50 of 84.14 µg/mL on 15-LOX and is the most potent among the extracts tested. HPLC assay proved the presence of berberine in all extracts at different concentrations.

Keywords: Berberine, LOX, *Tinospora*, Medicine

Stand-Up and be counted (a case of Talipes equinovirus)
Perlas, Ma. Pamela Milagros S.

To present a case of unilateral talipes equinovirus and to discuss latest treatment option; To show the role of Family Physician's approach in the holistic care of the patient. This is a case report conducted in tertiary hospital. Four year old patient sought consult because his right foot was curved inward. During interview, mother confessed that they no longer consider treating patient's condition because of financial constraints. Few months after birth, they were told at a government hospital that they would need 150,000 pesos for surgery. Condition has caused psychological pain on both patient and mother. The boy is shy and withdrawn. Family counseling is being done to help patient come out of his shell despite his disability and to encourage mother to let her child gain self-confidence. Other treatment options of club foot were given. A case of unilateral Talipes Equinovirus in a four year old boy who appears to suffer not just from his disability but also from social isolation. Family counseling is being done to address this situation. Previous treatment of this condition required extensive surgeries. However, non-surgical method, the Ponseti method is fast becoming the mode of treatment even for older children.

Keywords: *Talipes Equinovirus, Psychological pain, Ponseti method, Medicine*

Philippine Scientific Journal, Volume No. 43 Issue No. 1, 30
2010,
(Filipiniana Analytics)
NP

Studies on cardiac rehabilitation after myocardial infarction
Guzman, Santiago V.

Twenty-five patients who recovered for acute myocardial infarction (AMI) were given exercise programs on the treadmill at different time intervals of 2 to 4, 6 to 8 and 10 to 12 weeks. Result showed that cardiovascular responses to exercise normalize two to four months after an AMI and resumption of previous activities and/ or initiation of recreational exercises may be undertaken.

Keywords: *Cardiac rehabilitation, Myocardial infarction, Acute Myocardial Infarction (AMI), Medicine*

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1980 September,
(Filipiniana Analytics)
Fil(S) Q179.9 N38

A study on the feasibility of using the amniotic fluid for cancer therapy
Navarro, Manuel D., Guya, Mildred B., Prudencio, Patricia A.

The amniotic fluid from parturients were collected aseptically, pooled, mixed with sterile lactose solution, filtered through Millipore Filter HAWP 04700 HA 0.45u and lyophilized. Culture studies of the solution did not show any growth. Sensitivity tests carried out against *E. coli* and *S. aureus* did not show inhibitory effect; nor was any enzymatic activity noted. The solution was tried on chorio-carcinoma, breast and thyroid cancers. Injection produced chills and fever; further use was discontinued. Topical application demonstrated healing effect on the ulcerated cancer lesions to about 30%. Vitamin B17 (Amygdalin) had to be utilized as the main therapeutic agent.

Keywords: Amniotic fluid, Cancer therapy , Millipore Filter, Medicine

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0483

Synthesis, antitubercular activity and molecular docking studies of benzyl-modified 8-hydroxyquinolines

Ali, Mohd Tajudin Mohd , Pueblos, Kirstin Rhys S. , Quimque, Mark Tristan J. , Mathias, Mark Lester M. , Macabeo, Allan Patrick G., Franzblau, Scott G.

Infection with *Mycobacterium tuberculosis*, the causative agent of TB, is responsible for one of the global epidemics. Thus, new drugs are needed that do not confer cross-resistance with the currently administered front-line therapeutics. Quinoline-based natural products and synthetic derivatives have been extensively explored for antitubercular activity.

The main goal of this study is to prepare a collection of benzylated 8-hydroxyquinoline derivatives through synthesis, and assess their antitubercular activity along with a molecular docking study to clarify their biological mechanism of action.

The benzylated 8-hydroxyquinoline derivatives were synthesized using Williamson synthesis methods. Antitubercular activity was assessed against fast replicating *M. tuberculosis* H₃₇Rv using Microplate Alamar Blue Assay (MABA) and non-replicating cultures using Low-Oxygen Recovery Assay (LORA). Molecular docking studies were carried out against enoyl-acyl carrier protein reductase (InhA).

Five benzylated 8-hydroxyquinoline derivatives were synthesized in moderate yields and characterized using NMR spectroscopy. MABA and LORA assays indicate compounds 3–5 as the most inhibitory derivatives with MIC 's ranging from 6.38 to 54.28µM. Molecular docking against InhA showed modest 90 binding energies for compounds 4 (-8.5kcal/mol) and 5 (-8.6kcal/mol).

Our findings suggest a rationale for the further evolution of this promising series of antitubercular quinoline small molecules. Structure-activity analysis show that an 8-benzyl moiety with chlorine atom/s is/are important for improved activity against replicating and non-replicating *M. tb*. H₃₇Rv, which is also supported by our *in silico* studies.

Keywords: antitubercular, *Mycobacterium tuberculosis*, quinolines, molecular docking, enoyl-acyl carrier protein reductase, Medicine

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2019/09,
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0484

The Ureta Technique: secondary voice reconstruction after total laryngectomy

Ureta, Celso V.

To present Ureta Technique as an original surgical primary voice reconstruction procedure in total laryngectomy patients and determine its effectivity in voice rehabilitation. To determine the number of patients who had aspiration after undergoing the VMCU Technique of primary voice reconstruction. A prospective study of 34 patients who have undergone total laryngectomy with primary voice reconstruction using the Ureta Technique. The study was conducted in Tertiary Medical Center. Ten patients with stage III squamous cell carcinoma of the larynx underwent total laryngectomy, with or without radical neck dissection and post-operative radiotherapy from Jan. 1995 to Jan. 2005. Primary voice reconstruction with the Ureta Technique was done in all patients. Speech was evaluated based on the study of St. Guily (1992). Aspiration was also graded using a modification of Leipzig Classification (1980). Thirty-two out of thirty-four patients were able to acquire speech in 2-6 weeks after

undergoing total laryngectomy with the Ureta Technique. There were no incidences of serious aspiration in all cases. The Ureta Technique is an effective primary voice reconstruction procedure in laryngectomized patients. It was not associated with serious aspiration problems in our series of thirty-four cases.

Keywords: *Ureta Technique, Laryngectomy, Voice rehabilitation, Medicine*

Philippine Scientific Journal, Volume No. 43 Issue No. 2, 6-12
2010,
(Filipiniana Analytics)
NP

0485

The use of ionizing radiation in the control of *Oncomelania quadrasi* snails

De la Cruz, Benjamin

Nuclear techniques has been used in the control of parasitic diseases in man and animals. Adult *Oncomelania quadrasi* snails were exposed to 9 kr and 12 kr gamma rays from calibrated Gamma Cell 220 radiation source and were allowed to mate with non-irradiated adult female *Oncomelania quadrasi* snails. Pregenies with short life span and defective reproductive capacity were produced. Exposure of the adult male snails to 18 kr of gamma rays resulted in the production of permanently sterile males. The mortality rate of the irradiated male snails exposed to 9 kr and 12 kr five months after irradiation was 6.7% and 11.7% respectively while those exposed to 18 kr was noted to be 89 percent.

Keywords: *Oncomelania quadrasi snail, Ionizing radiation, Nuclear techniques, Medicine*

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1982 September,
(Filipiniana Analytics)
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0486

Way forward in eliminating NTDs in the Philippines: forging partnerships-highlights of the NTD forum on August 7, 2017

Villacorte, Elena A. , Magracia, Mary Joy A. , Enriquez, Angelica C. , Mistica, Myra S. , de las Llagas, Lilian A. , Belizario, Vicente Y. Jr. , Leonardo, Lydia R.

The Department of Parasitology of the College of Public Health held a special forum on neglected tropical diseases or NTDs with the theme “Way Forward in Eliminating NTDs in the Philippines: Forging Partnerships” on August 7, 2017 at the CPH Auditorium. The conference aimed to heighten awareness on NTDs in the Philippines and developing countries and drum up support and participation of various sectors in control and elimination efforts for NTDs in the country. Health Secretary Dr. Paulyn Jean R. Ubial delivered the keynote address while presentations on NTDs of the world and in the Philippines were presented by Dr. Rabindra Abeyasinghe from World Health Organization Western Pacific Regional Office (WHO-WPRO) and Dr. Leda M. Hernandez from the Department of Health, respectively. A panel of reactors representing the Department of Education, Association of Municipal Health Officers of the Philippines, Culion Foundation Incorporated, Research Institute for Tropical Medicine, Philippine Council for Health Research and Development and Johnson and Johnson Philippines shared their contribution to the control and prevention and their suggested way forward in the elimination of NTDs in the Philippines. Close to two hundred participants attended the forum half of whom were from other research and academic institutions and government and non-government agencies.

Keywords: *neglected tropical diseases, NTD, Philippines, forum, Medicine*

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2017/06,
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2016 food establishment survey: are we moving towards an obesogenic food environment?

Vargas, Marina B., Ph.D.

An individual's food choice plays an important role in determining the risk of gaining too much weight. The food choices are shaped by the kinds of food available at home and outside the home, the so-called food environment. Food environment as defined by the U.S. Center for Disease Control and Prevention refers to the physical presence of food that surround people and may influence their diet. It is an emerging field of study that looks into the food available in a community and how it relates to people's diet and health. In the Philippines, the food environment has undergone considerable change as evidenced by many food establishments now found anywhere. The consumption practice of Filipinos especially in the urban areas has also changed over the years. Based on the 8th National Nutrition Survey of the Department of Science and Technology's Food and Nutrition Research Institute (DOST-FNRI), nearly half of Filipinos are now consuming foods from away-from-home sources like fast-food restaurants, *carinderias* and other food establishments. With the proliferation of food establishments across the country, alarming issues on the nutritional content of some foods being offered by them are also mounting. There are studies linking frequent consumption of ready-to-eat or take-away meals with increased intake of calories, saturated fat, and sugary drinks which leads to obesity, higher body fatness, or higher BMI. The study aimed to characterize the food environment of selected study sites in the country by determining location, number and types of food establishments and describing their menu offerings. The study was conducted in six identified cities and provinces in the Philippines namely Baler, Aurora; San Jose, Mindoro Occidental; Malita, Davao Occidental; Biliran Province; Batanes Province; and Taguig City (Brgy. Tuktukan and Brgy. Upper Bicutan). Their locations were determined using Geographic Information System (GIS) for food establishment mapping. Food establishment was classified and characterized through face-to-face interview. Data were organized by type of food establishment. Menu offerings were grouped by food group and type of cooking method used. Beverages were classified as natural/fresh, sugar-sweetened beverages (SSB), alcoholic beverages. Descriptive Statistics such as means and percentages were computed using the STATA software. Results showed that *carinderia* and *turo-turo* were the predominant types of food establishments found across study sites; low proportion of different food establishments offer fruits and vegetables in all study sites; and sugar-sweetened beverages (SSBs) were the most common beverage offered in food establishments across study sites. It is noteworthy that alcoholic beverages were also being offered in *carinderias* in Baler, Aurora, Batanes and Biliran. In conclusion, *turo-turo* and *carinderia* were the most common types food establishment among study sites; fruits and vegetables were not commonly available in all types of food establishments; sugar-sweetened beverages were the most popular beverage offered in food establishments; with food items or dishes high in fats and sugars known to contribute to obesity readily available and accessible in widespread food establishments such as *carinderias* and *turo-turos*, the Philippines may be moving towards an obesogenic food environment. Further studies on food environment are recommended taking into consideration other provinces and highly urbanized cities in order to provide baseline data that policymakers and program implementers could use to address the problem of obesity.

Keywords: *food establishment survey, food environment, food choice, obesity, food consumption, DOST-FNRI, Nutrition*

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2018,
(Filipiniana Analytics)

Alcohol consumption and binge drinking in the Philippines

Patalen, Chona F., MPH

Alcohol is a psychoactive substance with dependence-producing properties that has been widely used in many cultures for centuries. The harmful use of alcohol or binge drinking has been identified as the third leading risk factor for premature deaths and disabilities, contributing significantly to the global burden of disease. According

to the National Nutrition Surveys (NNS) conducted by the Food and Nutrition Research Institute of the Department of Science and Technology (DOST-FNRI), the trend in the prevalence of current alcohol drinking in the Philippines was generally unpredictable. This study aimed to determine the prevalence and trends of alcohol consumption, as well as the socio-demographic determinants of binge drinking among Filipino adults, 20.0 years old and over, to provide basis for policy reformulation and enhanced healthy lifestyle programs in the Philippines. Binge drinking or the harmful use of alcohol means excessive consumption of alcoholic beverages in a single session, specifically the intake of 5 or more standard drinks in a row for men and 4 or more standard drinks in a row for women. Multi-stage stage stratified sampling design was employed using the master sample from the Philippine Statistics Authority. All adults aged 20.0 years old and over in the sampled households from one replicate were included. In 2015 survey, 21,969 respondents out of 24,866 eligible adults (88.3% response rate) were interviewed. Validated questionnaire adapted from the WHO-STEPwise approach to NCD risk factor surveillance instrument was used. STATA® version 12 was used to generate results on prevalence rates. A multivariate logistic regression analysis was also generated to determine the odds-ratio of current drinkers engaged in binge drinking (for the past 30 days) and its determinants based on socio-demographic characteristics such as sex, age group, wealth quintile, educational attainment, and work status. Two in every 10 (24.3%) Filipino women were current alcohol drinkers and four in every 10 (41.9%) current drinkers were engaged in binge drinking. Seven in every 10 (69.1%) Filipino men were current alcohol drinkers and six in every 10 (58.8%) current drinkers were engaged in binge drinking. The prevalence of current alcohol drinking has been slowly decreasing at an average of 0.68-percentage point annually since 2003. Current alcohol drinking and binge drinking were highest among young to middle aged adult males. While among females, current alcohol drinking significantly declined in 2015, but binge drinking increased. The study found significantly higher odds of binge drinking among males, young and middle-aged adults, those in the middle wealth quintile, and those with lower level of education. Results of this study may be used as basis for policy reformulation and enhanced program implementation to regulate alcohol consumption in the country. Policies on marketing and selling alcoholic beverages, including Republic Act No. 10351 or the Sin Tax Reform Law should be strengthened. Moreover, research gaps on alcohol drinking behavior of Filipinos should also be addressed for the enhancement of public health programs and policies, which are more effective and responsive to address the social and health problems entailed with alcohol consumption.

Keywords: *alcohol consumption, binge drinking, Filipino adults, single session, risk factors, national nutrition survey, unhealthy lifestyle, policy reformulation, DOST-FNRI, Nutrition*

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0489

Assessing household food security in the regions of Mindanao using world food programme's (WFP) food consumption score tool

Nueva España, Ma. Belina N.

While the Radimer/Cornell tool is able to identify the prevalence and geographic location of food insecure households, other dimensions of food security such as household food access and quality of food consumed are not measured. Devising alternative measures of food insecurity requires a more meaningful understanding of the dimensions of food insecurity. Hence, the Food Consumption Scores (FCS) of the World Food Programme (WFP) was used in this study as an alternative tool for food security assessment in Mindanao. This study aimed to assess the household food security in the regions of Mindanao. Specifically, it sought to describe selected socio-economic and demographic characteristics of households and classify households by wealth quintiles and describe foods consumed by households in terms of type and quality (diversity and frequency of consumption, thresholds and food sources). The study used the Food Security data from FNRI's 2013 National Nutrition Survey. However, analysis for this study only included regions in Mindanao. Household food consumption were collected based on past 7-day recall of food types, frequency of consumption and food sources. Using the FCS proposed by WFP, results showed that almost all regions except ARMM had a high percentage of households that belonged to the acceptable category of food consumption (>42 FCS) meaning households are food secure. Households consumed different foods that are relatively high in energy density, had good quality protein and micronutrients, with an average diversity of nine to ten different food groups. A higher percentage of varied diets was found in CARAGA and Davao regions Compared to other regions, Majority of the households "purchased" the food they consumed. The highest percentage of households with "poor" food consumption (42), compared to other regions in

Mindanao. The use of WFP-FCS tool was simple and easy to administer and likely to be useful in identifying target areas for interventions. It can be measured in combination with other food security indicators like depending on user needs.

Keywords: *household food security, food consumption, food access, food quality, Mindanao, DOST-FNRI, Nutrition*

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0490

Assessment of analytical performance of some Philippine testing laboratories through proficiency testing in corn-based snack food and wheat flour

Dajay, Leah C.

Proficiency Testing (PT) is a very useful and highly diagnostic tool of the laboratories' quality system that provides an objective independent measure of their analytical performance. DOST-FNRI Proficiency Testing Laboratory (PTL) organized PT Schemes that aimed to assess the performance of laboratories in the conduct of analyses on: (a) proximates (moisture, fat, protein and ash), minerals (iron, calcium, sodium, potassium and zinc) and saturated fatty acids in corn-based snack food; and (b) proximates in wheat flour. The homogeneous proficiency test items, corn-based snack food and wheat flour, were distributed to 33 and 19 registered local testing laboratories, respectively. Results were evaluated using appropriate statistical procedures based on ISO 13528:2015. The standard deviations for proficiency assessment, σ_{pt} , for all the measurands were derived from previous PT Round of the same matrix or by using the robust coefficient of variation (CV) of participants. The assigned values (xpt) from the consensus of PT participants' results were computed as the robust average using Algorithm A. The performance of the participating laboratories was evaluated by providing z or z' scores. There is a wide variability in the results, $u(xpt) > 0.3\sigma_{pt}$, reported by the laboratories for fat, protein, iron, calcium, sodium and zinc in corn-based snack food and moisture, fat and protein in wheat flour resulting in issuance of z' scores. While the other measurands that have xpt with negligible uncertainties, $u(xpt) \leq 0.3\sigma_{pt}$, were issued with z scores. No assigned value was established for saturated fatty acids in cornbased snack food due to high variability of the results submitted by a limited number of participants. The xpt (in g/100g for proximates and mg/100g for minerals) and the percentage of laboratories that obtained "Satisfactory" performance ($|z/z' \text{ score}| \leq 2.0$) were: a) Corn-based Snack Food: moisture (4.07, 83%), fat (15.36, 82%), protein (9.50, 72%), ash (1.69, 97%), iron (3.02, 83%), calcium (168, 89%), sodium (185, 76%), potassium (156, 88%) and zinc (2.75, 78%); and b) Wheat Flour: moisture (11.99, 95%), fat (1.15, 80%), protein (11.32, 59%) and ash (0.40, 71%). Majority of the participants obtained "Satisfactory" performance for both PT Rounds, except for saturated fatty acids in corn-based snack food with no performance score. Laboratories that did not obtain "Satisfactory" performance were encouraged to review their results and to take corrective action/s to prevent recurrence of the problem.

Keywords: *analytical performance, proficiency testing, Philippines, testing laboratories, DOST-FNRI, corn-based snack food, wheat flour, Nutrition*

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0491

Assessment of body composition of adolescents (13-18 years old) using isotope dilution technique

Baquiran, Amster Fei P.

Overweight and obese children and adolescents are likely to stay obese in adulthood and more likely to develop non-communicable diseases (NCDs) at a younger age. Because of various physiological developments occurring in the adolescence stage, assessment of body composition (BC) is useful for the screening of related metabolic

complications of obesity and for determining nutritional requirements and programs suitable for this age group. There are several methods to measure the percentage of body fat. Clinical setting extensively uses simple techniques such BMI, waist circumference (WC), waist-to-height ratio (WHtR) and skin-fold thickness. Although these methods can satisfactorily identify the risk, they are considered to be less accurate. BMI may not be as useful in children because of the changes in body shape as they progress through normal growth. It also fails to distinguish between fat mass (FM) and fat-free mass (FFM), consists of muscles and bones, and may exaggerate obesity in large muscular children. One of the reference methods for BC assessment is the isotope dilution technique (IDT) which indirectly measures FM and FFM from total body water (TBW). TBW is estimated from the amount of deuterium (a harmless isotope of hydrogen) in a water-containing specimen from the body like saliva after administration of deuterium oxide (D₂O). D₂O is basically water in composition and is distributed in the body in the same way. This study aimed to determine the BC of adolescents (13-18 years old) using IDT, anthropometric indices, and bio-electric impedance analyzer (BIA). Blood pressure (BP) and physical activity level were also measured and their relationships with BC were determined. BC of adolescents varied widely between genders and age-group. Based on %FM from IDT, most of the girls were classified as overweight/obesity against literature standard. Adopting cut-off points for %FM from researches conducted with different ethnicity may pose misinterpretation of BC data. It is recommended to conduct the assessment with larger sample size to derive %FM curves and cut-off points specific for Filipinos.

Keywords: *body composition, Filipino adolescents, isotope dilution technique, non-communicable disease, deuterium oxide, total body water, anthropometrics, DOST-FNRI, Nutrition*

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0492

Assessment of body composition of schoolchildren aged 6-12 years old

Body composition is an important indicator for health and nutritional status. Currently, there is scarce information on the body composition of children in the Philippines in terms of percent fat mass (%FM). Body mass index (BMI), waist circumference (WC) and waist-to-height ratio (WHtR) are commonly used to assess fatness. However, these are considered indirect measures of body composition, contrary to isotopic dilution technique which measures body fat from atomic to cellular level. This study determined the body composition of schoolchildren (6-12y) in Bicutan, Taguig City using anthropometric indices and isotope dilution technique and to test the correlation among measurements. Weight, height and WC were measured in 271 children, grouped as 6-9y.o. (n=135) and 10-12y.o. (n=136), and the corresponding BMI and WHtR were computed. Isotopic dilution technique was done by administering deuterium oxide to participants and saliva samples were collected before and then 3-hour and 4-hour after ingestion. Percent FM was estimated from total body water (TBW) which was computed from deuterium enrichment in saliva samples, analyzed using Fourier Transform Infrared spectroscopy. There was no significant difference in %FM within age groups of the same sex. However, a significant difference between %FM of boys and of girls ($p<0.05$) was noted. In general, boys have lower %FM (22.7 ± 0.9 for the 6-9y.o., 24.4 ± 1.3 for the 10-12y.o.) than girls (27.1 ± 0.9 for the 6-9y.o., 26.6 ± 0.8 for the 10-12y.o.). A significant difference was also observed in WC between sexes (63.3 ± 1.3 cm in boys, 60.9 ± 1.0 cm in girls) in 10-12 years old ($p<0.05$). Correlation analysis showed that BMI, WC, and WHtR have better agreement with each other than with %FM. Percent FM tended to be more significantly correlated with BMI in boys and with WC in girls ($p<0.05$). BMI, WC and WHtR may not be an accurate measures of fatness for an individual, however, these correspond fairly well with percentage body fat within sex by age group. It is recommended that body composition assessment be done with wider age group and larger sample size to represent the Filipino population.

Keywords: *Nutrition*

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Assessment of omega-6/omega-3 polyunsaturated fatty acid ratio of common Filipino foods

Briones, Dave P.

Literature shows that excessive amount of omega-6 Polyunsaturated Fatty Acids (PUFAs) and very high omega-6/omega-3 ratio, found in Western diets, promote the development of many diseases like cardiovascular disease, cancer, inflammatory and autoimmune diseases. Whereas, increased levels of omega-3 PUFAs (a lower omega-6/omega-3 ratio), have beneficial effects. This study aimed to (1) determine Linoleic Acid (LA), Alpha-Linolenic Acid (ALA), Arachidonic Acid (AA), Eicosapentanoic Acid (EPA) and Docosahexaenoic Acid (DHA) contents of 100 common Filipino foods and (2) assess these foods omega-6/omega-3 PUFAs ratio. Method for omega-6 and omega-3 analyses was validated before employing to target food samples. Samples used for the analysis were collected and shared from the previous and current projects involving studies on fast food dishes and processed foods. Foods highest in LA, ALA, AA, EPA and DHA were peanut butter (14.8736 g/100g), salted egg (0.3363 g/100g), mayonnaise (7.0987 g/100g), and tinapa (0.319 g/100g and 1.0841 g/100g), respectively. Among the sampled fast food dishes, the highest omega-6/omega-3 PUFA ratios were found in fast food D beef rice meal, fast food B chicken breast and fast food B chicken leg. The lowest omega-6/omega-3 PUFA ratios were observed in fast food A beef pattie with rice, fast food A french fries and fast food D noodle soup (beef). For the other processed foods, the highest omega-6/omega-3 PUFA ratios were found in peanut butter, *ampao*, ham and cheese-flavored chips. The lowest omega-6/omega-3 PUFA ratios were observed in *tinapa*, *dilis* (big) and *dilis-bauranon*. The highest levels of omega-3 PUFAs were observed in fish samples, hence, lower omega-6/omega-3 PUFAs ratios were observed. Fish samples are rich both in EPA and DHA. Further research should also be done with other omega-6 and omega-3 PUFAs since this study is only limited to LA and AA (omega-6 PUFAs) and ALA, EPA and DHA (omega-3 PUFAs). Ready-to-consume and/or cooked food samples should be analyzed since these already represent the true PUFAs consumed.

Keywords: *omega-6, omega-3, polyunsaturated fatty acid, common Filipino foods, non-communicable disease, linoleic acid, alpha-linolenic acid, arachidonic acid, eicosapentanoic acid, docosahexaenoic acid, DOST-FNRI, Nutrition*

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Assessment of selected food and nutrition policies: OPT revisited, the case of Abra de Ilog

Ramirez, Ma. Anna Rita M.

Malnutrition among Filipino children persist, hence the value of nutritional assessment procedures is underscored. In the Philippines, this is carried out at the local level during the annual Operation Timbang or OPT. Over the years, officials from local government units (LGU) have observed higher malnutrition prevalence rates (MPR) as reported by the Department of Science and Technology's Food and Nutrition Research Institute (DOST-FNRI) in its periodic feedback conferences of National Nutrition Survey (NNS) results compared with their own OPT results. This has often been a cause for discussion during these meetings. Hence, a revisit of the OPT was deemed necessary to provide evidence on the comparability of the two data sets and sources of variance addressed. This study compared the provincial estimates of malnutrition based on the 2015 Updating Survey with acceptable coefficient of variation (cv <20%) with the 2015 OPT of these provinces to check for differences in proportion. Having provided only a descriptive information as to the comparability of the two data sets, the second assessment generated analysis at the municipal level. It described how the OPT is carried out in all of the 10 barangays in Abra de Ilog in Mindoro Occidental, determined facilitating and hindering factors in the conduct of OPT; and compared results of the OPT and the DOST-FNRI local nutrition survey. It is believed that the OPT is a vital resource that local government units can use towards increased efficiency at tracking their nutrition situation as well as assessment of their local nutrition action plans and other nutrition-in-development programs. The study has the potential to benefit local nutrition program planning, implementation and delivery of basic services. More importantly, it can provide information that can be used in generating policy recommendations for the

amendments on the national policy on OPT. OPT Plus involves measuring the weight, length/ height of 0-71 month old children in the community conducted every first quarter of the year targeting at least 80% of the total number of PS in the recent barangay census. Examination of OPT-related activities in 10 barangays of Abra de Ilog using a mix of quantitative and qualitative research methods, conducted in October, 2016 at around the same time that the second mass weighing “OPT” activities in the municipality were carried out. Anthropometric survey (weight, height/length) conducted by DOST-FNRI in its local nutrition survey using standardized procedures. Malnutrition prevalence rate (MPR) of Abra de Ilog 2016 OPT Plus and the 4th quarter “OPT” reported lower values compared with the DOST-FNRI local survey, even when the “OPT” was assessed using the World Health Organization Child Growth Standards (WHO CGS). This has implications in determining the severity of malnutrition as a public health concern as it could mask the true picture in Abra de Ilog with an underestimation of the problem. According to research participants in Abra de Ilog, OPT involves mass weighing of 0-71 months old children, including height measurements, carried out during the first and fourth quarter. The municipal health officer, however, qualified that OPT is the mass weighing conducted during the first quarter and is submitted to the province. Facilitating factors to implementation of OPT are logistics (calibrated equipment and latest masterlist), LGU support, and budget. Issues with logistics, lack of manpower, work overload, low honoraria, low commitment, uncooperative mothers and high turnover of barangay nutrition scholars hinder the conduct of OPT activities. Findings reveal policy implications to the procedural implementation of the OPT Plus, in particular generation of quality data. The formula for the estimation of MPR is critical. As in a mathematical equation, the “numerator” is a function of the total client list (TCL) and updated masterlist, including the quality of this database. The “denominator” is a function of the 16.2 percent of projected population in estimating the number of 0-71 months old children as target coverage. In addition, the inclusion only of the barangays and municipalities with 80 to 110 percent OPT coverage in reporting overall MPR for the municipality and province, respectively. Thus, MPR reports may not entirely reflect the true prevalence rate. Training, continuous orientation and re-orientation of community health workers are reiterated. Provide appropriate and enough number of calibrated equipment for OPT. Review the efficiency of the 16.2 percent of projected population as basis for computing the target number of children to reduce potential sources of variance in MPR estimates between OPT and the DOST-FNRI local survey.

Keywords: *food and nutrition policies, malnutrition, national assessment procedure, local government unit, Operation Timbang, national nutrition survey, prevalence rate, DOST-FNRI, Nutrition*

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0495

Assessment of selected risk factors to non-communicable diseases on adults 18 years old and over and adolescents 10.0 to 17.9 years old

Goyena, Eva A., Ph.D.

The prevalence of major risk factors to non-communicable diseases (NCDs) is increasing among adults. NCDs are chronic conditions that resulted from behavioral risk factors, which include smoking, alcohol consumption, physical inactivity and unhealthy diet. This component of the 8th National Nutrition Survey aimed to determine the prevalence of selected risk factors to NCDs among adults and adolescents. Stratified multi-stage sampling design was employed in the selection of households. Weight, height, waist and hip circumferences were obtained to assess the prevalence of overweight and obesity among adults; while for adolescents, height-for-age and body mass index-for-age were assessed. A blood pressure of >140mmHg for systolic or > 90mmHg for diastolic was used to determine hypertension prevalence; fasting blood sugar of >126mg/dL was used to determine diabetes prevalence; dyslipidemia was defined with total cholesterol of >120mg/dL, LDL-cholesterol of >160mg/dL, HDL-cholesterol of 200mg/dL. Face-to-face interview was conducted to obtain history profile of diseases and NCD risk factors; frequency of food intake; smoking; alcohol consumption; and physical activity. Prevalence of hypertension is 22.3%* among adults, 20 years and over, a decline from 25.8%** in 2008. Likewise, prevalence of current smoking decreased from 31.0% in 2008 to 25.4%. However, diabetes prevalence*** increased to 5.4% from 4.3% in 2008. The prevalence of elevated total cholesterol level among adults is 46.9%, while raised LDL-cholesterol is 47.2%. For low HDL-cholesterol, the prevalence is 71.3%, and 38.6% of adults had high triglyceride. Binge drinking has a high prevalence of 56.2%, while physical inactivity is at 45.2%. Obesity prevalence is at 6.8%, but when combined with overweight, this balloons to 31.1%, an increase from 28.4% in 2011. Android obesity was seen more among women (63.2%) than men (8.0%). Prevalence of selected risk factors to NCDs

increased in the 8th NNS (overweight/obesity for adolescents and adults, android obesity, diabetes, dyslipidemia, alcohol consumption, and adults who are insufficiently physically active). Thus, systematic, evidence-based intervention programs that have the full complement of resources and an M&E component should be in place. The national policy on strengthening the prevention and control of chronic lifestyle related NCDs should be intensified at the grassroots level.

Keywords: *non-communicable disease, risk factors, Filipino adults, Filipino adolescents, DOST-FNRI, hypertension, physical inactivity, Nutrition*

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0496

Awareness, coverage, accessibility and utilization of PhilHealth benefits among Filipinos in the 8th national nutrition survey, 2013

Chavez, Milagros C.

The Philippine Health Insurance Corporation (PhilHealth) was created through the National Health Insurance Act of 1995 to provide social health insurance coverage to all Filipinos in 15 years' time. Efforts are being made by PhilHealth to attain the envisioned, sustainable, affordable and progressive social health insurance which aimed to influence delivery of accessible quality health care for all Filipinos. This study was done in collaboration with the Philippine Health Insurance Corporation (PhilHealth) to provide estimates on the awareness, usage and utilization of PhilHealth benefits of Filipinos. The FNRI developed a software structure of the questionnaires and was included in the electronic Data Collection System (e-DCS). Face-to-face interviews with the respondents were done using the questionnaires in its e-DCS form. Responses of the respondents were directly encoded in the e-DCS stored in the laptop computer. Data processing utilized the Statistical Package for Social Sciences (SPSS, rev.16). A total of 35,825 households and 116,215 household members 15 years old and over comprised the subjects of the study. About 72% of the total household members were aware of PhilHealth benefits and services. Awareness was high (80.1%) among 60 years old and over. This was followed by 20-59 years old (75.2%), while 15-19 years old (51.8%). Analyzing the PhilHealth coverage by households, 39.4% had no PhilHealth memberships while 60.0% had at least 1 principal member in the household. By type of PhilHealth coverage, 36.1% were sponsored by either the national or local government, 30.8% were private employees and about 12% are government employees. Among those who are PhilHealth members, whether principal members or dependents, 4.6% were admitted in a health care facility in the past 12 months prior to the survey. Those who were admitted, 73.4% availed of the benefits and services of PhilHealth. By place of residence, availing of 26.4% did not avail. Majority (57.9%) of those who did not avail reasoned out that the illness was not covered by PhilHealth. By place of residence, availing of PhilHealth benefits was higher in the rural areas (76%) than in the urban areas (71%). Across regions, availing of PhilHealth benefits was highest in Northern Mindanao (92.7%), followed by Eastern Visayas (91.2%). Among the wealth quintile group, the poorest and the poor members of PhilHealth have the highest admissions in a government hospital with a rate of 76% and 71%, respectively. PhilHealth members would like to include in the package of out-patient consultations, outpatient drugs/laboratory services, and rehabilitation services. Among the non-PhilHealth members, the most common reasons cited why they were not members, are "they are not aware of PhilHealth" (43.5%), and "cannot afford the premium contributions" (31.8%). The goal of PhilHealth to provide quality and affordable health care to all Filipinos has not yet been met. There is a need to review premium contributions to make it more affordable to those who have less in life. Benefits for the services and treatment of illness should likewise be extended. Lastly, out-patient consultations, outpatient medicines and laboratory services, as well as rehabilitation should be included in the health package.

Keywords: *PhilHealth, benefits, health insurance, national nutrition survey, accessibility, awareness, utilization, Nutrition*

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Batang Pinoy, SANA TALL: trends and current nutritional status of Filipino children

Angeles-Agdeppa, Imelda, Ph.D.

The Filipino Infant and Young Children (0-23 months), Under Five (0-59 months), and School age children (5-10 years old) are the most vulnerable age groups to malnutrition. If left unaddressed this may lead to high morbidity, low height at adulthood, poor cognitive development, reduced productivity, and higher risk to metabolic and cardiovascular diseases. This study evaluated the nutritional status of children in 2019 and compared this with the results of the 2018 Expanded National Nutrition Survey (ENNS) to determine whether our accomplishments are on track with our planned targets. Data used in this study is extracted from the 2019 ENNS. Weight and height were measured using standard techniques. Descriptive analysis was performed and data are disaggregated into sex, place of residence and wealth quintile. Data were organized and processed using STATA version 15. The prevalence of stunting (21.9%) and underweight (13.9%), among infants and young children are at moderate public health significance. Among the Under Five children, stunting prevalence (28.8%) and underweight (19.0%) are also of moderate significance while the prevalence of wasting is of low severity. Among the school age children, the prevalence of underweight (26.0%) is considered as high public health problem while stunting (25.2%) is at moderate severity. The prevalence of wasting (8.0%) is at low severity. Undernutrition is more prevalent in rural areas and those belonging in the poor to poorest households. Comparing the 2018 and 2019 results on physical growth of children, there is a slight decline in the prevalence of underweight by 1.1 percentage point, stunting (3.6% point), and wasting (0.4% point) among infants and young children. Among the Under Five children, the prevalence of underweight and stunting are reduced by 0.1 and 1.5 percentage points, respectively while wasting is increased by 0.2% point. Among school age children there is a slight increase in the prevalence of underweight, stunting and wasting by 1.1%, 0.6% and 0.4% points, respectively. The prevalence of all undernutrition indices in 2018 as compared with 2019 are not statistically significant. Overweight-for-height among infants and young children is 2.6%; among Under Five children (2.9%); and among school age children (9.1%). Conversely, overnutrition is more prevalent in urban areas than in rural areas and the prevalence is higher in households in the richest wealth quintile than in the poor to poorest wealth quintile. The prevalence of overweight has decreased between 2018 and 2019 in all age groups: 0.7% point among infants and young children; 1.1% point among Under Five children; and 2.5% among school age children. Comparing the data between 2018 and 2019, change in the prevalence is not statistically significant. Considering the sluggish decline in the prevalence of undernutrition, the call for innovative, high impact, area-specific and target-focused policies and programs is needed to be abreast with the PPAN and SDG targets. Although there is a slight decline in overweight among our children, nutrition implementing agencies need to have more coherent policies and programs and ignite more efforts to further lower the prevalence of overweight children in our country.

Keywords: *Filipino children, malnutrition, stunted growth, DOST-FNRI, Nutrition*

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Biscuit fortification to bridge iron and iodine gaps during supplemental feeding

Saies, Marcela C.

The most common micronutrient deficiencies affecting children globally are iron, iodine, vitamin A, folate, and zinc (CDC, 2019). According to the Food Fortification Law of 2000 or RA 8976, food fortification shall be encouraged for foods that are widely consumed by at-risk population groups. Based on the 2013 National Nutrition Survey, biscuit ranked 16th in the commonly consumed food products among Filipino households (8th FNRI NNS, 2013). The study developed a technology to fortify biscuits with iron and iodine in partnership with Republic Biscuit Corporation (ReBISCo). The study also determined the shelf-life of the developed fortified biscuits. Three (3) different iron sources were used in the study: micronized ferric pyrophosphate, ferrous fumarate, and iron-EDTA. Potassium iodate was used as iodine fortificant. Two methods of fortification were done and evaluated: addition of fortificants in the dry flour mixture and addition in the filling mixture. The experimental study design involved five stages: screening of fortificant, mineral absorption test, optimization, standardization, and shelf-life study. Results revealed that dry mixing method of adding fortificants to the biscuit

was more acceptable since it was easier to homogenize. Ferrous fumarate was the preferred fortificant because of its high acceptability, comparability to control, and recommended in the mandatory flour fortification. The iron content per 15g of fortified biscuits from three different iron fortificants ranged from 29-40% for milk-flavored, 32-35% for chocolate-flavored, 29-33% for strawberry-flavored, and 29-32% for lemon-flavored based on the 2015 PDRI for children aged 10-12 years old. The microbiological results of the samples were within the acceptable limits. The average nutrient content of the fortified biscuits for all flavors after storage were 4.57mg Fe/15 g and 26.85g I/15 g. The general acceptability after storage of the fortified biscuit for all variants were 'Like moderately' to 'Like very much'. The variants of fortified biscuit samples were found to be stable for six months. Four (4) variants of fortified biscuits were produced and found to be acceptable and safe for human consumption. About 19 batches of 500 kg fortified biscuits were produced at ReBISCo plant for supplementary feeding. The technology developed on fortified biscuit complied with RA 8976. It is recommended to fortify other food products to contribute in addressing micronutrient deficiencies.

Keywords: *biscuit fortification, iron deficiency, iodine deficiency, supplemental feeding, micronutrient deficiency, DOST-FNRI, Nutrition*

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0499

Chasing ace from waste: generation of technology for the production of viable functional food ingredients from agricultural wastes

Arcangel, Trinidad II T.

The increasing demand for food with 'extra' nutritional value triggered the interest to scientific researches on the extraction of bioactive compounds from natural sources to generate food products catering health benefits beyond its nutritional aspects. Recent study of DOST-FNRI on selected local fruits showed that peels contained higher concentrations of antioxidants and bioactive components as compared to its edible portion (Rosario *et al.*, 2016). Though agricultural by-products represent a major disposal problem, its utilization combined with ecofriendly processing techniques makes it a suitable food ingredient for foods that may provide health benefits beyond basic nutrition. In this regard, DOST-FNRI generated a technology that optimizes the production of food ingredients with bioactive components from agricultural by-products. The main objective of the study is to generate a technology for the production of a viable functional food ingredient from agricultural by-products. Specifically, it aims to produce two viable functional food ingredient in powder form from coffee pulp and mangosteen pericarp with identified bioactive components; to determine the optimum processing conditions utilizing enzyme-mediated extraction; and to determine the functional, physico-chemical, nutritional and sensory properties of the coffee pulp powder (CPP) and mangosteen pericarp powder (MPP). The study will undergo five major steps: (1) acquiring the raw materials through purchasing and quality assurance, (2) preliminary processing by washing and sanitizing, (3) process optimization and standardization through enzyme treatment and deactivation, (4) drying and pulverizing, and (5) packing and analysis of the physico-chemical, chemical, and sensory properties. Enzyme mediated process for the production of CPP and MPP were optimized and standardized based on identified processing conditions that may affect antioxidant activity (DPPH and FRAP) and bioactive components (Polyphenols, Anthocyanidins, and Flavanoids). Physico-chemical (moisture, color, and water activity), functional properties (SI, WRC, WHC), and sensory profile of CPP and MPP were established using the optimized processing parameters. Both CPP and MPP have high antioxidant activity (>80%) and high bioactive components. CPP have high iron and dietary fiber content and good source of potassium. Whereas MPP have high calcium and dietary fiber content and also a good source of potassium. This research illustrates that agricultural by-products, coffee pulp and mangosteen pericarp, can be utilized as viable functional food ingredients following the processing steps established in this study. The developed functional food ingredients contain significant amount of bioactive compounds and antioxidant activity which may promote overall wellness of human body. The versatility of the viable functional food ingredients may be used in a wide array of food products for food product development for future adoption of local food manufacturers. Shelf-life study of food products utilizing CPP and MPP is also recommended.

Keywords: *viability, functional food, agricultural wastes, nutritional value, bioactive compounds, coffee pulp, mangosteen pericarp, DOST-FNRI, Nutrition*

Chemical proficiency testing on fruit drink, milk powder and corn-based snack food *Dajay, Leah C.*

FNRI-Proficiency Testing Laboratory (FNRI-PTL) continually serves its purpose of providing quality, affordable and reliable proficiency testing (PT) schemes for nutrition labelling parameters and reference materials (RMs) for quality control purposes to assist the Philippine testing laboratories in achieving quality assurance on their generated results. The study aimed to provide three PT Rounds on different matrices for the analyses of chemical parameters. Three (3) PT Rounds on the analysis of vitamin C, total sugar, titratable acidity and pH for FNRI PT 19-01 (fruit drink), proximates (moisture, protein, fat and ash), minerals (iron, calcium, sodium, potassium and zinc) for FNRI PT 19-02 (milk powder) and proximates (moisture, protein, fat and ash), minerals (iron, calcium, sodium, potassium and zinc), saturated fat and total dietary fiber (TDF) for FNRI PT 19-03 (corn-based snack food) were participated in by 23, 20 and 67 local and foreign testing laboratories, respectively. The assigned values for all the measurands included in the three (3) PT rounds were established based on the consensus values of PT participants' results. Laboratories' performance was evaluated based on z or z' scores depending on the suitability of the consensus value. Upon statistical evaluation, majority of the participants obtained "Satisfactory" (S) performance (z/z' score ≤ 2.00) in three PT Rounds: (a) FNRI PT 19-01-vitamin C (57%), total sugar (69%), titratable acidity (89%), and pH (100%); (b) FNRI PT 19-02-moisture (88%), fat (75%), protein (87%), ash (94%), iron (75%), calcium (92%), sodium (100%), potassium (91%) and zinc(73%); and (c) FNRI PT 19-03-moisture (88%), fat (91%), protein (69%), ash (64%), total dietary fiber (54%), saturated fatty acid (78%), iron (69%), calcium (74%), sodium (82%), potassium (77%) and zinc(85%). Participants that did not obtain "Satisfactory" performance were encouraged to conduct self-investigation and corrective actions to improve their laboratory performance. The FNRI-PTL successfully organized and conducted three (3) PT rounds on Fruit Drink, Milk Powder and Corn-Based Snack Food for local and/or international participant laboratories. It is recommended that DOST-FNRI laboratory expands its scope of provision in terms of matrix and parameters to continuously provide affordable and quality food PT Schemes to local and foreign participants.

Keywords: *chemical proficiency testing, fruit drink, milk powder, corn-based snack food, nutrition labelling, DOST-FNRI, food quality, Nutrition*

Contribution of vitamin A-fortification of processed foods to the status of vitamin A deficiency (VAD) in the Philippines *Malabad, Cristina G.*

Micronutrient deficiency persists as major public health nutrition problem affecting a significant proportion of the population. More than two billion people worldwide suffer from micronutrient deficiencies. These deficiencies not only affect an individual's long term health but can also raise societal and public health care costs and potentially depress a nation's economic productivity. In year 2000, the Philippines responded to the global call to eradicate all forms of malnutrition by institutionalizing food fortification program through RA 8976. Since then, improvement in the micronutrient status particularly on iron and vitamin A have been observed in the National Nutrition Surveys (NNSs) of the Department of Science and Technology-Food and Nutrition Research Institute. Hence, this study will provide empirical evidence to evaluate the contribution of food fortification particularly on status of vitamin A nutriture of different population groups in the country. A pooled cross-sectional study design was utilized using the individual food consumption data of the 6th, 7th, 8th NNSs in 2003, 2008, 2013. Dietary intake of pre-school children, 6 months to 5 years old, pregnant women and lactating mothers obtained from the two non-consecutive days 24-hour food recall were used in the study. It included specific

information on the amount of foods actually consumed and the brand, variant, and manufacturer's name for commercial or processed foods. Improvement on the status of Vitamin A deficiency among children, (6m-5y), pregnant, lactating mothers was observed during 2003 and 2008. Generally, there was a decreasing proportion of individuals consuming fortified foods however intake of vitamin A coming from other non-processed/non-fortified foods increased. The contribution of individual's vitamin A intake from fortified foods was higher on year 2003 and 2008 compared to 2013. Among children, having vitamin A intake from fortified foods with less than 6.2% contribution to the total vitamin A intake is 16% more likely to be vitamin A deficient than having intake of higher percent contribution to the total intake. For children and pregnant women, lower intake of vitamin A from other foods significantly contribute to being vitamin A deficient. For all age/physiologic groups, VAD was less likely in 2008 and 2013 than in 2003 when food fortification program was not yet fully implemented. Findings showed that proportion of individuals consuming vitamin-A fortified foods decreased in 2013. This might have contributed to the slight increase in VAD in 2013. Increasing proportion of individuals with intake of vitamin-A fortified foods complementing it with increased intake from other foods might have sustain the decreasing trend of VAD. Strengthening of the program's implementation should be done for total VAD elimination. Regular monitoring and checking of fortification levels should be conducted to ensure that no other serious problems such as on vitamin A toxicity emerge in the country. Moreover, effect of vitamin A supplementation as complementary program to food fortification particularly among pre-school children and pregnant women should also be considered in the analysis.

Keywords: *vitamin A, fortification, processed foods, vitamin A deficiency, Filipino children, pregnant women, lactating mother, DOST-FNRI, Nutrition*

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0502

Determinants of childhood overweight and obesity in the Philippines

Malabad, Cristina G.

Overweight and obesity have emerged as major public health concerns in the 21st century. Among children under five years old and aged 5–10 years old, an increasing prevalence of overweight and obesity was evident at 4.2% and 8.6% in 2015, respectively, indicating more than 50% increase from the rates recorded 10 years ago. The study determined the major factors contributing to overweight and obesity among 6-23 mos, 24-60 mos, and 61-131 mos old Filipino children. Data from the 4,031 children 6-131 months old with complete socio-demographic, anthropometry, and dietary information in the 8th National Nutrition Survey in 2013 were utilized. Bivariate and multivariate logistic regression analyses were done separately among the three sub-age groups: 6-23mos, 24-60mos, and 61-131mos. Of the cereal and cereal products, rice and products contributed the most to the total amount of food intake and percent energy contribution among overweight (26.5%) and normal weight (22%) children. Noticeably, milk was the major source of energy in the diet of the youngest age group 6-23mos, particularly among the overweight and obese at 48.4%. Children whose parents have higher weight were more likely to become overweight and obese. About 38.3% children were overweight and obese in 6 mos-23mos age group while 68% among the oldest 61-131 mos.; all have parents who are both obese. Bivariate analysis revealed that the likelihood of being overweight and obese increased by 15 times among the 6-23 mos. and 30 times among the older 61-131mos when both parents are obese than those children with non-obese/non-overweight parents. Among the younger children 24-60mos, factors that were found to significantly determine overweight and obese were wealth quintile and urbanity of residence. While among the older group, 61-131mos, household size, wealth quintile, urbanity of residence, food security were the significant determinants. Dietary intake remains as one of the major contributing factors to children's nutritional status. The consumption of formula milk over breast milk which was found as a major contributor to diet of children, 6-23mos should be looked into. Further analysis which will include information on physical activity particularly among the older group, 61-131mos. should be done to provide more comprehensive findings for establishing early effective intervention programs for school-aged children.

Keywords: *Filipino children, overweight, obesity, dietary information, food consumption, socio-demographics, DOST-FNRI, Nutrition*

Determinants of hemoglobin status in Filipino children and women based on a 2013 nationwide survey
Goyena, Eva A., Ph.D.

Anemia is one of the largest public health problem affecting mostly young children and women in the Philippines. This study determined anemia prevalence and assessed the determinants of hemoglobin status of Filipino children and women using data from the 8th National Nutrition Survey (NNS) conducted in 2013. Data analysis was done in three population groups: pre-school aged children (PSAC) 6-71 months (n=3,089), school-aged children (SAC) 6-14 years old (n=7,561), and non-pregnant women (NPW) of reproductive age 15-49 years old (n=7,074). Anthropometric, biochemical, dietary, maternal, socio-economic and demographic factors possibly associated with hemoglobin status were included in the multivariate linear regression analysis. Hemoglobin level and dietary iron intake were found to be significantly increased with improved household food security and wealth status in the three groups. Among PSAC, older age group 3 to 5 years ($\beta=0.68$, $p<0.001$) was associated with higher hemoglobin level than younger age group 6 months to 2 years. Among SAC, being a female ($\beta=-0.19$, $p<0.001$) and residing in rural areas ($\beta=-0.11$, $p=0.03$) determined lower levels of hemoglobin, whereas older age group 12-14 years ($\beta=0.49$, $p<0.001$) determined higher hemoglobin levels as compared with younger age group 6-11 years. Among NPW, older age group 26-49 years ($\beta=-0.15$, $p<0.001$) and who were married ($\beta=-0.12$, $p=0.01$) had lower hemoglobin than their counterpart subgroups. Serum retinol level was positively associated with hemoglobin levels in the three population groups. Serum zinc concentration was positively associated with hemoglobin level in SAC ($\beta=0.01$, $p<0.001$) and NPW ($\beta=0.00$, $p=0.01$). Stunting was negatively associated with hemoglobin levels of PSAC ($\beta=-0.32$, $p=0.01$) and SAC ($\beta=-0.16$, $p=0.01$). Observed associations of age, sex, place of residence, marital status, micronutrient status, and stunting with hemoglobin levels can support nutrition-specific interventions such as micronutrient supplementation, food fortification, and nutrition education aimed at anemia control and prevention. Future studies are also encouraged to improve understanding of the determinants of anemia in the Philippines.

Keywords: hemoglobin, Filipino children, Filipino women, anemia, DOST-FNRI, Nutrition

Determinants of undernutrition and overnutrition among Filipino mothers with children 0-60 months
Goyena, Eva A., Ph.D.

The nutritional status of a woman is a significant predictor in determining pregnancy outcomes. In the Philippines, eight women die every day equivalent to one woman dying every three hours because of pregnancy-related causes. This study aimed to provide evidence-based data on the factors influencing maternal nutrition as inputs to policy formulation and program planning for the improvement of every woman's health and nutritional status. This study analyzed data from the 2011 Updating Survey of DOST-FNRI. A total of 11,531 mothers with children 0-5 years old were included as participants and were classified as pregnant mothers, lactating mothers and non-pregnant and non-lactating mothers (NP/NL). Nutritional status was assessed using appropriate anthropometric indices for the three (3) physiologic groups. The association between the selected independent variables and the nutritional status (undernutrition and overnutrition) of mothers was determined using Binary Logistic Regression. Undernutrition. The NP/NL mothers were more likely to be undernourished if they were from the poorest households (OR:1.47;CI:1.18-1.83), had their first pregnancy at less than 20 years old (OR:2.23;CI:1.76-2.82), and were residing in rural areas (OR:1.25;CI:1.04-1.49). Maternal health and dietary practices such as non-availability of prenatal services (OR:1.31;CI:1.09-1.56), delayed timing of first prenatal visit (OR:1.26;CI:1.06-1.50) and poor maintenance of kitchen cleanliness (OR:2.16;CI:1.44-2.35) were also found to increase the odds

of undernutrition among NP/NL mothers. Pregnant mothers with poor socioeconomic status (OR:2.19;CI:1.27-3.79) had a higher likelihood of being nutritionally at-risk. Among lactating mothers, longer duration of breastfeeding at seven months and longer (OR:1.86;CI:1.40-2.47) increased the risk for a mother to become undernourished. Overnutrition. NP/NL mothers who were working (OR:1.24;CI:1.10-1.40), 40 years old and above (OR:1.78;CI:1.55-2.04), those belonging to households with less than five (5) members (OR:1.32;CI:1.18-1.48) and of high socio-economic status (OR:2.41;CI:2.00-2.90) were found to be more prone to overweight and obesity. Similarly, employed lactating mothers (OR:1.66;CI:1.28-2.16) aged 40 years and above (OR:2.11;CI:1.59-2.82) belonging to more affluent households (OR:1.94;CI:1.37-2.74) and breastfeeding for six months at most (OR:1.38;CI:1.14-1.68) had higher odds of becoming overnourished. Results suggest that poor socio-economic status, young age at first pregnancy, living in rural areas, delayed timing of first prenatal visit, less than recommended number of prenatal and postnatal services availed, poor dietary practices and longer duration of breastfeeding (among lactating mothers) increased the odds of a mother to be undernourished. On the other hand, the significant factors that increased odds of overnutrition among mothers were older age at pregnancy, high socio-economic status, working status, small household size, with prenatal services and postnatal care availed and shorter duration of breastfeeding (among lactating mothers). Strengthening the access and delivery of health and nutrition interventions, with emphasis on reproductive health education, especially among adolescents, healthy lifestyle practices such as exercise and proper dietary habits should be emphasized in nutrition counseling sessions during prenatal and postnatal visits.

Keywords: *undernutrition, overnutrition, Filipino mother, lactating mother, non-lactating mother, pregnant women, non-pregnant, DOST-FNRI, Nutrition*

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0505

Determination of sugar in processed foods *Avena, Ennata M.*

The sugar content of foods must be known in order to provide the basis of food choices for nutrition and wellness especially for persons with diabetes. The Philippines ranks 15th in the world for cases of diabetes, afflicting four million Filipinos (International Diabetes Federation, 2014) Data on the sugar content of foods in the country are scarce and the method used for analysis is mostly titrimetry which determines only the total sugars without discriminating on the types and amounts present. This study determined the sugar content of selected processed food products. A total of thirty-five samples collected from Metro Manila including “pasalubong” products from selected provinces were analyzed using a validated state-of-the-art (SOTA) High Performance Liquid Chromatography (HPLC) method. Results of analysis expressed per 100 grams (g) of the food product showed the presence of five (5) different sugars in the food products. These were fructose (0.0–8.2g), glucose (0.0–8.1g), sucrose (0.0–1.5g), maltose (0.0–4.1g), lactose (0.0–10.5g) and the calculated total sugars (0.6–70.7g). Sucrose generally accounted for a big percentage of the total sugars content, indicating that it is the common sugar added to foods. Results of analysis will be included in the Philippine Food Composition Tables (FCT) while the validated method will be transferred to the FNRI Food Analytical Service Laboratory (FASL) as additional scope for ISO 17025 accreditation, to provide accurate data and information for nutrition labeling. The study recommends the analysis of more foods and the creation of a sugar database. Such will be made available to food and nutrition stakeholders like the consumers, students and academe, dietitians and meal planners, food industry, restaurant and fast food owners, and the government agencies crafting food, nutrition and health policies for improving the nutrition and well-being of the population.

Keywords: *processed food product, sugar content, HPLC, DOST-FNRI, Nutrition*

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Development and printing of the 2015 FNRI menu guide calendar (MGC): nutritious meals for extended emergency period

Bumanglag, Marietta M.

Malnutrition, particularly micronutrient deficiencies affected children aged 0-5 and 5-10 years, adolescents, adults, and pregnant and lactating women as shown in the 2013 FNRI National Nutrition Survey (NNS). The situation worsens when these vulnerable groups, especially the extended ones are affected by disaster, calamity and emergency. Hence, availability of recipes for feeding during natural or man-made disasters can address the need for nutritious and easy-to-prepare meals, in addition to donated commodities. This project aimed to develop a calendar featuring nutritious recipes that are appropriate for use during extended emergency period of a natural or man-made disaster. The project has two (2) phases. Phase I included a Focus Group Discussion (FGD) among Taguig City Hall officials to gather insights, knowledge and practices on provision of food during disasters or emergencies in evacuation centers. Based on these preliminary data, recipe trial formulations, recipe development and sensory evaluation using the 9-point hedonic rating were done to determine acceptability of the recipes. Energy and nutrient content per serving were estimated using the FCT+ Menu Eval software (2002). Photo documentation of recipes was conducted. Recipes were quantified into 20 servings, with corresponding market order. Twelve monthly-7 day cycle menus were planned. Phase II entailed the preparation of calendar design, layout and printing. The 2015 FNRI MGC with the theme "Nutritious meals during extended emergency feeding" highlighted 15 one-dish meals with a yield of about 20 servings, serving size, estimated energy and nutrient content per serving, and market order. Recipes in the 12-monthly-7 day cycle menus are simple, affordable, easy-to-prepare and make use of locally available ingredients. The recipes can be prepared with the presence of water and fuel, necessities during emergency feeding operations in evacuation centers. In addition, a one-week cycle menu for extended emergency feeding was prepared. The Nutritional Guidelines for Filipinos (NGF) and Pinggang Pinoy for adults, simple nutrition tips, and breastfeeding of babies even during emergencies were additional features of the calendar. The MGC highlighted recipes and nutrition guides in times of disasters and emergencies. The calendar may serve as a reference in planning and preparing meals in evacuation centers, and in households. Actual preparation of the recipes in an evacuation center should be done to test the feasibility of use of the recipes. The calendar may be uploaded in social networking sites to increase awareness for these recipes intended for extended emergency period during disasters.

Keywords: *menu guide calendar, nutritious meals, extended emergency period, malnutrition, micronutrient deficiency, DOST-FNRI, Nutrition*

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Development of 2017 FNRI menu guide calendar (MGC): addressing the energy and nutrient needs of pregnant and lactating women through Pinggang Pinoy

Pregnancy is the period from conception to birth. It is a vulnerable condition for both the mother and the baby during gestation and lactation. In the first 1,000 days, maternal nutrition is very crucial in ensuring the baby's health. The well-being of the baby is dependent on the wellbeing of the mother. To develop a calendar to help address the nutrient needs of pregnant and lactating women through *Pinggang Pinoy*. A Focus Group Discussion (FGD) by purposive sampling of ten participants from the FNRI was initially conducted to determine perception, taste and food preferences during pregnancy and lactation. Participants were 7 females who were either currently pregnant or lactating or have experienced pregnancies, while the 3 males were fathers. Based on the results, a two-level recipe development process (n=11, N=50) was conducted considering the *Pinggang Pinoy* recommendations for pregnant and lactating women. Sensory evaluation using 9 point hedonic rating scale was conducted to assess acceptability of the recipes. Energy and nutrient content of the recipes were estimated using the updated FCT + Menu Eval Software. Photo-documentation and formulation of 4-week cycle menus were also done. The calendar underwent 2-stage pre-testing and received both very satisfactory ratings from the respondents that included nutritionists, Barangay Nutrition Scholars, Barangay Health Workers, and pregnant and lactating mothers. The MGC 2017 highlights 19 photo-documented recipes incorporated in the 4-week cycle menus and

health and nutrition tips for pregnant and lactating women. The wall calendar was printed in full colors. The calendar illustrates how healthy eating can be sustained during pregnancy and lactation by emphasizing the *Pinggang Pinoy* recommendations. It provides easy-to-understand concepts on food groups, portion size and healthy cooking to maintain nutritional well-being of both the mother and infant during pregnancy and lactation. The calendar can serve as an easy daily reference material for homemakers and nutrition educators in homes and in the community.

Keywords: *Nutrition*

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0508

Development of 2020 menu guide calendar and recipe book-lutong FNRI: nutritious and affordable meals for healthier kids

Bumanglag, Marietta M.

The supplementary feeding program (SFP) is one of the most common forms of intervention to address undernutrition among children. To develop the 2020 FNRI Menu Guide Calendar (MGC) with recipes and meals for SFP for 3-5, 6-9 and 10-12 year-old children. Two separate brainstorming activities among feeding coordinators (FCs), teachers, parents and volunteers from the Department of Education (DepEd) schools and Department of Social Welfare and Development Day Care Centers (DSWD-DCCs) from Taguig City (n=10) and Tanay, Rizal (n=22) and one Key Informant Interview(KII) (n=1) from Taguig City were conducted to obtain information on food preferences of children, the participants' diet recommendation, practical health and nutrition tips on SFP and format of the calendar. Information gathered were utilized in the two-level recipe standardization process and development of the tools. Taste test was conducted among FNRI sensory panelists (n=10) using the 9-point hedonic rating scale. Photo documentation, formulation of 4-week-7-day and 5-week-5-day cycle menus, estimation of energy and nutrient content per serving of the recipes, and percentage contribution per meal using Menu Eval plus software were conducted. Health and nutrition articles were developed. A 2-stage pre-testing was conducted involving: KIIs among experts like teachers and feeding coordinators (n=32) and focus group discussion (FGD) among mothers (n=30) to assess the calendar's attractiveness, comprehensibility, acceptability and self-involvement. The FGD was suitable for mothers as it engages them to be proactive in responding. The 2020 FNRI MGC: Nutritious and affordable meals for healthier kids featured 15 nutritious recipes for 12 meals while Lutong FNRI: Recipes for Supplementary Feeding Program featured 30 recipes for 26 meals, serving portion of recipes per age group and list of substitute ingredients. The calendar can be downloadable from the FNRI website. The tools may serve as guide in planning, preparing and serving simple and affordable meals for the homes and institutions for Nutritionist-Dietitians, FCs, teachers, day care workers, health workers, parents and parent-volunteers, caretakers and nutrition students for capacity-building in providing appropriate meals for children. It is recommended to determine the effect of the recipes in SFP and gather feedback from feeding coordinators and program implementers in preparing the recipes.

Keywords: *menu guide calendar, recipe book, nutritious meals, affordable meals, supplemental feeding program, DOST-FNRI, Nutrition*

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Development of food products to address nutritional needs of women of reproductive age

Palomo, Alex M.

In the Philippines, 1 out of 4 Filipino mothers is nutritionally at-risk. More adolescent pregnant women less than 20 years of age (39.7%) are nutritionally at-risk than those 20 years old and above (22.4%). Chronic Energy Deficiency (CED) among lactating mothers stood at 13.6% while 22.4% are overweight/obese (Philippine Facts and Figure 2015). Micronutrient deficiencies in pregnant women are also of public health significance. Iron, vitamin A and zinc deficiency are among the deficiencies that challenge reproductive health in women. Iron deficiency anemia (IDA) can cause irreversible damage to fetal kidney and neural development. Pregnant women deficient in vitamin A have higher maternal mortality rates. In addition, zinc deficiency, with prevalence of 25.5% among pregnant women in the Philippines, may compromise infant development and lead to poor birth outcomes. This study developed a nutritious beverage and snack food from plant-based sources for women of reproductive age (WRA). Specifically, it aimed to determine the best formulation/processing condition for healthy beverage and snack food; evaluate the sensory, nutrient and microbiological properties of the food products, and estimate shelf-life. Locally available raw materials e.g. brown rice, flour, fruit juice powder, and fortificants were used in the study. Trial experiments were conducted to come-up with the formulation of the prototype food product for WRA. The best formulations were obtained by analyzing the results of sensory evaluation (hedonic rating scales) and level of fortification for vitamins and minerals. Formulation with the highest sensory acceptability and level of fortification were standardized and subjected to storage study. Three food products with vitamins and minerals recommended for WRA were developed. Instant powdered juice, brown rice bar, and instant pancake premix fortified with vitamin A, iron and zinc were developed. The food products had an average sensory score of “like moderately” to “like very much”. A glass of reconstituted powdered juice (12g) contributes 27%, 20% and 50% of the recommended nutrient intake (RNI) of female 15-49-year-old for vitamin A, iron and zinc, respectively. One serving size of pancake premix (40g) contributes 52%, 42% and 35% of the RNI for vitamin A, iron and zinc, respectively. One piece of fortified brown rice bar (25g) contributes 8%, 56% and 50% of the RNI for vitamin A, iron and zinc, respectively. All food products were microbiologically safe based on the FDA Philippines standard limits in food microbiology. Instant powdered juice, brown rice bar, and instant pancake premix have shelf-life of 2 months, 6 months and 4 months of storage, respectively. Three potential nutritional food products were developed containing significant amounts of vitamins and minerals recommended for WRA. These food products were acceptable and safe for human consumption. *In vitro* study, pilot-scale production and subsequent commercialization of the food products is also recommended.

Keywords: *innovative food products, nutritional needs, reproductive age, Filipino women, overweight, obesity, nutrient deficiency, plant-based sources, healthy beverage, extruded snack food, DOST-FNRI, Nutrition*

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Development of Pinggang Pinoy food guide for Filipino adults

Sandoval, Ma. Jovina A.

The so-called “double burden of malnutrition” continues to be a major public health problem in the Philippines. Obesity and chronic energy deficiency, in particular, have reached alarming rates among Filipino adults. With the current health status of Filipinos, the Food and Nutrition Research Institute-Department of Science and Technology, Department of Health, National Nutrition Council and World Health Organization Philippines has taken the initiative to address non-communicable diseases and malnutrition through the development of a new food guide to improve the dietary habits and lifestyle practices of every Filipino. The project aimed to develop a plate-based food guide for apparently healthy Filipino adults that will serve as a nutrition tool in preparing healthy and well-balanced meals to achieve adequate nutrition. The nutritional composition of the plate was established by developing two-week cycle menus that meet the population-weighted Recommended Energy and Nutrient Intakes (RENI). The percent contribution of the cycle menus to the RENI was computed using the Philippine Food Composition Table. Serving sizes were expressed in cups for easy understanding of the food proportion.

The food groups and their relative proportion were depicted on the plate using appropriate visual elements. The graphic illustration underwent technical consultation among nutrition and communication experts followed by pretesting to its target users. The Pinggang Pinoy food guide emphasizes three food groups: “Go” (rice and alternatives), “Grow” (fish and alternatives) and “Glow” (vegetables and fruits), reflecting the usual Filipino diet. Half of the plate is occupied by vegetables and fruits, while the rice and protein groups make up 1/3 and 1/6 of the plate, respectively. An identifying color and single graphic icons of locally known food items represented each food group. A glass of water was incorporated to highlight the importance of hydration. The Pinggang Pinoy brochure is one of the collaterals developed. It features a sample one-day meal plan, nutrition messages based on the 2012 Nutritional Guidelines for Filipinos and equivalent portion sizes to assist users in adopting Pinggang Pinoy. The developed two-week cycle menus met 100-105% of the energy requirement, 100% or more of the protein recommendation, and at least 70% of the other micronutrient requirements. A per-meal food guide for apparently healthy Filipino adults was developed. It uses a familiar plate model to convey in a simple and understandable way the concept of eating a variety of foods in the right proportion to meet the body’s energy and nutrient needs. Training of nutrition educators in using and interpreting the Pinggang Pinoy and its promotion to various stakeholders are recommended. The development of Pinggang Pinoy for children and other age groups is ongoing.

Keywords: *Pinggang Pinoy, DOST-FNRI, Filipino adults, malnutrition, obesity, chronic energy deficiency, RENI, Nutrition*

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0511

Development of Pinggang Pinoy® meals for 6-9 years old children for a school feeding program

Bumanglag, Marietta M.

Hunger and poor nutrition among children affect health and school performance. The 2015 National Nutrition Survey revealed the prevalence of malnutrition among children aged 5-10 years as follows: underweight is 3 out of 10; stunting is 3 out of 10; and wasting is 1 out of 10. The use of Pinggang Pinoy® conveys simple and easy-to-understand recommendations to improve dietary eating habits to meet daily nutritional requirements. The project aimed to develop Pinggang Pinoy® meals for 6 to 9 years old children for a school feeding program. Recipe development/validation and sensory evaluation were conducted among FNRI sensory panelists (n=10) using the 9-point hedonic rating. Nine out of 27 recipes were quantified to 150 servings and were subjected to consumer-type sensory evaluation among FNRI employees (n= 123 to 150). Estimated energy and nutrient content of the recipes/meals were calculated using the Menu Eval Plus Software. Twenty (20) meals passed the sensory test with a rating of 8 or like very much. The amount of vegetables was reduced from the original Pinggang Pinoy® proportion to make the serving size more appropriate for 6 to 9 years old children but still within acceptable proportion. The meals contributed 20% and 30% of the recommended energy and protein intake, respectively. The estimated average raw food cost is ₱13.40/meal. An offshoot of the project was a pre-tested recipe booklet entitled “Abot-kayang Pagkain sa Halagang P100” featuring 12 photo-documented meals for a family of five. The Pinggang Pinoy® meal combinations are recommended for use in school and community feeding of 6 to 9 years old children to ensure that the meals served provide the recommended amount of nutrients. Additional recipes and modification of existing meals for other age groups aligned with Pinggang Pinoy® can be developed to increase the repertoire of nutritious and affordable recipes/meals for use in school feeding programs. The recipe booklet can serve as a guide for meal preparers in serving nutritious and affordable meals for the family.

Keywords: *Pinggang Pinoy, school feeding program, hunger, poor nutrition, malnutrition, meal planning, Filipino children, DOST-FNRI, Nutrition*

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Dietary intake and nutritional status of children 0-5 years old left behind by women overseas workers ***Dorado, Julieta B.***

In the Philippines, overseas work among women has been an increasing option to augment household income. The population of overseas workers has grown with slightly more proportion for females (50.5%) than males (49.5%) and many of them have left their children behind. The study aimed to determine the characteristics of the household, mothers and 0-5 year old children, examine the nutritional status of the 0-5 year old children, and determine the percent adequacy of nutrient (energy, protein, vitamin A, iron) intakes among children 6 months to 5 years old. The study utilized secondary data from the 2008 National Nutrition Survey (FNRI-NNS). Household data sets and selected variables were merged with data sets of 0-5 year old children specifically the food consumption and the anthropometric data. The data was processed and analyzed using the Statistical Data Analysis (STATA) Special Edition 12.1. A p-value of less than 0.05 was considered significant. Of the 2,825 households with children 0-5 years old, fifty (50) had mothers working overseas. Most of the mothers in OFW households had finished high school and college levels, (43.4, 52.9 percent, respectively) whereas those from non-OFW households were usually elementary and high school graduates (27.9 and 45.3 percent). There is a significant difference between the education in households with OFW mothers than non-OFW ($p=0.022$). The weight of children in the households with OFW mothers did not differ significantly with the children with the non-OFW mothers ($p=0.102$). However, height measurements of children with OFW mothers differed significantly with the non-OFW counterpart ($p=0.013$). Children with OFW mothers had higher energy, protein, calcium and vitamin A intakes compared to children with non-OFW mothers but the difference is not significant. Majority of the children in both groups had energy intake less than 100 percent, same is true for calcium ($p=0.184$), iron ($p=0.526$) and vitamin A ($p=0.062$). The study being an analysis of secondary data was limited on the selected variables such as working status of household heads, mothers, and age, weight, height & nutrient intake of children. The care practices and behavior of mothers/caregivers were not covered in the analysis. Results showed that OFW mothers were better educated, have well-nourished children and a food secure household compared with non-OFW mothers. Having women working overseas had positive effects on the nutritional status (height) and food intake of the children in the households. The use of large sample size is recommended for future studies to compare between OFW and non-OFW households. Likewise, qualitative data on the effects of having an OFW mother on the care and nutritional status of children should be pursued.

Keywords: *dietary intake, nutritional status, Filipino children, women overseas workers, DOST-FNRI, Nutrition*

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Differences in nutrient intakes and food preferences based on candidate single nucleotide polymorphisms in hypertensive and non-hypertensive adults

Diet-related diseases, such as hypertension, remain to be one of the top leading causes of mortality and morbidity despite ongoing efforts in reducing its prevalence. Nowadays, nutrition researches are geared in conducting empirical studies using Nutrigenomics and Nutrigenetics approaches towards a more comprehensive and integrated management of such diseases. With the aid of high-throughput technologies, a study was conducted to assess the association of susceptibility genes and candidate SNPs with the dietary intake and food preferences of selected adults. The study aimed to determine the SNP genotypes of *TAS1R3* rs307355 and rs307377, *TAS2R38* rs713598, *TRPV1* rs8065080, *CD36* rs1761667, *ADD1* rs4961, *AGT* rs699, and *SLC2A2* rs8192675 among selected adults, and to determine variations in nutrient intake and food preferences based on SNP genotypes. A total of 995 genomic DNAs from the 8th National Nutrition Survey were analyzed to determine SNP genotypes via capillary sequencing and high resolution melt assays. Data were processed and analyzed according to SNP genotypes and blood pressure measurements. Chi-Square Tests for Comparison of Proportions and Hardy-Weinberg Equilibrium characterized and profiled the allelic frequencies of these SNPs. Analysis of Variance with Tukey's Post Hoc Test found significant differences in nutrient intakes between and within genotypes. A 95% CI was assumed for all computations. Minor allele frequencies of Filipino adults at *TAS2R38* (40.71%), *ADD1*

(46.34%) and *SLC2A2* (29.15%) loci were similar to that of Nigerians, Europeans, East Asians, East Anglians, Americans, and South Asians. *TAS1R3* rs307377, *TAS2R38* rs713598, *AGT* rs699, and *SLC2A2* rs8192675 were in Hardy-Weinberg equilibrium, which means that the allelic frequencies are expected to remain among Filipinos over time. Among hypertensive adults, significant differences in nutrient intakes were observed among those with *TAS2R38* rs713598, *ADD1* rs4961 and *AGT* rs699 genotypes, indicating that majority of those carrying heterozygotes had higher nutrient intakes as compared to homozygotes. Commonly consumed foods also differed among those with *TAS2R38* rs713598 and *ADD1* rs4961 genotypes. On the other hand, variation in nutrient intakes were observed among non-hypertensive adults with *TAS1R3* rs307355 and rs307377, *TAS2R38* rs713598, *TRPV1* rs8065080, *CD36* rs1761667, *ADD1* rs4961, *AGT* rs699, and *SLC2A2* rs8192675 genotypes; also indicating that majority of those carrying heterozygotes had higher intakes as compared to homozygotes. Finally, the commonly consumed foods among this group significantly differed among those with *TAS2R38* rs713598, *TAS1R3* rs307355, *TRPV1* rs8065080, *CD36* rs1761667, *ADD1* rs4961, and *SLC2A2* rs8192675 genotypes. This study provided relevant initial findings on how candidate genes and SNPs can relate to nutrient intakes and food preferences. Further studies involving socio-behavioral aspects and family dynamics in food intake among Filipino adults in different regions of the country are warranted. Overall, this study underscores the importance of considering genetic variations in the development of dietary recommendations for Filipinos.

Keywords: *Nutrition*

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0514

Discovery of nutrigenetic markers correlated with vitamin D nutrition in different lifestyle genes among adult respondents of the 2013 national nutrition survey

Zumaraga, Mark Pretzel

Vitamin D Deficiency is a widespread disorder across all age groups around the world including the Philippines. Highest proportion of deficient and insufficient levels was among the adult Filipino female of childbearing age, 20-39 years old (FNRI, 2013). Vitamin D had been linked to skeletal disease but growing scientific attention turned to its link to metabolic diseases, autoimmunity & death. With vitamin D implicated in a wide range of diseases, a fuller understanding of the determinants of vitamin D status is needed and must include consideration of inherited characteristics. The study determined the difference in serum vitamin D levels in lifestyle and nutrition disease-related genes among adult respondents, age 21 years old and above, of the 2013 National Nutrition Survey (NNS). This study followed Cross sectional study design. 187 Anonymized genomic DNA of the 2013 NNS aged 21 years and above were used in the study. DNA was sequenced using the IonProton Next Generation Sequencer (Invitrogen Life Technologies). To target amplify only those genes linked with nutrition-related diseases, the custom Ion Ampliseq™ Panel (Invitrogen Life Technologies), was used. Preliminary data analysis was done using the Ampliseq™ Variant Caller plug-in within the Ion Torrent Suite software (Invitrogen Life Technologies) Study variables: age, sex, smoking habits, hours of sun exposure, BMI, physical activity, fasting glucose, lipid profile, creatinine, serum micronutrient levels, urinary sodium, previous history of disease and genetics. DNA Samples that passed the DNA quality by spectrophotometry were sent for analysis at UP Service Laboratory. Continuous variables were analyzed by the t-test or ANOVA. Nutrigenetic Markers that were found to have statistically significant difference in serum vitamin D concentration across genotypes. The C risk allele carriers had reduced resting alpha oscillation. This may provide important information on latitude-dependent individual differences in stress response. Dipeptidase 1 (DPEP1) is a known biomarker for diagnosis and treatment of cardiovascular disease. Differences in serum vitamin D concentration reveals potential usage of this biomarker for vitamin D deficiency. rs1394205 influences bone turnover in women and may be improved by proper vitamin D supplementation based on genotype. It is very likely that using genotype data in Insulin-like growth factor 2 mRNA-binding protein 2 (IGF2BP2) rs4402960 may infer the likely causal relationship between genetic variation, changes in gene expression levels associated with type 2 DM and finally link occurrence of type 2DM with vitamin D deficiency. Cytochrome P450 Family 1 Subfamily A Member 2 (CYP1A2) gene encodes a protein that metabolizes nutrients and drugs. Genetic variants in the CYP1A2 have the potential to affect individual capacity to metabolize substrates such as vitamin D. Large scale analysis associated with lifestyle and nutrition diseases and other determinants of overall health has shown great utility in the discovery of genes and polymorphisms that play a role in vitamin D nutrition. Our data discovered at least five genetic variations that showed statistically difference in serum vitamin D concentration across genotypes. These genes were previously

shown to have contributed to the risk of CVD, T2DM, osteoporosis, stress and drug metabolism. Post-hoc test may be performed to confirm where the differences occurred between groups. It is envisioned that understanding how genetics interact with environmental factors, especially nutrition may hold the key to better prevention and management of nutrition-related diseases.

Keywords: *vitamin D deficiency, nutrigenetic markers, national nutrition survey, Filipino adults, C risk allele carriers, dipeptidase1, rs1394205, IGF2BP2, CYP1A2, Nutrition*

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0515

Eating away from home among Filipino adults: association with nutritional status and metabolic risk factors

Desnacido, Josie P.

Eating away from home refers to the practice of buying and eating foods outside of the home. This includes full meals, single ready-to-eat items, take away foods, and beverages purchased at restaurants, freshly-prepared food sections at grocery stores, institutional food-service settings, and other outlets. This kind of consumption practice has become a part of the modern lifestyle of many Filipinos. The growth of the food-service industry, shifting of consumers' food preferences, and changes in society and economy create an impulse for household members to eat away from home instead of preparing their own meals at home. Away-from-home foods are generally higher in calories, saturated fats, sodium and added sugar leading to being overweight or obese and acquiring metabolic risk factors. This study determined the proportion and characteristics of Filipino adults eating away from home and determined the association between eating away from home and the occurrence of obesity and metabolic risk factors.

Keywords: *eating practices, away from home, Filipino adults, dietary intake, Nutrition*

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0516

Effect of iron supplementation utilizing iron-fortified rice and malunggay leaves powder on the biochemical parameters and expression of genes associated with iron deficiency anemia in pregnant Filipino women

Timoteo, Vanessa Joy A.

Iron-fortified rice (IFR) and malunggay leaves powder (MLP) are two of the functional food products developed by the Food and Nutrition Research Institute (FNRI-DOST) in order to address the prevailing micronutrient deficiencies in the country, including iron deficiency anemia (IDA). Aside from not meeting the recommended dietary intake for iron, a number of genes may also confer susceptibility to IDA. SLC11A2 and TF are involved in the transport and delivery of iron to the cells, HFE functions in the regulation of iron homeostasis, and TMPRSS6 promote iron absorption. Since pregnant women are at high risk of developing anemia because of increased iron requirement, this study was conducted to determine the effect of IFR and MLP on the expression of genes associated with IDA and on the biochemical indices of iron status and concentration in pregnant Filipinas. The study followed a non-randomized controlled intervention trial. The intervention group (n=65), comprised of pregnant Filipinas living in selected barangays of Quezon, Palawan, received daily IFR and MLP-rich dishes as a meal during lunch for 120 days. These meals ideally meet one-third of the recommended dietary intake for iron of pregnant Filipinas. The control group (n=45), on the other hand, was advised and monitored to consume their usual food intakes for the entire 120 days of intervention. From these groups, pregnant women were matched based on age and month of pregnancy (n=7 per study group) in order to determine the effect of the intervention on the expression of SLC11A2, HFE, TMPRSS6 and TF, and on the levels of hemoglobin, hematocrit, serum

ferritin, serum iron, and total iron binding capacity at midline and endline. Results showed that among the pregnant Filipinas who depended only on the intervention (without additional oral iron supplement), daily iron supplementation of IFR and MLP food recipes for 120 days increased the mRNA levels of SLC11A2, HFE, TMPRSS6, and TF, as compared to baseline measures. This is equated to a positive iron status during pregnancy. Additionally, continuous increases in the levels of hemoglobin, hematocrit, and serum ferritin were observed while serum iron and total iron binding capacity levels were maintained in the intervention group. IFR and MLP supplementation was further shown to be more effective in iron-deficient than iron-replete pregnant Filipinas. This study is the first to provide information on the effect of foods and nutrients on the expressions of genes among pregnant Filipinas. IFR and MLP were shown to improve the expression of genes involved in human iron metabolism, which is corroborated by the increases observed in the levels of hemoglobin, hematocrit, and serum ferritin. IFR and MLP may be utilized in formulating diets for pregnant Filipinas on the basis of genome-based personalized dietary counseling.

Keywords: *iron-fortified rice, Filipino women, pregnant women, malunggay leaves powder, functional food products, iron deficiency, anemia, SLC11A2, TF, TMPRSS6, HFE, DOST-FNRI, Nutrition*

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0517

The effect of Momsie on the nutritional status of 6-36 months old children

Magsadia, Clarita R.

Infants and young children are at an increased risk of under nutrition, particularly when breast milk alone is no longer sufficient to meet their nutritional needs. During complementary feeding, it is important to provide appropriate, safe, suitable and acceptable complementary foods. The DOST-FNRI developed MOMSIE™, a complementary food made from soybean, peanuts, sesame seeds and mongo, for children six months to three years of age. It is high in calories and fortified with vitamins A and C, folate, iron, calcium and zinc. This study determined the effects of MOMSIE™ and unfortified ready-to-eat complementary food consumed daily over a 120-day feeding period on the nutritional status of normal and undernourished 6-36 months old children. This study followed a randomized, double-blind, controlled, two group design done in Angono, Rizal. It is a first class urban municipality with the highest prevalence of underweight among the 13 municipalities of Rizal. Qualified children were clustered by nutritional status (normal and underheight/underweight) then randomly allocated into two groups with matched number of samples of normal and underheight/underweight children. One pair received the Momsie™ while the other pair was given the unfortified ready-to-eat complementary food and served as the control. Both complementary foods were in unbranded 25 grams sachets and were color-coded. Each child participant was also given codes corresponding to their group code. Codes were revealed to the Research Team after the data analysis. The intervention was done for 120 days. Height/length and weight were measured monthly for the duration of the intervention. Blood samples for analysis hemoglobin and serum ferritin and dietary intake were collected at baseline and endline. Liking Score sheet was given to each mother/caregiver of child participant twice a month. Both the normal and undernourished groups given with Fortified Momsie™ demonstrated higher mean height/length and weight and hemoglobin level after the intervention. There was significant increase ($p=0.0041$) in median serum ferritin level in Fortified-Undernourished group. Both the fortified and unfortified ready-to-eat complementary foods were acceptable to children and their mothers/caregivers. The study showed that fortified MOMSIE™ can have a significant effect on improving hemoglobin levels and reducing anemia prevalence though its effects on improvement of height/length and weight was modest. Making the complementary food product MOMSIE™ available can make better the accessibility for quality fortified complementary food to help improve the iron status and nutritional status of infants and young children. It is a healthful choice for complementary feeding of infants and young children.

Keywords: *Momsie, complementary food, nutritional feeding, Filipino children, serum ferritin, nourishment, DOST-FNRI, Nutrition*

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The effects of a multi-micronutrient fortified juice drink on the hemoglobin levels of Filipino schoolchildren

Angeles-Agdeppa, Imelda, Ph.D.

Nutritional anemia can be caused by different micronutrient deficiencies like folate, riboflavin, vitamin A and cobalamine but iron is the major contributor. Food fortification is the most cost effective approach in reaching large populations at risk of iron deficiency anemia. The study evaluated the dose-response of a multimicronutrient fortified juice drink on hemoglobin level (Hb) of schoolchildren. Hb levels of 2423 children aged 6 to 9-years old in six public schools were collected. All anemic children (246) were randomly allocated into groups to receive different doses of fortified drink during a supervised 120-day feeding period: Group 1: daily dose (HD), Group 2: 5X/week (MD), Group 3: 3X/week (LD) and Group 4: unfortified (Control). Pre and post-measurements of iron biomarkers and food intake were collected using standard methods. At the start of the study, prevalence of anemia was 10%. Complete data from 228 children was observed. At baseline, mean Hb was significantly lower in the Control than in the intervention groups. At endpoint significant Hb increases were observed within time periods in all groups but no significant difference was found between groups. Consequently, there was a significant reduction in anemia prevalence in all groups from 100% at baseline to 36% (Control), 30% (LD), 23% (MD) and 26% (HD) at endpoint. At endpoint, the proportion of children meeting the Estimated Average Requirement for iron was: Control (29%), LD (54%), MD (48%) and HD (62%) with the juice drink contributing to 23%, 35% and 42% to the intake in the LD, MD and HD, respectively. At endpoint, no dose response effect was observed in hemoglobin in this population. This can be related to the low amount of iron in the juice and limited duration of consumption that can show significant improvement in Hb among the selected anemic population especially where the prevalence of IDA was low.

Keywords: *fortified juice drink, hemoglobin, nutritional anemia, micronutrient deficiency, food fortification, iron deficiency, Filipino schoolchildren, DOST-FNRI, Nutrition*

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The effects of coconut skim milk, cow's milk, and dairy-coco milk blend on the anthropometric indices of underweight school children

Angeles-Agdeppa, Imelda, Ph.D.

Milk is an important source of energy and nutrients particularly for children. Hence, it is used in the management of undernutrition. Milk feeding can serve as a strategy to address undernutrition in Filipino children. This study investigated and compared the effects of coconut skim milk; cow's milk and dairy-coconut milk blend (80% cow's milk + 20% coconut skim milk) on weight and height of selected schoolchildren aged 6 to 9 years old over a 120-day feeding period. The study followed a randomized, double-blind, controlled, parallel-group design in Guadalupe Elementary School in Cebu City. A total of 444 underweight/underheight schoolchildren were randomly allocated into three groups and they were given 200ml milk in color-and number-coded bottles. Height and weight were measured at baseline, midline and endline. Food intake was assessed at baseline and endline while acceptability of milk products was done monthly. Due to numerous holidays and class suspension, the feeding days was reduced to 95 days. A significant increase in mean weight and mean height was noted in all child participants after the 95 feeding day period. Similarly, nutrient intake of child participants particularly carbohydrates, protein, fats and calcium increased significantly from baseline to endline in all groups. Lastly, the three milk products were generally acceptable based on the acceptability questionnaire accomplished by the child participants. The study results showed a significant increase in weight and height of child participants from baseline to endline. The results affirmed the beneficial effects of consuming either one of the three types of milk (cow's milk, dairy-coco milk blend or coconut skim milk) in improving height and weight of schoolchildren. Coconut skim milk and dairy-coconut milk blend can be considered as good alternatives to cow's milk in feeding programs.

Keywords: *undernutrition, coconut skim milk, cow's milk, dairy-coco milk blend, anthropometric index, underweight, underheight, Filipino schoolchildren, DOST-FNRI, Nutrition*

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0520

The efficacy of multi-micronutrient growth mix with high calorie dense foods on the nutritional status of children aged 4-5 years old

Angeles-Agdeppa, Imelda, Ph.D.

Fortification of staple foods with micronutrients may be insufficient to improve physical growth because the total proportion of macronutrients is still inadequate. To answer this problem, newly developed Multi-micronutrient Growth Mix (MGM) was combined into high calorie dense snacks. This study evaluated the effects of multi-micronutrient growth mix (MGM) added to high calorie snacks in improving the nutritional status and hemoglobin levels of children aged 4 to 5 years old over a 120 day feeding period. This study was conducted in 19 selected schools in Tanauan (10 schools) and Talisay (9 schools), Batangas. Using a randomized, double blind placebo controlled design, 247 children ages 4-5 years old were grouped into anemic (fortified n=38, non-fortified n=40), anemic underweight (fortified n=24, non-fortified n=26), and underweight (fortified n=59, non-fortified n=60) children. These group participated and completed the 120-day feeding intervention period. Children were fed with either high calorie snacks plus placebo or with high calorie snacks plus MGM in the school feeding centers. Weight and height were measured and blood samples were collected for the analysis of hemoglobin. Results showed that significant increase in hemoglobin (Hb) concentration was observed in both groups between baseline and endline among anemic ($p<0.001$) and anemic underweight ($p<0.001$) children but no significant increase was observed between groups. Mean weight increased in all groups between time periods but no significant difference was observed between groups. Significant increase in height was also observed in all groups. Children with low micronutrient and anthropometric status had better response to both interventions - MGM plus high calorie dense snacks and high calorie dense snacks alone. It is recommended that MGM plus high calorie dense foods be used as an intervention snacks to help reduce both micronutrient deficiency and undernutrition.

Keywords: *multi-micronutrient growth mix, high calorie dense foods, nutritional status, food fortification, hemoglobin, macronutrients, Filipino children, micronutrient deficiency, undernutrition, DOST-FNRI, Nutrition*

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0521

Enhance multi-nutrient growth mix (MGM) to address malnutrition among children

Saises, Marcela C.

According to WHO, there is a global magnitude of micronutrient deficiency in 27% of the global population or equivalent to 2 billion people. In the Philippines, some of the common micronutrient deficiency and inadequate nutrient intake include iron, vitamin A, iodine, zinc, calcium, and B vitamins. Infants and children are included in the vulnerable groups which makes proper nutrition vital in combating and impeding the effects of malnutrition. Complementary foods such as the enhanced multinutrient growth mix (MGM) are administered among these vulnerable groups. The study aims to determine the feasibility of fortifying complementary food with essential micronutrients for children 6 months to 36 months. The enhanced MGM mix was prepared according to technical processing conducted by the DOST-FNRI. Then, it was evaluated for four markers: optimization of formulation, consumer acceptability of complementary food and other recipes fortified with enhanced MGM mix, nutritional content evaluation, and shelf-life study. Results showed that sensory acceptability of different recipes fortified with enhanced MGM mix was obtained a hedonic rating scale of "like moderately" to "like it very much". For every 2 grams of MGM powder, it contains: 315ug RE, vitamin A; 2.5mg zinc; 2.4mg iron; 24ug iodine; 62mg calcium; 0.21mg vitamin B1; 73.2ug DFE, vitamin B9; 0.63ug vitamin B12; and 22.4mg vitamin C. The enhanced

MGM mix has a competitive advantage because it is convenient, micronutrient dense, and low cost. It also has acceptable sensory, and long shelf-life. In conclusion, acceptable and shelf-stable rice base enhanced multi-nutrient growth mix was developed and standardized. The addition of MGM improved the level of micronutrients in complementary foods and other common household recipes. Enhanced MGM mix has a shelf-life of 1 year. It is recommended to make efficacy trials, market study, scale up production, and commercialization.

Keywords: *multinutrient growth mix, malnutrition, Filipino children, complementary food, consumer acceptability, shelf-life, DOST-FNRI, Nutrition*

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0522

Enzyme treatment on enteral food formula: will it work?

Palomo, Alex M.

Enteral nutrition (EN) is a tube-feeding technique of administering nutritional therapy to the normally functioning gastrointestinal tract (GI) of patients who are unable to eat or swallow. In 2000, the DOST-Food and Nutrition Research Institute (DOST-FNRI) developed a low-cost dehydrated instant tube feeding formula (Tanchoco *et al.*, 2000) from indigenous food sources. This formula was comparable with the commercial one in terms of nutrient density, and found 12.5 times cheaper. Results of clinical trials showed that it can prevent nutritional deterioration and slightly improve iron and protein status (Tanchoco *et al.*, 1999). Further improvement of the enteral food formula is needed by reducing its viscosity to prevent blockage in the nasogastric tube during tube feeding. The general objective of the study was to determine the effect of enzyme treatment on the developed DOST-FNRI instant tube feeding formula. Specifically, it aimed to determine the effect of enzyme treatment on the physico-chemical and nutritional properties of the DOST-FNRI developed enteral food formula. The enteral formula was prepared using the formulation of Tanchoco *et al.* with some modifications. Several trial experiments were conducted to determine the effect of enzyme treatment on the different properties of enteral food formula. Effects of incubation time, enzyme level, and moisture content of rice-mongo flour on physico-chemical properties of instant tube feeding formula, specifically on its viscosity were determined. The nutritional and microbiological properties of the feeding formula were also determined. Factors such as enzyme concentration, treatment time, and moisture content were found to have significant effect on the viscosity of the enteral food formula.

Keywords: *enzyme treatment, enteral food formula, enteral nutrition, gastrointestinal tract, tube feeding, DOST-FNRI, Nutrition*

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0523

An evaluation of a school-based nutrition education strategy: the healthy kids program

Dorado, Julieta B.

The double burden of malnutrition is prevalent among school-age Filipino children. Nutrition education is one of the interventions to improve their health and nutrition situation. The study evaluated the effects of Healthy Kids Program, a school-based nutrition education intervention, on the knowledge, attitude, and behavior of schoolchildren towards health and nutrition. Experimental design was used in the study, with intervention and non-intervention groups. A total of 10 lessons specifically developed for the study was provided to the intervention group while, the nonintervention group had the regular nutrition lessons. The non-intervention group was provided with the same intervention after the study. A total of 141 schoolchildren 9-10 years old with complete baseline and endline data were included in the analysis. Data collected included socio-demographic profile of the households, anthropometric measurements of schoolchildren, and their food intake using Dietary Diversity Score questionnaire. The knowledge, attitude and behavior of schoolchildren were determined through pre and post-tests administered by the teachers at baseline and endline, respectively. Parametric and nonparametric tests were

carried out in data analysis. Baseline mean scores of the schoolchildren in the intervention and non-intervention groups for knowledge, attitude and behavior were similar ($p>0.05$). After the intervention, significantly higher mean score in nutrition knowledge was obtained in the intervention compared with the non-intervention group (24.4 ± 5.4 and 20.6 ± 5.6 , $p<0.05$, respectively). High scores of the intervention group were noted particularly in understanding of Go/Grow/Glow, balanced meal, healthy breakfast, healthy lifestyle and reading labels. Also, significant increase in mean scores for favorable attitude ($p<0.05$) and behavior ($p<0.05$) towards health and nutrition were noted in the intervention group. However, dietary diversity scores were not significantly different within and between groups at baseline and endline. The conduct of 10 weekly nutrition education sessions resulted to improvement in the knowledge, attitude and behavior of schoolchildren on health and nutrition. The Healthy Kids Program shows strong potential for integration in the Department of Education's K+12 curriculum, thus, advocacy for its institutionalization is recommended.

Keywords: *school feeding program, nutrition education, Filipino schoolchildren, nutrition intervention, dietary diversity score, DOST-FNRI, Nutrition*

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0524

An evaluation of a school-based nutrition education strategy: the healthy kids program *Dorado, Julieta B.*

The double burden of malnutrition is prevalent among school-age Filipino children. Nutrition education is one of the interventions to improve their health and nutrition situation. The study evaluated the effects of Healthy Kids Program, a school-based nutrition education intervention, on the knowledge, attitude, and behavior of schoolchildren towards health and nutrition. Experimental design was used in the study, with intervention and non-intervention groups. A total of 10 lessons specifically developed for the study was provided to the intervention group while, the nonintervention group had the regular nutrition lessons. The non-intervention group was provided with the same intervention after the study. A total of 141 schoolchildren 9-10 years old with complete baseline and endline data were included in the analysis. Data collected included socio-demographic profile of the households, anthropometric measurements of schoolchildren, and their food intake using Dietary Diversity Score questionnaire. The knowledge, attitude and behavior of schoolchildren were determined through pre and post-tests administered by the teachers at baseline and endline, respectively. Parametric and nonparametric tests were carried out in data analysis. Baseline mean scores of the schoolchildren in the intervention and non-intervention groups for knowledge, attitude and behavior were similar ($p>0.05$). After the intervention, significantly higher mean score in nutrition knowledge was obtained in the intervention compared with the non-intervention group (24.4 ± 5.4 and 20.6 ± 5.6 , $p<0.05$, respectively). High scores of the intervention group were noted particularly in understanding of Go/Grow/Glow, balanced meal, healthy breakfast, healthy lifestyle and reading labels. Also, significant increase in mean scores for favorable attitude ($p<0.05$) and behavior ($p<0.05$) towards health and nutrition were noted in the intervention group. However, dietary diversity scores were not significantly different within and between groups at baseline and endline. The conduct of 10 weekly nutrition education sessions resulted to improvement in the knowledge, attitude and behavior of schoolchildren on health and nutrition. The Healthy Kids Program shows strong potential for integration in the Department of Education's K+12 curriculum, thus, advocacy for its institutionalization is recommended.

Keywords: *school-based feeding, nutrition education, Filipino schoolchildren, Healthy Kids program, DOST-FNRI, Nutrition*

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(Filipiniana Analytics)

Evaluation of dietary service in selected hospitals in the Philippines

Angeles-Agdeppa, Imelda, Ph.D.

The dietary service is one of the six major services of the hospital and is integral in total patient care. Today, with an increased workload and compensatory managerial process jeopardizing quality health care, some hospitals resort to outsourcing including their dietary service. This study evaluated the food quality and quantity, food cost, compliance to manpower, physical and food safety standards in both in-house and outsourced dietary services of government and private hospitals. This was a cross-sectional study covering 40 randomly selected hospitals (36 government and 4 private hospitals) with in-house dietary service and 7 hospitals (2 government and 5 private hospitals) with outsourced dietary service using multi-stage stratified random sampling by area and hospital category. Food weighing, face-to-face interviews, actual observations using a pretested checklist and document reviews were conducted. In both dietary services: foods served to service ward patients in all government hospitals were inadequate of energy (52-97%), carbohydrate (32-54%) and fat (10-19%); in hospitals with suite rooms (n=15), fat content of meals was high (40-63%). In service wards, every 10 peso increase in food cost significantly increases the following: energy (1.2%), carbohydrate (1.0%) and protein (2.1%). Both dietary services complied poorly with the Department of Health's (DOH) staffing and food safety standards, had improper dietary facility location and layout with poor ventilation, illumination and antiquated equipment. In both types of dietary services: poor quality and quantity of foods were served to service ward patients of government hospitals; foods with high fat content were served in suite rooms. Cost is not significantly related to the quality of meals served though increase in budget corresponds to higher quantity in total energy. Majority of the hospitals lacked compliance on human resources, physical layout, food safety and illumination standards. The cost of dietetic services in the hospital should be included in the Philhealth package. Area-specific food cost should be considered and foods to be served be planned for quality. DOH dietary service staffing pattern should be enforced. Manpower complement, standard equipment and layout in the dietary service should be considered for hospital licensing.

Keywords: *dietary service, Philippine hospitals, food quality, DOST-FNRI, safety standards, in-house dietary service, outsourced dietary service, Nutrition*

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Exposure to calamities predicts poor nutritional status in elderly adults but not in children and pregnant women: a secondary analysis of the 8th NNS

Acuin, Cecilia Cristina S., M.D., Ph.D.

The immediate and short term consequences of calamities on nutritional status have been assumed to be detrimental. Hence, government efforts focus on ensuring the availability of sufficient food in calamity-stricken areas. This study aimed to determine the possible effects of calamities on the nutritional status of children, 0-5 years old, the elderly and pregnant women. Merged datasets from the 2013 National Nutrition Survey (NNS) covering 35,825 households and 172,323 individuals nationwide and data on calamity exposure to include typhoons, flood, earthquakes and landslides among others from the National Disaster and Risk Reduction Management Council (NDRRMC) were utilized. Multivariate analysis using logistic regression analysis was done to predict undernutrition. Children from poorer households, whose mothers had elementary education and were from households with more than five members are more likely to be underweight and stunted than children from richer households, whose mothers had reached college and were from households with less than five members. Teenage pregnant women, as well as those belonging to the poorest quintile and those who did not avail of prenatal services are more likely to become nutritionally at-risk of giving birth to low birthweight babies. Exposure to calamities of these population groups did not predict poor nutritional status. However, the elderly, who were poorly educated, unemployed, with poor wealth status and who experienced several bouts of calamities prior to the survey are more likely to be underweight and iodine deficient than the younger age groups. Exposure to calamities predicted poor nutritional status among the elderly but not among children 0 to 5 years old and pregnant women. This may be attributed to the possible preferential feeding practices of the household at the expense of adult members and exceptional caring for children and pregnant women during calamities. As such, in the

provision of post-calamity assistance from government and non-government organizations, it is necessary to consider the needs of elderly members of the households.

Keywords: *nutritional status, calamity, Filipino elderly, food security, Filipino children, Filipino pregnant women, poor household, undernutrition, DOST-FNRI, Nutrition*

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0527

Extraction and characterization of natural colorants and its application to nutritional food products *Arcangel, Trinidad II T.*

Color plays a significant role in the acceptability of foods. Food industries have used food colorants for centuries to enhance or restore the original appearance of foods, ensure uniformity, and to improve food quality. Reports on the health hazards and toxicity caused by synthetic colorants and chemicals used in food manufacturing have led some food industries towards the use of natural food colorants. Enhancing the aesthetic property of food through the use of natural colorants, may entice and encourage target customers specifically children to consume nutritiously healthy snack foods with safe ingredients. This study aimed to develop a technology for the production of natural colorants derived from locally available raw materials. Specifically it aimed to optimize processing conditions, standardize the process, determine the colorants' shelf-life, and apply the colorants to nutritional snack food products. Yellow, red, and blue natural colorants were extracted from squash (*Cucurbita maxima* L.), purple sweet potato leaves (*Ipomoea batatas*), and blue ternate flower (*Clitoria ternatea*), respectively. Yellow liquid colorant was produced using lipid extraction technique while red powder and blue powder colorants used aqueous extraction and spray drying technique. The process was optimized and standardized to come up with the most acceptable physicochemical characteristics and the colorants were stored for stability study. The standardized colorants were applied to extruded and steam-fried snack foods using coating technique. The physico-chemical, sensory acceptability, and microbiological parameters were monitored for shelf-life study. Results of the study showed that the optimized processing conditions for the extraction of natural colorants were repeatable. The shelf-life was found to be 11 months for yellow, and 8 months for both red and blue colorants, based on physico-chemical results. When applied to extruded and steam fried snack foods, the shelf-life of the final products were 6 and 3 months, respectively. Extruded and steam-fried snack foods were rated as "like moderately" with sensory profiles within the acceptable values. The physico-chemical and microbial properties of the colorants and snack foods with colorants were within the acceptable limits. Extraction and production process of natural colorants from locally-sourced raw materials was technically feasible. The optimized natural colorants produced can be both applied to extruded and steam fried snack foods. Natural colorants and snack foods with colorants were acceptable and safe for human consumption. It is recommended to use the optimized colorants to other food products and food matrices to determine its applicability and acceptability. Pilot scale studies on the production of natural colorants is also recommended.

Keywords: *natural colorants, nutritional food products, Cucurbita maxima L., Ipomoea batatas, Clitoria ternatea, physico-chemical properties, shelf-life, DOST-FNRI, Nutrition*

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Are Filipino fisherfolks healthy or not? Excerpts from 2013 results of the National Nutrition Survey

Capanzana, Mario V., Ph.D.

The fishing industry is a significant producer of food in the Philippines, yet the fisherfolks remain to be one of the most marginalized sectors in the country. Filipino fishing communities are thought to be at particularly high risk of malnutrition, yet limited studies that assess the nutritional status and dietary intake of fisherfolks are available. The study aimed to analyze the nutritional status, dietary diversity and food security of fisherfolks. Using the database of the 8th National Nutrition Survey (NNS) conducted by the DOST-FNRI in 2013, 35,825 households by various occupational groups were included. Data were disaggregated by age, sex and occupational groups, and analyzed using Stata 12.0. Descriptive statistics like mean, frequencies and percentages by population and occupation groups were generated. Results showed high prevalence of malnutrition among households headed by fisherfolks as stunting (40.1%) and underweight (36.6%) were problems among children, while Chronic Energy Deficiency (CED) among adults (11.4%). On health indicators, fisherfolks had the least number of anemic (8.0%) and diabetics (2.3%). In terms of diet, fisherfolks had the highest fish and fish products intakes (162g), but had the least intake for meat products and poultry (22.7g); eggs (11.3g); and milk and milk products (18.5g). Across occupational groups, fisherfolks had lower percentage of households meeting the energy and nutrients intake (27.2%). They also had the lowest percentage of households meeting the requirement for iron (5.7%), vitamin A (16.2%), calcium (7.3%), and riboflavin (9.7%). In terms of food insecurity, fisherfolks had the highest percentage of food insecure households (82.6%) in all indicators of the Cornell-Radimer hunger scale. High prevalence of stunting and undernutrition exist among households headed by fisherfolks. This in-depth analysis revealed significant information on nutritional status, dietary diversity and food security among fisherfolks, and is the first to look at the prevalence of these issues using a nationally representative sample. There is an urgent need to address the problems of malnutrition among fisherfolks, which may have taken root from the multifaceted causes of poverty. Focused intervention may be developed and be implemented to cater to the needs of this group.

Keywords: *Filipino fisherfolks, health status, dietary diversity, food security, stunting, undernutrition, national nutrition survey, DOST-FNRI, Nutrition*

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The first 1000 days project in Palawan: moving forward to provincial institutionalization of maternal and child nutrition program

Dorado, Julieta B.

The “First 1,000 Days” (11KD) of a child’s life is the combined number of days from conception (270 days) to the child’s second birthday (730 days). According to the World Health Organization, it offers a unique window of opportunity to help shape a healthy and more prosperous future and an opportunity to intervene and prevent malnutrition. Thus, the shift of priority target for nutrition interventions from under-five children to the 11KD of the child’s life. As a sequel of the initial project in Quezon, Palawan, the current project started in 2013, when the provincial government adopted and allotted budget for the implementation of the complementary feeding component of the 11KD project in 10 nutritionally-depressed municipalities of Aborlan, Balabac, Bataraza, Brooke’s Point, Busuanga, Coron, Rizal, Roxas, S. Española and Taytay for 2014. The project aimed to advance recommendations for the adoption of the 11KD concept in the form of Feedback Conference. The conference was conceptualized to disseminate the results of the 11KD pilot intervention and advocacy activities among Local Government Unit (LGU) officials to influence the institutionalization of the program with focus on maternal and child concerns. The project was also conceived to capacitate local community health and nutrition workers through skills training on program implementation. The project implemented activities dubbed as “FACT”: Feedback Conference, Advocacy Activities, and Capacity-Building through Training-workshops. The multi-level Feedback presentation of the results of the 11KD pilot intervention was successfully conducted in Puerto Princesa City, Palawan on July 29, 2014, attended by local officials and program implementers. The Advocacy activities

were conducted with the concept of the 11KD from June to September 2014 in nine expansion municipalities, attended by 140 members of the Municipal Nutrition Committees. The Training Workshops on DOST-PINOY modules were conducted from August to November 2014 in nine municipalities, participated in by 308 representatives primarily the local program implementers from 11 municipalities, as a collateral program for the setting-up of a large-scale complementary food production facility in Brooke's Point, Palawan. Beyond these activities, the project benefited 1,874 young children, 55% of them belonged to the 11KD period. The most highlighted outcome was the provincial resolution (No. 11476-14) passed and approved, urging all local government units to support and allocate funds for the adoption and implementation of the Nutrition Intervention strategy of the DOST-FNRI. To date, four municipalities (Quezon, S. Española, Brooke's Point and Busuanga) have already passed their respective municipal resolutions. The basic concern of sustaining the program was acted upon immediately by the province by adopting the complementary feeding intervention through budget allocation and passing of a provincial resolution. For the DOST-FNRI, the investment in this critical period of the 11KD of a child's life in one town in Palawan has already multiplied ten-fold. While the DOST-FNRI continuously and intensively advocates and promotes recommended that similar programs and interventions be implemented and sustained at the local level.

Keywords: *malnutrition reduction program, maternal and child health, nutrition education, local development units, DOST PINOY, DOST-FNRI, Nutrition*

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0530

FIT for LIFE: food and nutrition innovation and technology for improved quality of life *Saises, Marcela C.*

The 45th DOST-FNRI Seminar Series (45th FSS) is an annual event which serves as a platform for disseminating food and nutrition (F&N) information and strengthening networks on F&N research and development—all aimed at improving the health and nutrition situation of the country. The theme for 2019 FSS was “FIT for LIFE: Food and Nutrition Innovation and Technology for Improved Quality of LIFE”. The event aimed to provide a forum for learning, collaboration and partnership with various health, food and nutrition stakeholders, and disseminate results of completed researches of the Institution in 2018. The 45th FSS was conducted at the Philippine International Convention Center (PICC) at Pasay City from July 2-4, 2019. It was attended by 714 participants from different sectors, profession and academe. The seminar was in the form of plenary and break-out sessions which included oral presentations, TED talks, communication technology (ICT) demonstrations and interactive sessions. It also showcased student research competition, product display and e-poster and technology exhibitions. Seminar topics discussed were the results of the 2018 FNRI completed researches including research and development programs addressing overnutrition/ NCDs, food quality and safety, product innovation, gut microbiota, food security, proposed antropometric standards, PISO project, Expanded National Nutrition Survey (ENNS) 2018 and Malnutrition Reduction Programs (MRPs). The seminar was highlighted with Fellowship and Stakeholder's Nights. Six (6) undergraduate student research winners were awarded in the fields of food technology and nutrition through oral competition, six (6) e-posters were declared as the winners from the 44 poster entries and eleven (11) partnerships were forged during the 45th FSS event. Overall, the event was a success and was rated very satisfactory to outstanding in bringing together students and professionals in food, nutrition, and other related fields. The 45th FSS enabled nutritionists, public health professionals and frontline workers, academicians, students, industry partners and other stakeholders to learn research and development updates and innovations through the presented results of 2018 completed researches of the Institution. It also provided a forum for partnership and collaboration with various institutions.

Keywords: *food and nutrition, innovation, learning forum, academic competition, DOST-FNRI, Nutrition*

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Fit for seniors: development of physical activity guide for older Filipinos

Tan, Robby Carlo A.

Older population is susceptible to poor nutrition and health status. Muscle weakness occurs along with decreased exercise level which can lead to decline in muscle mass and overall functional status. To develop a physical activity guide for community-dwelling older persons aged 60 years and above. The project started with the needs assessment. Three sessions of Focus Group Discussion (FGD) was conducted among older persons (n=24) residing at Brgy. Talon Singko, Las Piñas City, Brgy. Upper Bicutan, Taguig City, and Mandaluyong City to identify the barriers and determinants in performing physical activity, as well as the preferences of older people in programs promoting increased physical activity and exercise. Based on the results of the FGD, a physical activity guide was developed in consultation with an “exercise is medicine” certified instructor and human kinetics expert. Senior Citizen participants (n=23) from Lower Bicutan, Taguig with signed informed consent were screened by a geriatrician. Qualified participants were asked to join the pilot-testing of the different exercises in the developed physical activity guide led by a certified “exercise is medicine” instructor. The FGD revealed that most senior citizens perceived exercise and physical activity as identical. Moreover, seniors found some exercises offered in their community to be fast moving and not age-appropriate. The physical activity guide developed had two levels of exercises with 10 different sets each which aim to promote balance, strength, flexibility, and coordination of older persons. Level 1 exercise is relatively easier as compared to Level 2. Exercises can be done without the use of sophisticated equipment. Results of the pilot-testing showed that the exercises in both levels were fun, engaging but some steps were difficult to follow at first. A physical activity guide was developed for older persons to improve balance, strength, flexibility, and coordination. A feasibility study on the use of the physical activity guide among older persons in the community is recommended.

Keywords: *Filipino elderly, physical activity, poor nutrition, health status, muscle mass, functional status, physical activity guide, DOST-FNRI, Nutrition*

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Food security and the food threshold: how much do households consume and spend?

Vargas, Marina B., Ph.D.

Access to nutritious food is a challenge that often strain many households with limited resources which compels them to make food choices that are short from the recommended intakes. Food threshold (FT) is the minimum income that meets the basic food needs, satisfying the recommended 100% of energy and 80% nutrient intakes in the Philippines (PSA, 2015). However, limited empirical evidence is available that confirm whether the threshold is met by food secure and insecure households. This study estimated and compared between food secure and insecure households the: (1) one-day household food consumption and percent contribution to total intake; (2) household intake and adequacy of energy and nutrient intake; (3) commonly consumed food items; (4) one-day household food cost and the FT. Secondary data analysis was done using the 2015 Nationwide Survey on Updating of the Nutritional Status (DOST-FNRI). A total of 9,618 households were included in the study. Household Food Insecurity Access Scale (HFIAS) period was used to classify whether the household was food secure, mildly, moderately or severely food insecure. Households were grouped into four to determine if the FT satisfies energy/nutrient adequacy: (1) Meeting both FT and adequacy; (2) Meeting FT but not adequacy; (3) Not meeting FT but meeting adequacy; and (4) Not meeting both FT and adequacy. Data was processed using STATA version 13. Among food insecure households, one-day intake of body-building foods such as meat, fish and milk were significantly lower, while the energy-giving foods such as rice and other cereal products were significantly higher than food secure households. Mean one-day household food cost were Php300.70 among food secure, Php 274.80 among mildly food insecure, Php 237.10 among moderately food insecure, and Php229.90 among severely food insecure households. Majority of the households recorded energy and nutrient adequacy below the recommended intakes. Plotting FT against adequacy, less than a quarter of households met both FT and energy/nutrient adequacy. Moreover, the proportion of households not meeting both FT and energy/nutrient adequacy increases

as food insecurity worsens. Considering only the mean household food cost, food threshold can be met even by food insecure households but this did not translate into adequacy of energy and nutrients as majority of households did not meet daily recommendation. Combination of livelihood, social safety net and nutrition education programs are needed to assist households that are not meeting both food threshold and energy and nutrient adequacy. There is also a need to evaluate the food threshold level considering the cost of actual foods consumed by households.

Keywords: *food security, food threshold, nutritious food, household food consumption, food insecurity, DOST-FNRI, Nutrition*

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0533

Is food wastage and food procurement method associated with food security status among Filipino households?

Malabad, Cristina G.

Food security is a multi-dimensional phenomenon with numerous underlying factors hindering its achievement. Strategies to reduce food insecurity among households include the reduction of food wastage and cultivation of home grown food for human consumption. According to the Food and Agricultural Organization (FAO, 2015), food loss and food wastage worldwide has reached 1.3 billion tons a year. One third of this wastage can already feed millions of individuals suffering from hunger and malnutrition across the globe. Philippine law makers had introduced a bill on Zero Food Waste in 2016 which encourages the government to facilitate in redirecting surplus to those who do not have food on their plates. One of its provisions is to address proper information dissemination on how Filipinos can follow the food waste reduction hierarchy. The bill's goal is to ultimately end the cycle of having food end up in the trash instead of stomachs. Likewise, programs on cultivation of home grown produce is being strengthened, school and home yard gardening are being encouraged to help sustain food security of households. Recognizing the importance to provide empirical evidence to demonstrate the above claim, the study aimed to determine association of households' food wastage and procurement method (i.e. purchased, own production or given-free) with food security status. Findings are hoped to provide local data to support government efforts to reduce food insecurity in the country. Four (4) replicates from the NSO Master Sample which utilized 100% of the Labor Force Survey households. One replicate, which includes 9,926 households, was used for data analysis. The study used a multi-stage stratified random sampling where in the first stage, also called as primary sampling unit, consists of one barangay or contiguous barangays with at least 500 households. The second stage, tagged as enumeration area, consists of contiguous area in the barangay with 150-200 households. Last, the third stage consists of individual household. A questionnaire was provided during the face-to-face interview and all participants were given with measured food pack. More households with food waste were food insecure than food secure. Moreover, food insecure households produce twice as much the amount of food waste than food secure households. Households without plate waste from the major food groups such as the body-building foods and other foods (i.e. fats and oils and sugars) are less likely to be food insecure. Socio-demographic factors such as large household size, urban dwelling, and being poor also have significant contribution to being food insecure. Households, regardless of food security status, have purchasing as their main procurement method. It was also shown that a small but significant proportion of food secure households obtain items from the major food groups through own production. Logistic regression analysis, thus, showed that no significant association was seen between method of procurement with food security status of households. Food insecure households produce twice as much the amount of food waste than food secure households. Majority of households obtain food by purchasing. Food wastage of body-regulating foods is associated with being food insecure. However, socio-demographic variables particularly household size, place of residence, and wealth level, are significant factors to determine the variation of food security status. Sustainable programs on food production, such as home vegetable garden or urban farming must be implemented and monitored to foster self-sufficiency, especially for areas with high proportions of food insecure households. Programs which concentrate on proper food storage, use of leftovers to create new recipes, and guidelines on the preparation of adequate yet smaller food portions for family meals must be planned and implemented, along with policies and programs which help raise awareness on the growing problem of food wastage not only on the household level but among food establishments as well.

Keywords: food wastage, food procurement, food security, Filipino households, Zero Food Waste, food storage, DOST-FNRI, Nutrition

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0534

Fortified rice for healthier women *Saises, Marcela C.*

Women of reproductive age (WRA) have inadequate dietary nutrient intake of thiamine, riboflavin, vitamin A, iron, zinc and folate according to the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI, NNS 2015). The food product development section of the Institute explored on the use of extrusion technology in the development of a multi-nutrient extruded rice kernels (MNERK) for women of reproductive age (WRA). This product supports the Republic Act 11148 known as “Kalusugan at Nutrition ng Mag-Nanay Act” requiring scaling up of national and local health and nutrition programs of the government through a strengthened integrated strategy for maternal, neonatal, child health and nutrition in the first days of life. This study developed and produced MNERK with iron, zinc, vitamin A, thiamine, riboflavin and folic acid and characterized the product in terms of physico-chemical, nutrient, sensory acceptability and microbiological properties. The study involved the fortification trial runs and production of MNERK with vitamins and minerals. The process was optimized and standardized to come up with a safe and acceptable product. The rice kernel was tested for its quality in terms of color, bulk density, moisture; nutrient content in terms of iron, zinc, vitamin B1, vitamin A, folic acid and vitamin B2; acceptability using quantitative descriptive analysis and hedonic rating and microbiological properties. MNERK has a concentration of 839.7mg iron, 145mg zinc, 40.8mg vitamin B1, 12mg folic acid, 23.9mg vitamin A and 33.6mg Vitamin B2 per 100g of kernel. This premix is added to 200g of ordinary rice to produce fortified rice. Consumption of three cups (3) of cooked fortified rice can provide approximately one-third (1/3) of the Philippine Dietary Recommended Intake for female 15-49-year-old for iron, zinc, folic acid, vitamin A, vitamin B2 and one fifth (1/5) for vitamin B1 (PDRI 2015). Cooked fortified rice was rated 7 to 8 or “like moderate” to “like very much” by the panelists. MNERK with significant amount of vitamins and mineral for WRA was successfully developed in laboratory scale and found to be safe and acceptable. Shelf-life study and pilot testing are recommended to speed up commercialization of the product.

Keywords: fortified rice, Filipino women, reproductive age, dietary intake, multi-nutrient extruded rice kernels, DOST-FNRI, Nutrition

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0535

Fortified rice-mongo curls: opportunity for improving the nutritional requirements of children six (6) months to five (5) years old for iron and zinc *Saises, Marcela C.*

Results of the 7th FNRI National Nutrition Survey (NNS 2008) showed that eight in every ten Filipino children 6 months to 5 years old did not meet the recommended energy intake, while five of ten children fell short of their protein requirement. Moreover, the 8th NNS, 2013 revealed that the prevalence of anemia was 39.4% and 11.3% among infants 6 months to less than 1 year old and 1-5 year-old children, respectively. The Food and Nutrition Research Institute of the Department of Science and Technology (FNRI-DOST) developed and produced complementary and snack foods like rice-mongo instant blend, rice-mongo curls and crunchies and rice-mongo-sesame ready-to-cook blend. These products when fortified may improve the nutritional requirements of children for iron and zinc. The study aimed to develop fortification technology for fortified rice-mongo curls in pilot scale production using a twin-extruder machine and to determine the product's shelf-life. The pilot scale production of

fortified rice-mongo (RM) curl and blend involved trials using fortificants namely: vitamin A acetate, two (2) different iron fortificants (micronized ferric pyrophosphate and ferrous fumarate), and micronized zinc oxide. The experiments were conducted using factorial design and products were evaluated by determining the physico-chemical, nutrient content, sensory and microbiological properties of the product during development and storage. Results of the experiment were analyzed by Design Expert Software to determine the optimized fortification level where taste and acceptability were maximized, while rustiness, aftertaste and bitterness were minimized. The product was stored for 6-8 months to determine the stability of the products. Results of the study showed that the acceptable iron and zinc levels of RM curls per 30g serving size was for code 20% RENI (Recommended Energy and Nutrient Intake) each using micronized ferric pyrophosphate and micronized zinc oxide and increases for code 31% RENI using ferrous fumarate and micronized zinc oxide. Both for code 20% and 31% RENI for both iron and zinc were stable during storage and even after storage. Vitamin A was not retained in the rice-mongo curls after processing due to high temperature generated by the extruder machine. The fortification technology for rice-mongo curls with iron and zinc was developed and standardized in a twin-extruder machine with a shelf-life of 6 months. Results of the study can be used as a scientific basis for bioavailability, efficacy, market-trial, scale-up production and commercialization of RM curls and blend. It can also be used as basis for the fortification of other complementary and snack foods.

Keywords: *fortified rice-mongo curls, Filipino children, iron, zinc, recommended energy intake, protein requirement, DOST-FNRI, fortification, Nutrition*

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0536

The frequency and diversity of potential gene markers of nutrition-related diseases generated from next generation sequencing (NGS) panel designed by DOST-FNRI *Rodriguez, Marietta P.*

Non-communicable diseases (NCDs) are considered major public health concerns worldwide. According to the World Health Organization (WHO), NCDs are responsible for the 60 percent of total deaths globally while consequently contributing to an estimated 40 percent of universal disease burden annually (WHO Global Status Report on NCDs, 2010). The rise of risk factors for chronic degenerative diseases has been linked to diet, physical activity, environment, lifestyle, and genetics thus, requiring a holistic approach in order to be thoroughly studied. This study aims to devise a Next Generation Sequencing (NGS) panel that will allow the sequencing of relevant genes associated with diet and nutrition-related diseases as well as to determine the allelic frequency of selected genes in the Filipino population using the NGS panel. Out of 10 ml of blood samples collected by trained and licensed Medical Technologists during the 8th NNS in the National Capital Region, 1.5 mL was separated and transported on ice for genomic analyses. A total of 187 anonymized human blood samples were used for DNA extraction. Genomic DNA was isolated using the QIAamp DNA Blood Mini Kit (Qiagen, Germany) following an optimized protocol. Targeted sequencing was employed for validation and database generation. The allelic frequency of Methylenetetrahydrofolate Reductase (MTHFR) rs18001131 polymorphism for the Filipino population was higher than what was reported in the global frequency. The risk variant for MTHFR rs18001131 is known to pose impaired folate metabolism. More than 90% of the genetic variations in the panel were found to convey information at Minor Allele Frequency (MAF) >0.05. The allelic frequency of certain genetic variations such as the Dopamine Receptor D2 (DRD2) rs1800497 (for Type 2 diabetes mellitus), Apolipoprotein C3 (APOC3) rs2854117, Bradykinin Receptor B1 (BDKRB1) rs12050217, Adducin 1 (ADD1) rs4961 (for cardiovascular diseases), and Brain-Derived Neurotrophic Factor (BDNF) rs6265 (for obesity) was observed to be higher among Filipinos than the overall reported frequency in the global population (1000 Genomes database). A framework depicting risk scores and allelic profiles of genes and genetic variants can be generated using a Next-Generation Sequencing (NGS) panel. This panel identified the genetic biomarkers that are known to modulate the relationship between diet and health outcomes, including its incidence in the Filipino population. Adopting the use of the NGS panel designed by DOST-FNRI will enhance the understanding of the underlying causes of the debilitating yet preventable diseases such as Type 2 diabetes, obesity, cardiovascular disease, and other micronutrient deficiencies in the Filipino population from the genomic standpoint.

Keywords: *nutrigenetic markers, next generation sequencing, nutrition-related disease, non-communicable disease, allele frequency, methylenetetrahydrofolate reductase, Apolipoprotein C3, Dopamine Receptor D2, Bradykinin Receptor B1, Adducin 1, Brain-Derived Neurotrophic Factor, DOST-FNRI, Nutrition*

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0537

Genotype effects of beta-carotene conversion to vitamin A: implications on reducing vitamin A deficiency in the Philippines

Vitamin A is required for normal organogenesis, immune competence, tissue differentiation, and the regeneration of the visual cycle. Worldwide, vitamin A deficiency (VAD) is estimated to be 190 million in pre-school-age children. In the Philippines VAD prevalence among 6-12 years old children is 11.1% which is considered as a public health problem of moderate severity. The requirements for vitamin A can be met either from intake of animal foods containing preformed vitamin A or from plant foods containing provitamin A such as carotenoids. The key enzyme responsible for carotenoid conversion into the active form of vitamin A is β -carotene 15,15'-monooxygenase (*BCMO1*). However, it has been reported that the conversion efficiency of carotenoid into vitamin A is highly variable in different individuals as well as among population groups due to genetic variants in the *BCMO1* gene. The study determined the *BCMO1* single nucleotide polymorphism(SNP) frequency among 6-18 year old Filipino children, particularly rs7501331 and rs12934922. Extracted DNA samples from respondents of the 8th NNS were analyzed and genotyped for *BCMO1* rs7501331 and rs12934922 using the 96-well CFX96™ RT PCR Detection System. A total of 555 selected amplicons of *BCMO1* SNPs rs7501331 were submitted for direct sequencing and genotype analysis for rs12934922 among 723 respondents was performed using the High Resolution Melt SNP analysis following Biorad™ Precision Melt Supermix. Results showed that 56.0%, 37.86% and 6.31% of CC, CT and TT for rs 7501331 genotype were found among Filipino children, while 80.36%, 19.50% and 0.14% genotype frequencies of AA, AT and TT were obtained for rs 12934922. Results of the genotype frequency of both SNP targets follow the Hardy-Weinberg Equilibrium at p-value >0.05, indicating good data quality. The results suggest that a portion of the Filipino children (43.96% for rs7501331 and 19.6% for rs12934922) carries the risk genotype that decrease a person's ability to convert β -carotene into vitamin A. Pre-determination of the proportion of the population who are at risk for VAD by genetic profiling is an important step in prioritizing those that needs intervention either by increasing intake of β -carotene or preformed vitamin A supplements. Adaption of recommended dietary intake of carotenoids, or doses of carotenoids incorporated in functional foods/supplements, to population groups with genetic variants that affect carotenoid status is also forward.

Keywords: *Nutrition*

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0538

Gut microbiota of Filipino infants (2-4 months old): profiles by mode of delivery and mode of milk feeding *Mallillin, Aida C.*

Birth process and infant milk feeding are major drivers in the establishment of the infant intestinal microbiota, of which their influence on the gastrointestinal function are often associated to the maturation of host's immune system and overall health later in life. This study determined the variations in the gut microbial profiles of healthy Filipino infants, 2 to 4 months old, based on their mode of delivery and infant milk feeding. Stool samples from 60 healthy Filipino infants aged 2 to 4 months were obtained and stratified into six groups based on their mode of delivery (spontaneous vaginal and C-section) and infant milk feeding (breast milk, formula milk and mixed

feeding). The gut microbial diversity and composition were assessed through amplification of V3-V4 hypervariable region of the bacterial 16S rRNA gene. Results showed minimal variations in the alpha and beta diversities of the Filipino infant gut microbiota at 2 to 4 months old based on mode of delivery and mode of milk feeding. Compositional analysis of the classified taxa showed similar profiles of cesarean-delivered breast-fed with all vaginal-delivered infants regardless of infant milk feeding, rather than with the cesarean-delivered infants that were formula-fed and mixed-fed. Significant difference was also observed in the number of core taxa present (100% prevalence threshold) in the gut of infants, where cesarean-delivered infants that were formula-fed had the most diverse core taxa while vaginal-delivered formula-fed infants had the least core taxa. The results highlighted the collective, rather than independent, impact of mode of delivery and milk feeding type on the microbial colonization of the infant gut, wherein the gut microbiota of cesarean-delivered infants can still be modulated with breastfeeding. This can contribute to our current knowledge on modulations of early gut microbiota between the age of 2 to 4-month old towards positive child growth and development. As we have sampled the infants at one time-point only, it is recommended to perform a longitudinal study with multiple sampling points to predict the overall microbial diversity of the highly unstable infant gut microbiota during the age of 2 to 4-month old.

Keywords: *gut microbiota, Filipino infants, milk feeding, birth process, Nutrition*

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0539

Healthy aging program for pinoy (HAPPY) senior citizens

Tan, Robby Carlo A.

The latest census of the Filipino elderly was at 4.6 million and the number is projected to reach more than 19.6 million by 2040. Due to the increase in life expectancy, older Filipinos will need access to the basic services offered by government and private entities to maintain good health. Although interventions and services have been instituted to protect the welfare of the elderly such as free vaccination, free medical consultation, priority lane and discount privileges, there is limited opportunity valuing nutrition as a potential contributor in improving and attaining quality of life among Filipino elderly. Hence, the DOST-FNRI initiated the Healthy Aging Program for PinoY (HAPPY) Senior Citizens to contribute to the enhancement of their quality of life through good nutrition. The first phase of the program aimed to determine the profile of the older Filipinos. The study particularly looked into particularly the prevalence of underweight and overweight/obesity, anemia, hypertension, blood sugar and abnormal blood lipids by sex and age groups. Data on body mass index (BMI), hemoglobin, blood pressure, blood sugar and blood lipids collected in the 8th National Nutrition Survey (NNS) were used to determine the nutrition and health profile of older Filipinos. Results showed that Chronic energy deficiency (CED) was present in one out of five older persons with the highest prevalence among 80 years and above and in both sexes. Overweight and obesity was present in one out of four older persons. Anemia prevalence was 21%, which is described as a moderate public health problem. There were more anemic male (13.9%) than female (12.9%) older persons. High and Impaired Fasting Blood Sugar (FBS) was also observed in this age group at 10.9% and 7.9%, respectively. High total blood cholesterol (TC) was present in one-fourth of male and female older persons, while one-third had borderline level. Older females had higher TC than males. The problem of anemia, and both under- and overnutrition were present among older Filipinos. Risk factors to non-communicable diseases (NCD) such as hypertension, high blood sugar and blood lipids also characterized this age group. More in-depth studies should be conducted on the association of nutrition on functionality and to determine appropriate interventions to attain the desired quality of life of the elderly.

Keywords: *Nutrition, HAPPY, senior citizens, Filipino elderly, nutrition security, DOST-FNRI*

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2015,
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Household food security is associated with stunting among preschool children in Occidental Mindoro

dela Luna, Kim Leonard G., Bullecer, Ernani R.

Food security is achieved when the population at all times has access to safe, sufficient and nutritious food to sustain a healthy and active life. This study aimed to determine significant association between household food security and stunting among preschool children in Occidental Mindoro. Specifically, this study was conducted to determine the prevalence of stunting among preschool children and household food security in the study area.

This study utilized cross-sectional study design and a three level multi-stage, stratified random sampling to answer the study objectives. A total of 480 preschool children (n=240 urban; n=240 rural) were included in the study. Radimer-Cornell Tool was used to determine the food security status of the household. A validated-constructed questionnaire was used to determine other factors which were controlled in this study. Multiple Logistic Regression was used to determine significant association between the exposure and the outcome variable while controlling confounding variable simultaneously.

Result of this study revealed that the prevalence of food insecurity in the province was 51.04% (95% CI: 46.55, 55.53) while prevalence of stunting was 36.04% (95%CI: 31.73, 40.35). Meanwhile, after controlling the confounding effect of household income and low dietary diversity score it was found that the odds of having a stunted child were 23 times higher among food insecure households (OR: 23.00, 95%CI: 12.05, 43.91).

Based from the result of this study, magnitude of household food insecurity and stunting were found to be very high in the study areas. There was a significant association between household food security and stunting among preschool children.

Keywords: *stunting, preschool children, household food security, Nutrition*

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Impact of calamities on the proportion of households meeting the recommended energy intake among Filipinos

Duante, Charmaine A.

During calamities, the food security of the population is compromised due to the significant negative impact of extreme weather events on agriculture (Israel,2013). Prices of agricultural products tend to increase thus consumption decreases (World Bank, 2010). During and after the onset of calamities, diets are no longer diverse because of lack of food supply and this mainly consists of staples, thus current diets no longer satisfy the nutritional requirements of individual members of the household. This study validated the effects of calamity exposure on the proportion of households that meet 100 percent of the recommended energy intake of Filipinos. Merged datasets from the 2013 National Nutrition Survey (NNS) on household head information, household socioeconomic profile and government program participation and data on calamity exposure to include typhoons, flood, earthquakes, landslides among others from the National Disaster and Risk Reduction Management Council (NDRRMC) were analyzed to determine the effects of calamity exposure of households in meeting their recommended energy requirements. Households from the richer quintiles, who were already food secure to begin with, and have smaller sizes, those that participated in livelihood programs of the government particularly the food production program are more likely to meet their energy requirements even after adjusting for calamity exposure. Households participating in non-agricultural work are less likely to meet their recommended energy requirements. Only 30 percent of households exposed to calamities prior to the survey are more likely to meet the recommended energy intake. Hence, even in the absence of calamities, it is necessary to consider households vulnerable to food insecurity in formulating disaster risk reduction efforts and identifying priority groups for intervention. Without government support, the members of calamity-exposed households are likely to experience hunger and become undernourished.

Keywords: *recommended energy intake, health status, calamity, Filipino households, food security, DOST-FNRI, Nutrition*

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2017,
(Filipiniana Analytics)

0542

The impact of fortification in milk on iron and zinc status and immunity among schoolchildren

Angeles-Agdeppa, Imelda, Ph.D.

Iron deficiency is the most prevalent nutritional deficiency according to the World Health Organization. Adverse effects of iron deficiency may result to anemia, growth faltering and serious consequences in children. The study evaluated the effect of fortified powdered milk drink on the iron status and physical growth of selected schoolchildren 5-8 years old in Cagayan De Oro City. In the Philippines, micronutrient deficiencies still pose a public health problem. Focusing on child health, adverse effects of micronutrient deficiencies and child survival are particularly acute resulting to serious physical and developmental consequences. The study used a randomized double-blind controlled design (n=120 children) at Bulua Central School in Cagayan de Oro City. The participants were divided into two groups and fed with moderately fortified powdered milk and highly fortified powdered milk, respectively. Dietary assessment showed no significant difference in Energy, Protein, Vitamin A, Vitamin C & Iron between groups and time periods. Improved hemoglobin, SF, CRP, and AGP levels indicated better iron status of children in both groups. The higher fortification level might have contributed to the sustained iron stores with lower depletion level in the HF groups. Catch-up growth was observed in the HF group which could explain the similar mean increases in the both groups at endpoint. It is recommended that the future studies be conducted among children who are undernourished to validate efficacy of micronutrient fortification in milk.

Keywords: *iron status, fortified milk, micronutrients, Filipino schoolchildren, iron deficiency, ferritin, hemoglobin, food intake, DOST-FNRI, Nutrition*

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(Filipiniana Analytics)

0543

Impacts of climate shocks on caloric intake of Filipino households engaged in agriculture

Duante, Charmaine A., MSc

Climate change or erratic weather may lead to a decline in agricultural production which may cause increase in prices and eventually lower food consumption or a shift in consumer's preference. Due to climate change and possible decline in production, individuals depending mainly on agriculture will have higher vulnerability to food insecurity. This paper examines the nature and extent of vulnerability of Filipino households engaged in agriculture to the impacts of climate change on food security. The study utilized the 2008 National Nutrition Survey data on food consumption which was associated with level changes in climate shocks from the downscaled climate scenarios provided by Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA). A total of 1,498 households engaged in agriculture were included in the study. Data on per capita caloric intake, information on household heads, assets, and government program participation were analyzed. Vulnerability analysis using maximum temperature and rainfall model was used to allow the estimation of the probability of falling below the per capita caloric threshold of 2,000kcal. An increase in the maximum temperature showed no significant effect in the food consumption. On the other hand, a percent decrease in rainfall between 20% and 10% showed a significant decrease in the food consumption. The overall food security status of the households remained consistent in both models at the national level. On the average, 80% of the households engaged in agriculture are permanently food secure without any interventions while nearly 12% are chronically

food insecure. Simulation analysis showed that increasing the education of household heads to at least high school or limiting household size into 4 is expected to decrease the mean vulnerability by almost 5 percentage points. Understanding the overall effect of climate change in food security is a complex process. This attempt may contribute in designing policy interventions by assessing both sensitivity and adaptive capacity at the household level. Investment in education could increase the resiliency of households engaged in agriculture against the impact of climate change.

Keywords: *climate shocks, caloric intake, Filipino households, climate change, agriculture, food insecurity, food consumption, DOST-FNRI, Nutrition*

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2015,
(Filipiniana Analytics)

0544

Implementation of GarNESupp (gardening, nutrition education, supplementary feeding) model in conflict-stricken area

Angeles-Agdeppa, Imelda, Ph.D.

The Marawi siege has displaced thousands of residents. In conflict-stricken areas widespread malnutrition among vulnerable groups could be experienced. The United Nations Higher Commissioner for Refugees recommended the implementation of emergency nutrition interventions such as food distribution, anthropometric surveys, supplementary feeding and micronutrient supplementation and nutrition education. This study evaluated the effects of a nutrition intervention model composed of gardening, nutrition education and supplementary feeding (GarNESupp) on the nutritional status of all families in the transitional shelters in conflict-stricken Marawi. The study was conducted in the temporary shelters of Barangay Sagonsongan-Area 1 where 75 families with 352 individuals were housed. Standardized low-cost nutritious 'halal' recipes were developed. Rice was fortified with multi-nutrient extruded rice kernel with iron, zinc, vitamin A, vitamin B9 and vitamin B12 (MNERK). All individuals were given free lunch for 120 days cooked at the makeshift kitchen. Lunch was served with the fortified rice and a dish selected from the developed recipes. Families were organized to do the cooking and other responsibilities on a rotational basis. Nutrition Education among adult family members was conducted for 2 months with topics on nutrition, hygiene and gardening. The nutrition modules used were specifically developed for the study and translated in local dialect. Container gardening hanged in fences or poles was done to sustain the supply of vegetables for home use. Excess vegetables were sold to the common kitchen. Weight and height of all family members were measured; knowledge, attitude and practice was collected using pre-post evaluation tests; biochemical markers on iron, zinc, folic acid and vitamin A of all family members aged 6 years and over were assessed using standard techniques. All measurements were collected before and after the 120-day intervention period. The number of households with gardens were recorded. The GarNESupp model resulted in a significant improvement in the weight and height of children 1-12 years old ($p<0.001$) but the obesity rate increased among adults ($p<0.001$); significant decrease in the prevalence of zinc deficiency among adults ($p<0.001$) and significant decrease in the prevalence of folate deficiency among women of reproductive age ($p=0.03$); test scores on Knowledge, Attitude, and Practices (KAP) have significantly increased from baseline to endpoint ($p<0.001$). All households had container gardening. The GarNESupp model is effective in improving the nutritional status of children but interventions for adults must include increasing physical activity. It is recommended that this intervention be replicated in other calamity-stricken areas to prevent further deterioration of health of families in transitory shelters. Results should be documented to build more evidences on the feasibility of the model.

Keywords: *GarNESupp, gardening, nutrition education, supplementary feeding, Marawi, DOST-FNRI, Nutrition*

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2020,
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Improving the nutritional status and quality of life of persons who use drugs (PWUDs) through proper nutrition management

Angeles-Agdeppa, Imelda, Ph.D.

Substance abuse leads to malnutrition, either as a result of not eating enough throughout the day or eating foods that are low in necessary nutrients. Due to the significant impairment to health and nutrition caused by the recurrent use of illicit substances, Persons who use drugs (PWUDs) experienced disability and failure to meet their responsibilities at work, school, or home. According to the 2008 National Survey of Drug Use and Health (NSDUH), about 23.1M aged 12 years old and older needed treatment for illicit drug or alcohol use. This study evaluated the changes in nutritional status and quality of life of PWUDs after an intervention using FNRI-developed recipe booklet for PWUDs and Nutrition Management Guidelines (NMG) for PWUDs. A quasi-experimental one-group, pre- post-test design was employed with respondents of 268 PWUDs admitted in selected Drug Treatment and Rehabilitation Centers (TRC) in the Philippines. The developed NMG and standard Recovery Recipes were provided to the TRCs to be integrated in the rehabilitation regimen of PWUDs for 120 days. Baseline and endpoint measurements of BMI, level of depression, quality of life, and gaps in the implementation of the handbooks were collected. Results showed that from baseline to endpoint measurements, underweight decreased by 92% and overweight increased by 33%. There was also a significant decline in depression level, decrease in percentage of PWUDs experiencing severe psychological distress, and a significant improvement in the quality of life based on the increase in the WHO Quality of Life-BREF scores. Limited manpower, facilities and equipment, as well as low meal cost are the challenges encountered in the implementation of the NMG and Recovery Recipes. The results of the study showed that nutritional care process and services aided in the improvement of nutritional status and quality of life of PWUDs. Incorporation of the developed nutrition management tools in the DOH Manual of Operations is feasible and is highly recommended to ensure the sustainable implementation of nutrition services in TRCs in the country.

Keywords: *nutritional status, PWUDs, nutrition management, DOST-FNRI, Nutrition*

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Incoming message: how genes dictate nutrient intake and common risk factors of non-communicable diseases in selected Filipino adults

Jacalan, Frances Isabelle B.

In the Philippines, the prevalence of Non-Communicable Diseases (NCDs) has already reached endemic proportions despite on-going efforts to mitigate or eradicate its onset and progression. Nutrition researches are now looking into the possible role of genes into the individuals' susceptibility to the common risk factors of NCDs, including dietary intake. The human body is made up of trillions of cells that contain sets of chromosomes passed through generations. Enclosed in these chromosomes are building blocks of life abbreviated into A, C, T, and G, known as DNA, which are further organized into units called genes. The way genes are "spelled" make up the so-called "instruction manual" of life and dictate the manifestation of a person's trait such as hair color, etc. Any "misspellings" in these genes can affect the state of health or disease. In 2013, a study was conducted to gain insights into the genetic control of macronutrient intake and found out that the variations in the FGF21 gene is potentially related to genetic control of caloric intake, which could be related to the rise of NCDs. This study aimed to determine the SNP genotypes of FGF21 rs838133 among selected Filipino adults, and to determine variations in nutrient intake and common risk factors of NCDs based on identified alleles. This study used a cross-sectional design and was approved by the DOST-FNRI Institutional Ethics Review Committee. A total of 1,439 genomic DNA samples from selected Filipino adults ages 20 years and over, residing in the National Capital Region, and who were part of the 8th National Nutrition Survey (8th NNS) were included in the study. Genotyping of FGF21 rs838133 was carried out in the NuGen™ Laboratory of DOST-FNRI. Chi-square proportions found significant differences in population diversity and in the prevalence of high diastolic blood pressure, one of the risk factors for NCDs.

Keywords: genes, non-communicable disease, Filipino adults, SNP, T allele, C allele, DOST-FNRI, Nutrition

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0547

In-house method validation for detection and identification of *Vibrio* spp. from various food matrices by cultural methods and real-time PCR

Cortez, Christine Eden T.

Vibrio species are the most dominant bacterial pathogens in farm-reared shrimps and other seafoods such as oysters, fishes, crabs, and mussels. These are known to cause “vibriosis”, which is one of the most serious bacterial diseases in the aquaculture and food industries posing major threat on the health and economic issues globally. Standardized methods with high sensitivity and specificity are needed for accurate detection of *Vibrio* spp. in different seafood products to control or eradicate food pathogens. This study aimed to conduct in-house method validation of *Vibrio parahaemolyticus*, following ISO 21872-1:2017, which includes both conventional microbiological procedures and Real-time Polymerase Chain Reaction (qPCR) method. The study also aimed to determine the prevalence of *V. parahaemolyticus* in seafood products by collecting and analyzing raw and ready-to-eat (RTE) seafood samples from Metro Manila. The verification of both conventional and qPCR methods were conducted following the performance requirements of National Association of Testing Authorities, Australia (NATA) Technical Note 17. In addition, analysts participated in a proficiency testing (PT) program organized by IFM Quality Services, Inc. to assess their performance of the method. A total of 65 seafood samples: 33 RTE (cooked, undercooked, sashimi) and 32 raw were collected and analyzed for the presence of *V. parahaemolyticus*. Validation results showed that both the conventional and qPCR methods were precise and possess 100% sensitivity, selectivity, and trueness. Both conventional and qPCR analyses revealed that recovering *V. parahaemolyticus* in seafood samples decreased when target pathogen is in low numbers. In addition, the laboratory showed competency in the method performance through satisfactory PT results. From the incidence study, 50% (16/32) of the raw seafood samples was positive for *V. parahaemolyticus* while none of the ready-to-eat samples were contaminated with the pathogen. Both the cultural and real-time PCR methods were fit for their intended use in the laboratory. Since the pathogen has been shown to be abundant in raw seafood, care must be done in the consumption of undercooked seafood products to avoid acquiring foodborne illness brought about by the pathogen.

Keywords: *Vibrio parahaemolyticus*, cultural method, real-time PCR, vibriosis, detection, identification, DOST-FNRI, proficiency testing, foodborne illness, Nutrition

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0548

Innovative food technologies for the recovery of persons who use drugs (PWUD)

Saies, Marcela C.

According to the 2015 Nationwide Survey on the Nature and Extent of Drug Abuse in the Philippines (NEDAP), the current drug use prevalence among Filipinos aged 10 to 69 years old is at 2.3% or an estimated 1.8 million users (Dangerous Drugs Board, 2016). High protein and antioxidant foods have been known to play a critical role in promoting good health and proper brain-functioning while helping restrain oxidative stress during withdrawal episodes of recovery (Miller, 2000; Xu *et al.*, 2006). The objective of the study was to develop, optimize, and conduct shelf-life studies of snack foods and beverages designed specifically for the recovery of persons who use drugs (PWUD). Three (3) snack foods namely high protein food bar, protein cookies and crackers were developed without preservative using hot extrusion and mixing technology. Four (4) beverages including strawberry-calamansi-turmeric (SCT) juice, pineapple-calamansi-kamias (PCK) juice, mangosteen-green, mango-pineapple

(MGMP) juice, and pineapple-beet root-kamias (PBK) juice were also developed without preservative using extraction method. The physico-chemical, nutritional, microbiological analyses and sensory evaluation were conducted to determine product quality and stability. Results of the shelf-life study revealed that the snack foods developed were stable and safe up to six months while the beverages lasted up to two weeks when stored at room temperature (25 to 30C) without preservatives. The general acceptability of all food products ranged from 'like moderately' to 'like very much'. The protein contents of snack foods at 60-gram serving size were 9.78g for high protein food bar, 7.86g for protein cookies, and 8.48g for protein crackers. The beverages have 78.92% to 91.34% antioxidant potential per 100ml sample. The developed high-protein snack foods were acceptable and shelf-stable. In addition, the beverages contain high antioxidant content may help improve the recovery of PWUD. It is recommended to explore other possible processing technologies and techniques to increase the shelf life of the beverage products. The addition of fortificants to enhance the nutritional value of the products is also recommended. Furthermore, clinical studies on the efficacy of the products may also be explored.

Keywords: *innovative food products, PWUD, snack food, shelf-life, high protein, antioxidant, DOST-FNRI, Nutrition*

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0549

Intervention model for the production and distribution of nutritional food products to conflict-stricken areas

Saises, Marcela C.

The conflict between the government forces and the militant group in Marawi City on May 23, 2017 created a massive displacement of Marawi constituents. Access to food, water, and proper healthcare are limited to individuals resulting to malnutrition due to lack of consumption of micronutrient-rich foods. The objectives of the study were to produce four (4) nutritional food products, evaluate its quality and acceptability, and develop a mechanism or model of product distribution that can be adopted in time of man-made calamities. Project activities were planned through coordination with the Department of Social Welfare and Development (DSWD) Region XII field office, DOST-Regions X, XI and XII Regional and Provincial offices and Local Government Units (LGUs). Current technology adoptors of the Department of Science and Technology–Food and Nutrition Research Institute (DOST-FNRI) were visited and evaluated for their capability to produce nutritional food products for displaced individuals. The physicochemical, nutritional, microbiological analyses and sensory evaluation of the nutritional food products were determined. About 352 displaced individuals or 75 families from Brgy. Sagonsongan Temporary Shelter, Area 1, Marawi City were selected as study participants. Nutritional food products such as multi-nutrient extruded rice kernels (MNERK), fortified rice, and fortified rice-mongo curls, and blends, were produced by the adaptors, delivered to the site, stored in a private storage facility and transported weekly to the kitchen of the temporary shelter. The iron content of MNERK fortified rice was reported to be 93-95% within acceptable blending ratio of 0.004-0.006. More than 50% of the adult respondents gave the cooked fortified rice the highest rating of 7 (gustong-gusto or like very much) using a 7-point hedonic scale. On the other hand, 93% of the child respondents rated the fortified mango curls a smiling face (gustong-gusto or like very much) using a 5-point hedonic scale. The production and distribution of DOST-FNRI nutritional food products were feasible. The fortified rice and snack foods were acceptable, within the quality standard, and deemed fit for human consumption. The developed distribution mechanism for the provision of nutritious food to individuals and families under conflict-stricken areas like Marawi City was found to be feasible. This model on nutritious food intervention can be recommended in other affected areas.

Keywords: *nutrition intervention, nutritional food products, Marawi, multi-nutrient extruded rice kernels, Nutrition*

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Iodine levels of household salts in the Philippines in the 8th national nutrition survey

Dumag, Rosemarie J.

Iodine deficiency continues to be a major threat to health and development particularly among preschool children and pregnant women in the country. Thus, the Philippine government passed Republic Act (R.A) 8172 known as An Act Promoting Salt Iodization Nationwide and for Related Purposes (ASIN Law) in December 1995. The FNRI conducted a study on iodized salt to assess the national iodine status as of 2005 and 2008 and compare to the 2013 National Nutrition Survey. The study looked into the percentage of the respondents on levels of awareness and usage of iodized salt. It also examined the distribution, handling and storage of iodized salt. For the 8th National Nutrition Survey, all 80 provinces of the country including 10 highly urbanized cities and 10 chartered cities were covered for sampling. Approximately 100 households were statistically selected to represent a national estimate from a total of 8,164 households across the country. Questionnaires were given to households for the iodized salt survey. Salt samples received in the FNRI laboratory were described and documented prior to iodine analysis. The iodine content of the salt samples was determined using WYD Iodine Checker. Results revealed a slight increase in the percentage of level of awareness from 79.5% (2003) to 83.4% (2005). However, a continuous decrease from 83.4% to 78.5% to 71.5% from 2005 to 2008 to 2013 was recorded. The percentage of households using iodized salt significantly increased from 38.1% (2003) to 49.2% (2005) which further increased from 41.9% (2008) to 47.5% (2013). A percentage of 77.1% used transparent containers with covers as storage for iodized salt. There was a decrease in median iodine levels of household salts in the Philippines from 12.0% (2005) to (5.3%) 2008 and with a slightly increase from 5.3% (2008) to 5.6% (2013). Generally, most households were aware of iodized salt but only less than half of the number of households surveyed was users of iodized salt. The median iodine levels of household salts in the Philippines were way below the recommended level mandated by the ASIN Law. A plausible reason that can explain the changes in median iodine level was the revised ASIN Law which lowered the iodine level from 40-150 ppm (1995) to 20-70 ppm (2010) and increased to 30-70 ppm in 2013 across distribution channels. Continuous information dissemination should be done to increase the level of awareness on the use and benefits of iodized salts. Education on proper handling and storage of iodized salt can help retain iodine in salt. It is recommended that iodine test be done not only in the household but from the production site and retail market as well to monitor the change in iodine level from the producer to the consumer's end.

Keywords: *iodine deficiency, iodine level, household salts, national nutrition survey, DOST-FNRI, iodized salt, Nutrition*

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(Filipiniana Analytics)*

Length and height measurement instruments: out with the old, in with the new

Dasco, Ma. Lilibeth P., RND, MSAN

The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) conducts periodic National Nutrition Surveys (NNS). One of the components of NNS is the Anthropometry which includes measurements of length/height. For several years, the wooden infantometer and microtoise are utilized to measure length/height. With technology progressing in a rapid pace, emergence of innovative modifications on these instruments raised the competitive criteria for selection with the basis on ease of use, economic cost, and most importantly, the quality of data produced. In 2015, the FNRI acquired new instruments for measuring length/height such as the medical plastic infant measuring board and stadiometer. To ensure the reliability of data, it is important to establish that the new instruments are as accurate as the ones being currently used before they are purposely adopted in nutrition surveys. The study aimed to determine whether the measurements obtained from the new instruments are within the same degree of differences and are within acceptable level of agreement with the current instruments before they are used in the nutrition surveys.

Keywords: *measurement instruments, anthropometry, infantometer, microtoise, stadiometer, Bland-Altman plot, scatter plot, DOST-FNRI, Nutrition*

Local level food, health and nutrition survey (LFHNS) 2016: a pilot survey

Duante, Charmaine A., MSc Epid (PH)

The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) has been conducting National Nutrition Survey (NNSs) and Updating Surveys which generate national and regional level estimates. With the devolution of health and nutrition programs and services to local government units (LGUs), there has been strong clamor for local level data by LGUs, Senate, Congress and stakeholders. In response, the Local Level Food, Health and Nutrition Survey (LFHNS) was conducted. Aside from providing reliable local level estimates of food, health and nutrition statistics, this pilot study will also serve as basis for the conduct of the 2018 Expanded NNS. Moreover, the LFHNS results may be used as baseline in attaining several components of the Sustainable Development Goals (SDGs): SDG-2 on Zero Hunger, SDG-3 on Ensuring Healthy Lives and Promoting Well-being for all and SDG-12 on Responsible Consumption and Production. For SDG 3 on health and well-being, LGU-level data on health risk factors would provide pragmatic bases for local level Maternal and Child Health (MCH) and Noncommunicable Diseases (NCD) policies and programs. The LFHNS pilot survey aimed to generate reliable local level estimates of food, health and nutrition statistics in the selected pilot areas. The 2016 LFHNS was conducted in seven (7) pilot areas: Municipality of Pulilan in Bulacan, City of Taguig and the Provinces of Aurora, Davao Occidental, Occidental Mindoro, Biliran and Batanes. The 2013 Master Sample (MS) design for household-based survey was utilized for the city of Taguig and Provinces of Aurora, Davao Occidental, Occidental Mindoro and Biliran. The 2014 Community-based Monitoring System (CBMS) listing was used for the Municipality of Pulilan. For Batanes, spot maps were utilized for a subsample of all households. A separate sampling frame was constructed for pregnant women for all pilot areas. Anthropometry, Biochemical (in selected areas only), Clinical and Health (blood pressure, risk factors to noncommunicable diseases such as smoking and alcohol intake, physical activity), Dietary, Socioeconomic, Household Food Security, Government Program Participation, Infant and Young Child Feeding, Maternal Health and Nutrition. Face-to-face interviews, anthropometric and blood pressure measurements, blood extraction, food weighing following standard techniques and procedures. The conduct of the pilot survey affirmed the feasibility and applicability of the LFHNS for generating local level estimates on food, health and nutrition (graphics found in the digital poster). The results can serve as basis for crafting local policies and prioritizing addressing of nutrition and health issues in accordance with the needs of the area. As such, local development plans can be formulated in accordance with the nutrition and health situation and needs of the area. Analysis affirmed the feasibility and applicability of the LFHNS for generating local level estimates. The use of this method is recommended for the conduct of the Expanded National Nutrition Survey.

Keywords: *local government unit, local level food, health and nutrition, non-communicable disease, maternal and child health, DOST-FNRI, Nutrition*

Low protein rice kernel from sago flour and starch for chronic kidney disease patients

Saises, Marcela C.

In the National Nutrition and Health Survey (NNHS) 2003 – 2004, more than 1 million Filipino adults had Chronic Kidney Disease (CKD). CKD is a condition wherein the function of kidneys as excretory organs is decreased, leading to build-up of toxic wastes in the blood. To address this lifestyle related disease, the Department of Science and Technology–Food and Nutrition Research Institute (DOST–FNRI) developed a technology on low protein rice through the use of sago flour and starch. Sago is an excellent source of carbohydrates with minimum amounts

of protein. The study aimed to develop a technology for the production of low-protein rice kernel utilizing sago flour and starch with optimum physico-chemical and microbiological characteristics and sensory attributes. *Sago* flour and starch were initially produced utilizing standard production procedures developed by DOST-FNRI. Experimental trials for the production of rice kernel from sago flour and starch were conducted following two mixture optimal designs (Design Expert 8.0). Parameters for %*sago* flour, %*sago* starch, and %rice flour were optimized, and rice kernels were produced by extrusion. Optimal appearance, color, odor, hardness, smoothness and general acceptability of the product were assessed by Quantitative Descriptive Analysis. Physico-chemical and microbiological tests were also conducted. The technology for the production of rice kernel from *sago* flour and starch with optimum physico-chemical, microbiological, and sensory characteristics was developed. Protein content of the raw and cooked variants was 0.5% and 0.4% respectively. The developed rice kernels from *sago* flour and starch have lower protein content than the regular rice in the market and may be a good substitutes for ordinary rice being eaten by individuals with CKD. Experimental trials to further lower protein content and optimize the shelf-life of the developed rice kernels may be conducted. Procedures for cooking also need to be standardized.

Keywords: *low protein, rice kernel, sago flour, starch, chronic kidney disease, Filipino patients, DOST-FNRI, food and nutrition, Nutrition*

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2017,
(Filipiniana Analytics)

0554

What makes teenagers fat? Obesity-associated factors in selected Filipino adolescents *Udarbe, Mildred A.*

Adolescence is characterized by accelerated growth rate and increased caloric needs, and considered to be a nutritionally vulnerable time where dietary excess and insufficiency, and lack of variety and balance (unhealthy diet) are common. These are often confounded by lifestyle changes that contribute to the erratic and unhealthy eating behaviors which lead to increased rate of obesity during adolescence (Banna J.C et. al, 2016). The contribution of genetic factors (i.e. polymorphisms in the FTO gene variants (rs99339609, rs17817449) and MC4R rs17782313) to obesity can not be discounted. Over 340 million children and adolescents aged 5-19 y.o were overweight or obese and has nearly tripled since 1975 (WHO, 2016). Overweight and obesity is no longer a high-income country problem but also a great concern for the low- and middle-income countries, particularly in urban settings. Most of the world's population live in countries where overweight and obesity kills more people than underweight. In the Philippines, the number of overweight/obesity is on the rise and has reached 8.3% (2013 Facts and Figures). Thus, it is imperative to determine the contributory factors that predisposes an adolescent to obesity. The study employed the following methods: (1) anthropometric measurements such as weight, height, body fat, waist and hip circumference; (2) accomplishment of questionnaires through collection of data using three factor eating questionnaire and 5-day food diary; (3) analysis of genes by genotyping FTO rs99339609 and 1421085 and MCR rs17782313; and (4) data analysis using t-test, ANOVA, simple and multiple logistic regression with a significance set at $p < 0.10$ via Stata 12 for Windows. Only the risk-carriers of the obesity-gene FTO rs1421085 indicated significantly higher caloric intake as compared to nonrisk carriers of FTO rs99339609 and MC4R rs1778210. Except for fat intake, only the risk-carriers of the obesity-gene FTO rs1421085 indicated significantly higher carbohydrate and protein intakes as compared to non-risk and risk carriers of FTO rs99339609 and MC4R rs1778210. Higher waist-hip ratio was found to be associated with being overweight/obese. Risk carriers of FTO rs1421084 had ten times greater chances of becoming overweight or obese than their non-risk carriers counterpart. A gram increase in carbohydrate intake increases the chance of one becoming overweight or obese. In conclusion, the Filipino-translated TFEQ can be useful in characterizing eating behaviors of the adolescents having different weight categories; eating behavior, particularly limiting or monitoring food intake (cognitive restraint), plays a role in the development of overweight/obesity as indicated in their significantly lower scores among the different weight categories; waist hip ratio, risk-carriers (C) of FTO rs1421085, and carbohydrate intake contributes to body weight and; different culture have different responses related to obesity-associated genes and different phenotypes thus, additional studies and genetic screening in adolescents at a larger scale are still needed to fully understand how these factors can influence and contribute to lifestyle modification to decrease the prevalence of obesity in the adolescents.

Keywords: *Filipino adolescents, obesity, growth rate, calories, unhealthy lifestyle, genetic factors, DOST-FNRI, Nutrition*

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2018,
(Filipiniana Analytics)

0555

Malnutrition reduction program: monitoring the intervention *Dorado, Julieta B.*

The Malnutrition Reduction Program (MRP) has been rolled-out from 2012-2016 to various regions in the country and continuously being adopted by the Local Government Units (LGUs). It has two components (1) the technology transfer and (2) the nutrition intervention strategy. The intervention component is a combination of complementary feeding (CF) among 6 months to below 3 years old children and nutrition education (NE) among mothers/caregivers. The project aimed to monitor the MRP implementation by the local government units (LGUs) and determine the facilitating and hindering factors for its implementation. Thirty-two cities/municipalities were monitored using quantitative and qualitative methods for data collection. Key informant interviews and focus group discussions were conducted. Children's weight and height data, and mothers/caregivers participation in NE were obtained through records in the LGUs. Twenty-two LGUs implemented both CF and NE; five (5) implemented CF only; and five (5) did not implement. Fifty percent of the implementing LGUs have resolution adopting the intervention. The CF implemented among 6-71 months old children for 30-120 feeding days with one (1) to four (4) cycles. Based on the analysis of records, there was a decreased from 79.8% to 38.7% and 6.9% to 5.8% among underweight and severely underweight children, and stunting, respectively. On the average, 28 mothers/caregivers in 153 barangays participated in the nutrition education classes. Local chief executives' political will, presence of resolution, complementary food facility and technical assistance by the DOST-FNRI appeared as primary facilitating factors in the implementation of the intervention. Awareness of the mothers/caregivers on the program, functional Municipal Nutrition Committee (MNC), and presence of monitoring staff were other factors that facilitated program implementation. Hindering factors perceived were negative attitude among mothers/caregivers, distance of the households from the feeding post, unawareness on the program among barangay officials and mothers/caregivers, and nutrition program not considered a priority by LGUs. Full support and commitment from the LGU officials will result to effective implementation of the program. Monthly monitoring of the intervention at the local level and continuous monitoring by the DOST-FNRI are recommended.

Keywords: *malnutrition reduction program, malnutrition, LGUs, DOST-FNRI, technology transfer, nutrition intervention, complementary feeding, Nutrition*

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2019,
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0556

Maternal and health nutrition and infant and young child feeding practices *Guirindola, Mildred O.*

The first 1000 days window of opportunity from conception up to a child's second birthday is crucial for ensuring a healthy start in life and avoiding child morbidity and mortality. The study aimed to determine related statistics on maternal health and nutrition and infant and young child feeding and to test for association between selected maternal health and nutrition practices and maternal and household characteristics. Maternal health and nutrition and infant and young child feeding (IYCF) are two separate components of the 8th National Nutrition Survey conducted in June to November 2014 and February to April 2015. For maternal health and nutrition, respondents were mothers with children 0-36 months old and all pregnant women from the randomly-selected households. For IYCF, mothers were asked on the feeding practices of their children 0-23 months old and the child's food intake

the previous day using 24-hour food recall. Descriptive statistics and test of association of different maternal and feeding practices with selected maternal and household characteristics were determined using Stata version 12.0. Teenage pregnant mothers were more nutritionally-at-risk and anemic (37.4% and 30.6%) than older mothers (22.6% and 25.4%). By timing of first prenatal care, 28.9% of pregnant mothers had their first prenatal at 4 to 6 months and 2.4% at 7 to 9 months. By place of delivery, 79.4% newborns were delivered in a health facility and 20.5% were still delivered at home. Newborns delivered in private health facilities were the least initiated to breastfeeding compared with those delivered in public hospitals and clinics and born at home. The timing of breastfeeding initiation among children 0-5 months and their feeding practice at the time of the survey were tracked. Results showed that 0-5 months old children initiated to breastfeed more than one hour after delivery were introduced earlier to complementary foods (31.8 vis-a-vis 16.7) and given breastmilk substitutes more often (20.3 vis-a-vis 15.0) compared to children initiated to breastfeed within 1 hour after birth. Wider socio-economic disparities were noted between the richest and the poorest on the timing of first prenatal care, delivery at health facility, assistance by health attendants and caesarean delivery. Narrower disparities were noted on mothers' knowledge on breastfeeding by wealth quintiles but the practice of exclusive breastfeeding and continued breastfeeding at 1 year was higher among mothers from the poorest quintile. Teenage pregnant women are more at risk of becoming chronic energy deficient and anemic while older mothers are more at risk of being overweight and obese. Mothers with higher educational attainment and living in urban areas had a higher proportion in terms of getting prenatal care, right timing of prenatal care, supplement intake and health facility delivery. There is a need to improve mothers' knowledge and practices on maternal health and nutrition and empower them to avail of the services of a health facility; access to an integrated Maternal Neonatal and Child Health and Nutrition (MNCHN) service package needs to be close to their places of residence.

Keywords: *maternal health, maternal nutrition, infant feeding, child feeding, national nutrition survey, DOST-FNRI, Filipino mothers, breastfeeding, breastmilk, Nutrition*

41st FNRI Seminar Series Abstract, Volume No. Issue No. , 33
2015,
(Filipiniana Analytics)

0557

Methodological study in the conduct of food stores survey *Guirindola, Mildred O.*

Researches on food environment seek to address questions pertaining to the who, what, when, where, why and how of food acquisition and consumption (Source: Food Environment Working Group Technical Brief). Based on the 8th National Nutrition Survey (NNS), only 10% of Filipinos grow their own food while the remaining 90% are basically food consumers who depend on what is available in the market to buy their food. The same survey also shows that Filipinos with non-communicable disease (NCD) risk factors are on the rise. Consistently, their diet shows a decreasing intake of fruits and vegetables and an increasing intake of processed foods. The DOST-FNRI conducts a regular Food Consumption Survey but only collects information on food intake at the level of the household and individual and not at the level of food stores and establishments. Although food stores and establishments are also great sources of information, the sampling methodology of NNS limits the data collection away from food stores and establishments. Thus, there are research gaps on what are the food choices available, and the affordability and quality of foods in different food stores in different community settings in the Philippines. In order to respond to these gaps, there is a need to develop a method for the conduct of Food Stores Survey. This study aimed to pilot-test a methodology for mapping and characterizing the different food stores in Pulilan, Bulacan; Baler Aurora; Biliran Province; and Malita, Davao Occidental in 2016 and in Batanes Province in 2017. Two questionnaires were provided: one questionnaire (Form 1.1) was used for mapping, locating, and identifying the type of food stores and second questionnaire (Form 1.2) is used on food store checklist to determine food items available, quality, and price. The researchers identified all operational food stores in the sampled barangay with the help of barangay officials and they asked permission and consent from the store owners/staff to participate in the survey. Then, they mapped and identified the store coordinates through the GIS. Sampling for food store type with more than 50 representative stores was conducted while one-time accomplishment was done for Form 1.2. Last, the collected data were encoded in the e-DCS. From the coordinates collected from the field, location of food stores in a study area can be mapped and food store density can be visually determined. Areas with few or without food stores can easily be identified. In this example, it can be easily observed that sari-sari store is the most common type of food store in Baler, Aurora. There are also areas in Aurora with few or without food stores.

Food store mapping can be further presented in smaller areas such as barangays. In Brgy. Sabang, Baler, Aurora, sari-sari store is also the most common type of food store. There are few areas with high food store density whereas there are areas without food stores. Sari-sari store is the most common type of food store. About 8 in 10 food stores are sari-sari stores, regardless of geographic location. In all study sites, snack chips and candies were the food items most commonly sold, followed by sugar-sweetened beverages and alcoholic beverages. Fruits, vegetables, and fresh fish, meat, and poultry were less available. The methodology for characterizing and mapping the food stores in the sample area through the GIS was implemented successfully. To further improve the Food Store Pilot Survey Questionnaire and field survey operations for possible inclusion in the ENNS, the following are recommended: provide operational definition of 'operational food store' to determine the comprehensiveness of the list of candidate food store; change 'food stores' to 'food retailers' because food stores, as used in literature, also include stores selling dry and cooked food; reconsider the basis for food store classification. The number of cash registers could be the basis for classification at the individual store level. Food stores can then be further classified according to variety of offerings, time of operations, frequency of operations and day of operations; have a clear criteria to identify and describe when a food store and food establishment co-exists and; reconsider the sampling protocol for food stores. Provide details on how the sampling will be conducted specifically on determining the number of food stores in each survey area and on conducting the random sampling.

Keywords: food store, non-communicable disease, national nutrition survey, food acquisition, food consumption, surveying, store mapping, DOST-FNRI, Nutrition

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0558

Mineral availability from naturally and synthetically-fortified multi-nutrient growth mix (MGM)

Baquiran, Amster Fei P.

To help reduce cases of micronutrient deficiencies in young children, the FNRI developed the MGM products, which can be added to complementary foods to enhance nutrient intake. Aside from mineral content of fortified foods, an important factor to consider in assessing the adequacy of mineral intake is the efficiency of absorption. This study aimed to determine the availability of iron, zinc and calcium from the MGM's and the amount of inhibitors (phytic and tannic acid) and enhancer (vitamin C) of mineral absorption. Four MGM variants were analyzed – banana-squash (BS), yellow sweet potato-spinach (YS), carrotanchovies (CA), and rice-based sprinkle. Mineral contents were determined following modified AOAC methods and mineral availabilities were evaluated using *in vitro* method. Determination of phytic and tannic acid, and vitamin C contents were also performed using colorimetric and titrimetric methods, respectively. Results showed that MGM products have appreciable amounts of iron, calcium and zinc with varying extent of availability for absorption. Among the three naturally-fortified variants, BS had the highest mineral content but its high amount of calcium and phytic acid may have suppressed the release of iron and zinc by forming insoluble complex. Iron was most available from CA (29.30.5 %) as may have been enhanced by vitamin C. Calcium was most available from BS (59.02.2 %) while zinc from YS (5.860.08 %). Compared to the naturally-fortified MGMs, the synthetically-fortified sprinkle had considerably higher mineral availabilities (63.9% in iron, 99.9% Ca, 35.6% Zn) and lower amounts of inhibitors. Iron, zinc and calcium in MGM sprinkle were found to have excellent availability for absorption. The naturally-fortified products also showed good mineral availability but the choice of food to which they will be added should be considered well since local crops which they were made from inherently contain inhibitors and minerals, which may interact and impede mineral absorption. Further investigation using *in vivo* methods should be done to validate the results.

Keywords: synthetic product, multi-nutrient growth mix, natural products, micronutrient deficiency, complementary food, nutrient intake, absorption efficiency, calcium, phytic acid, DOST-FNRI, Nutrition

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Monitoring and process evaluation of DOST PINOY

Dorado, Julieta B.

“Local technology works!” is the battle cry of the DOST that drove the development of a nutrition intervention strategy dubbed as DOST PINOY under the Malnutrition Reduction Program (MRP). Complementary feeding for 6-35 months old children and nutrition education of mothers and caregivers has been implemented since 2012 to contribute to the reduction of underweight prevalence among Filipino young children. In 2014, the focus of the MRP was the monitoring and process documentation of the DOST PINOY’s implementation in selected Local Government Units (LGU’s). The study documented and assessed the implementation of the DOST PINOY intervention strategy. The procedures and progress of program implementation were examined and documented. The LGUs of Pulilan and Plaridel, Bulacan adopted the DOST PINOY intervention. A total of 261 ages 6-35 months children regardless of their nutritional status were the participants of the intervention along with their mothers/caregivers. The study used both quantitative and qualitative methods for data collection. Key informant interviews (KII) among community workers and LGU officials and Focus Group Discussions (FGD) among mothers/caregivers and community workers were conducted. The DOST PINOY in Bulacan adhered to the program phases of planning, organizing, implementation, monitoring and evaluation. Specific roles were performed by the local implementers at the municipal and barangay levels. The capacity building of community workers empowered them to implement the DOST PINOY. The LGU conducted complementary feeding for 120 days utilizing local-based complementary foods along with nutrition education classes among mothers/caregivers using the DOST PINOY modules. The evaluation indicators were the weight of children participants and the knowledge scores of mothers/caregivers. The number of children-participants with normal weight-for-age nutritional status increased in both municipalities after the intervention. On the other hand, the mean knowledge scores of mothers/caregivers increased significantly in both study periods. Strong support and cooperation from the local implementers and mothers/caregivers and adherence to the program requirements were key factors in the efficient implementation of the program. For the sustainability strategy, the passing of local ordinance for the adoption and financing of the intervention is recommended. The MRP is on-going until 2016 when impact evaluation will be conducted, thus, the report is limited to descriptive accounts of the accomplishments for 2014.

Keywords: *malnutrition reduction program, DOST PINOY, DOST-FNRI, complementary feeding, nutrition education, local government units, Nutrition*

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How much breast milk do toddlers consume? Data from vitamin A safety assessment study

Countries with significant vitamin A (VA) deficiency problem implement large-scale intervention programs to reduce child morbidity and mortality. However, overlapping program exposure may result in excessive VA intake and toxicity. Breastfed children are likely to receive adequate VA from breast milk if their mothers have adequate VA status. Any excessive VA intake caused by exposure to multiple VA programs may be most likely among breastfed children. The study was conducted to assess whether breastfed children exposed to multiple VA programs are at risk of having excessive VA intakes, their breast milk intake, breast milk VA concentration, and VA intake from other food sources must be known. The study aimed to determine the breast milk intake among children (12 to 18 months) living in a community where multiple VA interventions are in place. The study was conducted in nine barangays in Mandaluyong City, while the pilot study was conducted in Baesa Compound, Tondo, Manila. Dose-to-mother isotope dilution technique was done through the following processes: (1) the mother drinks deuterium oxide ($^2\text{H}_2\text{O}$), (2) the baby gets $^2\text{H}_2\text{O}$ from breast milk, and (3) saliva enriched with $^2\text{H}_2\text{O}$ is collected and analyzed using Fourier transform infrared spectroscopy. Breastfeeding young children aged 12-18 months and their mothers were divided into three groups: Group 1 - superkid group (n=12), exposed to VA programs, treated 1 month after VAS, excessive VA intake; Group 2 - superkid group (n=16), exposed to VA

programs, treated 3-4 months after VAS, excessive VA intake; and Group 3 - superkid group (n=24), not exposed to VA programs, treated 3-4 months after VAS, low-adequate VA intake.

Keywords: *Nutrition*

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0561

Nutrition-related corporate social responsibility programs of selected corporations in the Philippines

Gordoncillo, Normahitta P. , Talavera, Ma. Theresa , Marges, Rosemarie L. , Mojica, Loida E.

Malnutrition being a multi-faceted problem, with causes cutting across a number of sectors (WFP, 2014) requires a combination of effort and programs to effectively be addressed. Many corporations have embarked on programs that can contribute to the reduction of malnutrition. This study aimed to describe and analyze the nutrition-related Corporate Social Responsibility (CSR) Programs of six corporations and their contribution to effort to the reduction of malnutrition. This study used a pretested questionnaire in data collection by self-administered and interview processes of representatives from six corporations. Data was analyzed by profiling and characterizing the CSR programs according to five parameters and the programs' contribution to nutrition-improvement. Corporations in the food and beverage industry implements the most number of nutrition related CSR programs and are mostly focused on nutrition-specific interventions. The corporations were found to implement programs that are appropriate and effective. The CSR programs have the capacity to contribute on nutrition improvement by being able to address some of the immediate, underlying and basic causes of malnutrition.

Keywords: *Corporate Social Responsibility, malnutrition, nutrition specific intervention, nutrition sensitive interventions, Nutrition*

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0562

Opportunities for improving micronutrient deficiency among women of reproductive age (WRA) in Cambodia using DOST-FNRI's developed technology

Saises, Marcela C.

Micronutrient deficiencies are common in women of reproductive age (WRA) due to their reproductive biology, low social status, poverty, lack of education and socio-cultural traditions (Nguyen *et al.*, 2014). In Cambodia, some of the most important micronutrient deficiencies among WRA are zinc (26.3%), folate (17.8%) and thiamine (27%). Fortification of rice is a cost-effective strategy in addressing this problem. The International Life Sciences, Inc. (ILSI) Japan CHP collaborated with the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) to develop a multi-nutrient extruded rice kernel (MNERK) for an efficacy study in Cambodia. The general objective of the study was to develop a technology for MNERK with zinc, thiamine and folic acid for WRA in Cambodia. Specifically, it aimed to conduct production runs, transport MNERK to Cambodia and conduct shelf-life study at DOST-FNRI. The MNERK with zinc, thiamine and folic acid was developed using hot extrusion technology. The product was analyzed for physico-chemical, nutrient, contaminant, microbiological and sensory characteristics. The shelf-life was determined by storing the product packed in polypropylene (PP) plastic bags at room temperature for 6 to 12 months. Results of analysis of MNERK were within the set limits of ILSI Japan CHP (nutrient content), DOST- FNRI (physico-chemical), Codex (contaminants), and Food and Drug Administration (microbiological parameters). The cooked fortified rice produced by blending ordinary rice with MNERK was rated "like moderately" to "like very much". Results of the shelf-life study revealed that MNERK was stable for six (6) months. MNERK was transported to Cambodia together with the necessary documents for an efficacy study among female workers in a Japanese-owned company

in Phnom Penh, Cambodia DOST-FNRI was recognized by ILSI Japan CHP as technology provider of MNERK with zinc, thiamine and folic acid. The forging of private-public partnership may help reduce the prevalence of micronutrient deficiency globally. Pilot testing and commercialization of this product may help in addressing micronutrient deficiency in women of reproductive age.

Keywords: *micronutrient deficiency, reproductive age, women, Cambodia, rice fortification, multi-nutrient extruded rice kernels, Nutrition*

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2020,
(Filipiniana Analytics)

0563

Philippine dietary reference intakes 2015

Sagum, Rosario S., Ph.D.

The Recommended Energy and Nutrient Intakes (RENI) has been the nutrient-based dietary standard in the Philippines since 2002 and is a vital tool used by nutrition scientists and public health professionals as the source of information on recommended energy and nutrient intakes for the maintenance of good health. The RENI is evaluated and updated periodically to keep pace with the advances in energy and nutrient requirements. This project aimed to review and revise the RENI 2002 edition. Specifically, the project provided the final updated values for energy and nutrient intake recommendations for the different age and physiologic groups. After a thorough and extensive review by the RENI Committee composed of technical experts in health, nutrition, biochemistry, and allied fields, the proposed recommendations were subjected to an independent review by another group of nutrition and health experts. This was followed by a consultation with stakeholders and potential users from various disciplines and sectors, before finalization by the Committee. As in the 2002 edition, intakes for energy, protein, vitamins A, B₁, B₂, B₃, B₆, B₁₂, C, D, E and K, folate, calcium, phosphorus, iron, zinc, selenium, magnesium, fluoride, water, and electrolytes (sodium, potassium, and chloride) were recommended in the 2015 edition. The key feature of the present edition, however, is the adoption of multi-level reference values, which included the Estimated Average Requirements, Recommended Energy/Nutrient Intakes, Adequate Intakes, and Tolerable Upper Intake Levels, or collectively referred to as Philippine Dietary Reference Intakes (PDRI). In addition, Acceptable Macronutrient Distribution Ranges of protein, fats, and carbohydrates are given. Recommended intakes for dietary fiber and polyunsaturated fatty acids and the maximum intake levels for sodium and free sugars are also included. There is a marked increase in vitamin A requirements for individuals 10 years old and above as a result of new data on lower liver storage efficiency of ingested vitamin A. A new set of dietary standards has been established for the general population. The PDRI represents a paradigm shift in the way dietary reference values are formulated and used, thereby requiring a thorough understanding of its origin, purpose, and intended applications. Thus, it must be ensured that the PDRI concepts and uses are properly communicated to and understood by various users and stakeholders in the form of trainings, dissemination fora, scientific meetings, and related activities. The implications of the updated values to existing food and nutrition and public health policies and programs have to be studied and reviewed.

Keywords: *RENI, PDRI, recommended energy intake, good health, DOST-FNRI, Nutrition*

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2015,
(Filipiniana Analytics)

Philippine food composition tables (PhilFCT®) online database: data updates, features and security enhancement

Nacionales, Kristine B.

The Philippine Food Composition Tables Online Database (PhilFCT®) is the country's web-based nutrition tool which provides detailed information on the chemical/nutritional composition of foods. Since 2015, the PhilFCT® is continuously reviewed and updated with nutrient data, photo documents and food items. The project aimed to update the PhilFCT® Online Database with food data and to strengthen or enhance its security controls and features. Nutrient data and photo documents generated from the Food Composition Laboratory were thoroughly checked and encoded in the database. The encountered bugs and errors in the database were summarized for the creation of additional security functions and features. The database system programming and updating were done by the FNRI Management Information System Unit for an enhanced data entry which underwent a series of beta testing. The PhilFCT® enhancement project collected and prepared an additional 106 photo documents of food items and encoded 1,802 nutrient data. As of December 2018, the project team monitored a total of 142,710 user hits. Security measures done by the programmer included SQL injection, XSS Filter, remote code execution, URL protection, confirm input data and hide your files. Beta-test showed that uploaded food data have duplicated entries. The programmer addressed the duplication of data entries by developing separate data entry for adding food data and updating food data. Updating food data and enhancement of security features help improve user experience. Continuous monitoring and checking of database system crash and errors are recommended to protect the Institute's assets and to maintain the stability of the system. Hence, PhilFCT® should be regularly updated to cope with ICT innovation and to address current challenges in food and nutrition.

Keywords: *Philippine food composition tables, online database, chemical composition, nutrition education, DOST-FNRI, nutrient data, management information system, Nutrition*

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2019,
(Filipiniana Analytics)

Physical activity, macronutrient intake, eating behavior, and obesity-associated genes as risk factors for obesity in selected 9-12 year old children in Taguig and Pateros

Physical activity, food intake, eating behavior, and obesity-associated genes were previously identified to have causal effect in the development of obesity. This study determined the association of physical activity, energy and macronutrient intake, eating behavior, and obesity-associated genes with the Body Mass Index (BMI) of children. A total of 125 children participated in the study. Body weight and height were measured to determine the BMI category. The physical activity level category and eating behavior of children were assessed through a Filipino-translated Physical Activity Questionnaire for Children (PAQ-C) and Child Eating Behavior Questionnaire (CEBQ), respectively. A five-day food diary was used to collect data for the energy and macronutrient intake. Amplification and genotyping of target genes (*FTO* rs993960, *FTO* rs1421085, and *MC4R* rs17782313) was done using BIORAD CFX-96 and Precision Melt Analysis software, respectively. The participants had a mean BMI of a 22.44.8kg/m² and were considered to be minimally active (2.60.8). No significant differences were observed in the energy and macronutrient intakes between sex, and between the risk- and non-risk carriers of the three obesity-associated genes. The frequency of the risk carriers among the participants are as follows: 39%, 36.8% and 17.6% for *FTO* rs9939609 (AA/AT), *FTO* rs1421085 (CC/CT) and *MC4R* rs17782313 (CC/CT), respectively. The risk carriers of *FTO* rs9939609 and *FTO* rs1421085 had significantly higher ratings for enjoyment of food and lower ratings for satiety responsiveness and slowness in eating as compared with the non-risk carriers. Majority of the eating behavior subscales were found to be associated with BMI but not for the three obesity-associated genes and physical activity level. This holds true for energy and protein intakes of the participants. BMI may possibly be affected by the eating behavior of children carrying the risk genotypes for *FTO* rs9939609 and *FTO* rs1421085. Specific eating behavior, and awareness campaign, as well as providing the resources/facilities to promote increased physical activity among school children can be targeted in intervention studies to curb childhood obesity.

Keywords: *Nutrition*

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0566

Pilot scale production and shelf-life study of ready-to-drink carrot-pineapple juice

Engr. Adona, Charlie E.

The 8th National Nutrition Survey of the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) showed vitamin A deficiency (VAD) remains a persistent public health issue in the Philippines. An increase of VAD incidence (among children ages 6 months to 5 years was reported from 15.2% in 2008 to 20.4% in 2013. DOST-FNRI previously developed a β -carotene rich juice to address the prevalence of VAD. To fully commercialize the product, pilot-scale-production was conducted to determine product's market feasibility. The objective of the study was to conduct pilot scale production of Ready to Drink Carrot-Pineapple Juice (RTD-CPJ). Specifically, it aimed to conduct technical feasibility of the product in pilot scale and to determine the shelf-life life of the product. Pilot scale production of RTD-CPJ involved determination of production yield, product cost and manpower requirement. Process standardization and conduct of shelf-life study was also undertaken. Physico-chemical, nutrient, microbiological and sensory characteristics of RTD-CPJ were monitored to determine the shelf-life of the product. One production run of RTD-CPJ produced approximately 105 bottles of 350ml juice, with a selling price of Php 51.70 per bottle. A five-year projection feasibility study revealed that with an initial capital of Php 3 million, the return of investment is 42.12% or a payback period of 2 years for a production capacity of 8,550 bottles (350ml/bottle) per month. Results of physico-chemical, nutrient, sensory and microbiological analysis of RTD-CPJ showed a shelf-life of 6 months. The product contains 348 RE vitamin A per 350ml, providing 50% of the recommended nutrient intake (RNI) for male adults aged 19-29 years. The juice was liked moderately by sensory panelists and its sensory attributes of "orange color", "sweet aroma", "mildly thick texture", "smooth mouthfeel" and "sweet carrot-pineapple taste" were maintained throughout the 6 months shelf-life. The production of RTD-CPJ in pilot scale is technically feasible. With an initial capital of Php 3.0 million, the return of investment is 42.12%. RTD-CPJ is safe for human consumption and contained high vitamin A content. It is recommended that technology transfer to prospective adopter be forged to make the product available to the consumers.

Keywords: *vitamin A deficiency, beta-carotene, carrot-pineapple juice, safety standards, shelf-life, ready-to-drink, DOST-FNRI, Nutrition*

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0567

Pinggang Pinoy® community challenge: a precursor to healthy eating

Pinggang Pinoy® is the latest food guide for Filipinos to achieve optimum nutrition. It is presented in the form of a food plate that shows the concept of eating a variety of foods in right proportions. This project was conducted as a private-public partnership to promote the health and well-being of Filipinos through disseminating the recommendations of Pinggang Pinoy® to the ultimate clients-the Filipino families, where mothers and caregivers take the lead in managing family meals. The project aimed to create awareness on Pinggang Pinoy® among mothers and caregivers and challenge them to apply the recommendations of Pinggang Pinoy® in preparing meals. The Pinggang Pinoy® Community Challenge was the strategy used in disseminating to the mothers and caregivers the recommendations of Pinggang Pinoy®. Information-motivation campaign was conducted which composed of nutrition education and training seminar on Pinggang Pinoy®, food safety, and meal planning. Pre-test and post-test were administered by the project team to assess the learning acquired from the training. Mean scores were analyzed using paired t-test. The participants were mentored by the project team through practice cooking. As a culminating activity, a cook-off was held. The judges evaluated the prepared meals based on nutritional aspect,

palatability, originality, use of locally available ingredients, cost, and visual presentation. The practice of food safety of the participants observed during the cook-off was also evaluated. Sixty-one mothers and caregivers whose children were participants of the multinational company's dietary supplementation program from the cities of Caloocan and Taguig participated in the activities. A total of 12 one-day meal plans were generated. Fifty-one participants completed the pre-test and post-test. The Pinggang Pinoy® Community Challenge resulted in a statistically significant increase in knowledge of the participants as shown in the mean scores of their pre-(13.4+2.8) and post-test(17.0+2.8). The Pinggang Pinoy® Community Challenge was an effective strategy in communicating the recommendations of Pinggang Pinoy® hence, considered a potential precursor to adopting healthy eating of Filipino families. Development of a manual on the Pinggang Pinoy® Community Challenge implementation and its adoption is recommended as well as a follow through of this activity to sustain the campaign on healthy eating.

Keywords: *Pinggang Pinoy, food guide, meal planning, community, healthy diet, DOST-FNRI, Nutrition*

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0568

Prevalence of elevated blood pressure and high fasting blood glucose among Filipino adults

Patalen, Chona F., MPH

Non-communicable diseases (NCDs) continue to rise which took the lives of more than half (67%) of the Filipino population in 2016. Elevated blood pressure (BP) and high fasting blood glucose increase the risk of developing NCDs. Regular conduct of surveys estimating the prevalence of these risk factors provide significant health information for program and policy review in order to implement more effective interventions. This study aimed to determine the prevalence of elevated BP and high fasting blood glucose among Filipino adults 20 years old and above. The clinical and health survey component of the Philippine National Nutrition Survey (NNS) included the measurements of risk factors for NCDs among Filipinos, 20 years old and above. Blood pressure was measured using a non-mercurial, hybrid sphygmomanometer and blood sample was collected for fasting blood glucose after a 10-12 hour overnight fasting. A systolic BP of ≥ 140 mmHg or diastolic BP of ≥ 90 mmHg determined the prevalence of elevated BP, while fasting blood glucose of ≥ 126 mg/dL determined the prevalence of high fasting blood glucose. Interviews regarding behavioral risk factors were also conducted. Descriptive statistics were generated using Stata version 15. The trend in the prevalence of elevated BP among adults, 20 years old and above increased by 0.43 percentage point annually from 1998 to 2008. Although a three-percentage points decline was noted in 2013 (22.3%), the prevalence of elevated BP significantly increased in 2015 (23.9%). In 2018, the prevalence of elevated BP dropped significantly to 19.2%. The prevalence of high fasting blood glucose increased from 3.4% in 2003 to 5.6% in 2013. In 2018, the prevalence of high fasting blood glucose rose to 7.9% which reflected a 4.5-percentage points increase for the past 15 years. Moreover, impaired fasting blood glucose increased from 2.7% in 2008 to 8.2% in 2018. Generally, older population (60 years old and above), males, those residing in urban areas, and those belonging to the richest wealth quintile were more at risk of developing NCDs. Although elevated BP significantly declined in 2018, this remains a concern. On the other hand, high fasting blood glucose continues to escalate over the years. The survey results call for the high-impact government's plans and actions in addressing premature deaths due to NCDs. Monitoring and evaluation are essential to assess status of current interventions and policies vis-à-vis the targeted population.

Keywords: *elevated blood pressure, high fasting blood glucose, Filipino adults, non-communicable disease, Nutrition*

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Production and exportation of multi-nutrient extruded rice kernel (MNERK) with iron and zinc to address micronutrient deficiency in Vietnam

Saises, Marcela C.

More than 2 million Vietnamese children (5 years old) are stunted and have undeveloped bones, while over 1 million are acutely malnourished (NIN, 2013). To address this problem, the National Institute of Nutrition (NIN) of Vietnam forged collaboration with the Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) with the funding support of ILSI-Japan CHP, Taiyo Kagaku Co., Ltd., Japan and the Global Alliance for Improved Nutrition (GAIN). The study aimed to produce and export DOST-FNRI developed technology on multi-nutrient extruded rice kernel (MNERK) with iron and zinc to NIN, Hanoi, Vietnam. MNERK with iron and zinc was produced at FNRI Pilot Plant Processing Facility using hot extrusion process. The kernel was tested and evaluated for its quality in terms of physico-chemical, nutrient, contaminants, sensory and microbiological properties and exported to Vietnam via sea-freight. Visit to the study site in Thai Binh Province, Hanoi was also conducted to monitor the exported rice kernel, Vietnamese fortified rice and blending operation of the rice miller. Certificate of Analysis (COA), Export Permit and Phyto-sanitary certification were accomplished and sent to NIN. About 100% of the MNERK samples analyzed were within the standard set by DOSTFNRI for iron (3.6-4.8 mg/g) and zinc (1.6-2.3 mg/g). About 100% of the MNERK samples tested for sensory evaluation were rated "like moderately" to "like very much" (Philippines) and "would love" to "extremely interested" (Vietnam). Four (4) tons of multi-nutrient extruded rice kernel (MNERK) with iron and zinc exported to Vietnam were found to be safe and conformed to the DOSTFNRI and Codex Standards. Blending machine in Le Hanh Rice Mill, Hanoi, Vietnam was efficient and Vietnamese rice was found to conform to the requirement of DOST-FNRI and NIN. As a result of this partnership, the DOST-FNRI was recognized as technology provider of extruded multi-nutrient rice kernel with iron and zinc by the international market. The forging of private-public partnership towards this end may help reduce prevalence of micronutrient deficiency globally. The study recommends that more efforts on technology development with multivitamins, pilot-testing and subsequent commercialization be conducted to address other micronutrient deficiencies.

Keywords: *multi-nutrient extruded rice kernel, iron, zinc, Vietnamese children, bone development, micronutrient deficiency, DOST-FNRI, Nutrition*

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Promoting sufficient fruit and vegetable intake among teachers: an intervention using the Solomon four group design

Simbulan, Nymia P. , Mira, Nona Rachel C.

Majority of recent deaths in the Philippines were attributed to noncommunicable diseases. Adequate consumption of fruits and vegetables can potentially decrease the burden of certain heart diseases and cancer. Health promotion and education interventions have been shown to increase fruit and vegetable intake.

The study was conducted to evaluate the impact of a self-management intervention on psychosocial variables and fruit and vegetable intake (FVI) of public school teachers.

The study utilized the Solomon four-group design. The psychosocial variables were derived from Bandura's social cognitive theory and Ajzen's theory of planned behaviour. FVI was measured using a food frequency questionnaire. An assessment of interaction between the intervention and pretest, group comparison tests, and nested ANOVA approach were performed.

Teachers from 44 schools, 112 in the intervention group and 116 in the control group, were included in the analysis. Results indicate no significant interaction between treatment and pre-test group ($F[1,224]=0.15$, $p=0.703$), no significant differences in the psychosocial variables scores and FVI of the intervention and control groups ($p>0.05$). Significant findings in two of four psychosocial variables, particularly diet-related attitude

($t=2.412$, $p=0.009$) and knowledge regarding the recommended FVI (Fisher's exact test $p=0.010$), and mean FVI ($t=1.898$, $p=0.031$) were only found using data of the posttest-only intervention group who were able to attend the lecture-workshop and control group.

The study found no evidence of pretest sensitization. There was insufficient evidence to conclude that there were differences in FVI and psychosocial variables of the intervention and control groups postintervention.

Keywords: *fruit and vegetable intake, self-management intervention, teachers, Solomon four-group design, Bandura's social cognitive theory, Ajzen's theory of planned behaviour, Nutrition*

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0571

From pyramid to plate: a formative research on the development of a Filipino food guide

Narciso, Zenaida V., Ph.D.

Advances in nutritional science have underscored the need to review the FNRI food pyramid with more appropriate representations and develop a new Filipino food guide for nutrition education. While the FNRI food pyramid enjoyed widespread recognition, consumers viewed it as a general guideline and expressed difficulty in understanding its specific nutrition messages. While the FNRI food pyramid enjoyed widespread recognition, consumers viewed it as a general guideline and expressed difficulty in understanding its specific nutrition messages. A formative research was conducted to generate science-based evidence for the development of a new guide and determine perceptions on the old guide (pyramid). Key informant interviews (KII) was conducted among 153 experts (nutrition educators) and 27 focus group discussions (FGDs) among users (mothers) in urban and rural communities in Luzon. Each FGD was composed of 6 participants, a moderator and recorder. Quantitative analysis of KII data involved frequencies and percentages, while qualitative analysis of FGD proceedings was done through textual analysis. Majority of the key informants and mothers were aware of and have used the pyramid. They offered a number of different locations where they had seen it like through advertisements, health centers, schools, offices, and bookstores. Though aware, key informants cited serving portion and content as the most common barriers in using it. Mothers cited “no money” to follow recommendations, unavailability of copies especially in rural communities and unclear copies as the barriers to its usage. Most of the KIs and mothers said the existing guide (pyramid) is enough but a supplement guide will be helpful to make it more relevant to today’s lifestyle and food choices. KIs and mothers both affirmed that the supplement guide should indicate a “per meal” eating recommendation rather than “per day”. The pyramid still has value but there is a need for a supplement guide to complement its usage on a per meal basis. Problems encountered on the use of the pyramid were related to insufficient resources, availability, access and downloading to the grassroots. Development of the supplemental guide should consider the following: serving size terminology—make the recommendations more concrete and applicable to the consumer; making the graphic more user-friendly and attractive—the use of actual photos and not just icon, it has to be eye-catching and colorful for easy recall; personalizing the information—there is a need to have nutrition information individualized by age and gender.

Keywords: *food pyramid, Filipino food guide, nutrition education, DOST-FNRI, Nutrition*

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Quality of life and its association with functional capacity and nutritional status of community-dwelling older persons in the National Capital Region

Orense, Consuelo L.

In the Philippines as well as in other developing countries, the number of persons aged 60 years and above is rising. Based on the 2010 Philippine population census 6.25 million are older persons, this number is projected to reach more than 19.6 million in 2040. This implies that more resources will have to be allocated for older persons who will avail of health and nutrition services to maintain good health and prolong life. Currently, studies are still limited on effective interventions to safeguard the health and quality of life of older Filipinos. Quality of Life (QOL) is defined as the individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns- World Health Organization (WHO). Functional Capacity refers to the ability of a person to perform activities that relate to self-care and daily living. The study aimed to determine the nutritional status and its association with the functional capacity and quality of life of older persons in the National Capital Region (NCR). Specifically, to assess the nutritional status of older persons among selected participants of the study by means of anthropometric, biochemical, clinical and dietary methods; to assess the functional capacity and quality of life of older persons; and to relate nutritional status with functional capacity and quality of life. A cross-sectional study among community-dwelling older persons in the National Capital Region (NCR) taken from the households covered by the 2015 Updating of the Nutritional Status of Filipino Children and Other Population Groups survey was conducted by the DOST-FNRI. Data collected include anthropometric (weight/body fat, height, waist, hip, and calf circumference), biochemical (high sensitivity C-reactive protein [HSCRP], hemoglobin), clinical (blood pressure, medical history, aging-related disorders), dietary (food and nutrient intake, adequacy), functional capacity (muscular strength, activities of daily living/instrumental activities of daily living [ADL/IADL], physical activity [GPAQ]), and quality of life (questionnaire-based [WHO-QOL-BREF]). Results showed that among urban-dwelling older persons, four in ten males and six in ten females participated in this study. Six out of ten are from the younger age group of older persons. about 90% live with their families, 63% have health insurance, 98.5% are members of PhilHealth and 58% are Members Social Organizations in which 47% of them are members of Senior Citizen's Organization. Under- and overnutrition are also present where 11% (underweight with BMI <18.5), 34% (overweight or obese with BMI >25.0), and 55% (normal) of the population. At least seven in ten males and females are at risk to malnutrition based on low calf and mid-upper arm circumference. Eight and nine in ten females have excess abdominal fat based on waist-hip ratio and waist circumference, respectively. About half of the participants have normal arm muscle strength. Almost all (96%) are independent or can perform both basic and instrumental activities of daily life using ADL/IADL questionnaire. Meanwhile, four out of ten are at risk to malnutrition using MNA questionnaire. As for the health condition, majority (95%) have gastrointestinal problems; eight out of ten have vision problems; 47% are hypertensive; one out of five is anemic; and at least one in every three older persons have arthritis, hearing, psychiatric, pulmonary, and genito-urinary problems. Both under and over nutrition exists among older persons in NCR. Older persons are at risk to malnutrition while common ailments associated with aging are also present. Majority of the older persons can still perform activities of daily life independently irrespective of age, BMI and health condition. Majority of older persons perceive their quality of life and health as satisfactory. The scores from MNA, a measure of nutritional risk, is a significant factor that influence the quality of life of older persons. Measurements on the calf and mid-upper arm circumferences, hand grip strength and MNA scores significantly affect satisfaction on the quality of their health. It is recommended that health care and support services should be made accessible for older persons that include a tailored nutrition and education campaign for this group. Continued family and community support is also needed to address nutrition and medical problems and to create a safe environment where older persons remain productive. Local cut-off points should be established for calf circumference and MUAC as a practical tool to determine risk to malnutrition among the older age groups.

Keywords: *functional capacity, nutritional status, Filipino elderly, quality of life, food diet, anthropometry, biochemical, clinical, DOST-FNRI, Nutrition*

Quick response to disaster: production and field-testing of FNRI-developed complementary/supplementary foods

Tobias, Joyce R.

Earthquakes in Bohol and super typhoon ‘Yolanda’ in Eastern Samar and Southern Leyte alerted the DOST to launch a Quick Response to Disaster Program in accordance to its disaster mitigation and emergency feeding thrusts. The program aimed to readily respond to the basic needs of disaster victims through the provision of ready-to-eat foods which are nutritionally appropriate for emergency situation. The Food and Nutrition Research Institute (FNRI) developed food products that can respond to the nutritional needs of the victims during disaster situations. The project aimed to produce ready-to-eat foods such as Rice-Mongo Curls and Instant baby food, Rice-Mongo crunchies and ready-to-cook Rice-Mongo–Sesame brown rice power bar, compressed food “Nutri-Bite” and fortified complementary food “Momsie” for the eight (8) regions affected by disaster in Luzon and Visayas. Secondly, the study determined the acceptability of the brown rice power bar, compressed food “Nutri-Bite” and fortified complementary food “Momsie”. A total of 10,500 pieces of Nutribite, 10,150 pieces of Brown Rice Power Bar and 20,500 sachets of “Momsie” were produced, used in the acceptability testing and distributed in Luzon and Visayas. A consumer type taste test using a 9-point Hedonic Rating Scale score cards was used to assess the acceptability of these food products. The facial expression score cards for children was used for the fortified product “Momsie”. Other products totaling 14,900 packs of rice-mongo curls, 7,950 packs of rice-mongo crunchies, 30,500 sachets of rice-mongo blend and 18,950 sachets of rice-mongo-sesame blend, all weighing 30g per pack were also distributed as tokens to the children-respondents and other residents in the same areas. The activities were done in coordination with the municipal mayors, Provincial Nutrition Action Officers (PNAOs), Municipal Nutrition Action Officers (MNAOs) barangay captains and the DOST regional and provincial directors in the areas covered. Acceptability of the food products showed that out of 1,335 respondents for Momsie, 87% rated the product “like extremely”. Out of 1,097 respondents for Nutri-bite, 58.% scored “like extremely” and 30% scored “like very much”. For brown rice power bar, 62% scored “like extremely” and 26% scored “like very much” out of 1,014 respondents. A total of 14,900 packs of rice-mongo curls, 7,950 packs of rice-mongo crunchies, 30,500 sachets of rice-mongo blend and 18,950 sachets of rice-mongo-sesame blend were also produced and distributed. The study provided data on the acceptability of the FNRI-developed food products and may serve as input for consideration by agencies conducting food assistance during emergency situation. This may also serve as basis for the conduct of efficacy studies on the food products and for the roll-out of the food technologies as part of transfer and commercialization in the regions.

Keywords: *malnutrition reduction program, complementary food, supplementary food, ready to eat food, rice-mongo, Nutri-Bite, Momsie, DOST-FNRI, Nutrition*

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Refinement of the Philippine food consumption data tools for country, regional and global dietary exposure assessment: using the Foodex2 classification system

Apilado, Ruby J., Ph.D.

Dietary exposure assessment is an important step in the risk assessment process to evaluate the exposure of a population to dietary hazards. There is a need for constant updating, enhancing and harmonizing of food consumption information to provide the latest exposure estimates and risk characterization of a population from hazards in food. The FoodEx2 classification system was developed by the European Food Safety Authority (EFSA) to be used in harmonizing food consumption databases that will help ease the process of data collection and exchange across countries. The Food and Agriculture Organization and World Health Organization (FAO/WHO) created the FAO/WHO Chronic Individual Food Consumption database–Summary Statistics (CIFOCoss) template to support chronic dietary exposure assessment and international risk assessment. This project aimed to harmonize the Philippine food consumption database for dietary exposure assessment with the FAO/WHO CIFOCoss template using FoodEx2 classification system. The list of food items from the 2008

National Nutrition Survey (NNS) were coded and categorized using FoodEx2 classification system. The coded food items were verified and validated. After verification, the food items were mapped following the data requirements of the FAO/WHO CIFOCC template. A total of 1,240 food items from 2008 NNS were coded and verified using the new FoodEx2 catalog browser released on October 2018. After verification, 132 out of 1,240 food items were re-coded. The verified food items were mapped into each group in the CIFOCC template. The mapped food items will be used to process food consumption data that will be submitted to FAO/WHO for incorporation into their international food consumption database. The harmonized Philippine food consumption database will help support local and international policy makers, risk assessors, and other stakeholders in making decisions at country, regional, and global level in the area of nutrition and food safety.

Keywords: *Philippine food consumption, data tools, dietary exposure assessment, Foodex2 classification system, DOST-FNRI, Nutrition*

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0575

Review and update of the 1994 food exchange lists for meal planning *Orense, Consuelo L.*

The Food Exchange List (FEL) classify weighed food items into seven groups with approximately similar macronutrient contents. The FEL is a tool used for people with normal healthy diets, those on therapeutic diets, and to facilitate diet counseling. The first Philippine FEL was published by Corpus in 1953 and revised by Tanchoco in 1994. The need for an updated FEL emerged with the advent of novel foods and products that can influence the lifestyle and eating habits of individuals. This study aimed to update the 1994 Food Exchange List (FEL) based on the current needs of the users. This is a cross-sectional research study using both survey and focus group discussions (FGDs) to gather qualitative and quantitative data among professional nutritionist-dietitians. The survey and FGDs were conducted in selected regions in the country. The re-computation and re-validation of macronutrient contents of foods were primarily based on the 2016 Philippine Food Composition Tables (FCTs). Six core nutrition consultants formed part of the expert panel to further improve the technical contents of FEL. This study was approved by the FNRI Institutional Ethics and Review Committee. A total of 529 questionnaires were retrieved from the survey. More than half of survey respondents were from NCR and two-thirds were professional nutritionist-dietitians. Survey and FGD results were similar, wanting more food items included, particularly new foods available in the market. The same food groups were retained as the previous FEL. However, the vegetable list was reduced to one, whereas the rice list was reclassified into three subgroups based on the protein content. Some foods were regrouped and renamed based on recomputed macronutrient contents. Overall, more than 700 food items were validated and measured per exchange portion and with selected food photos included to visualize exchange portion sizes. The revised FEL incorporated novel foods, updated serving portion per exchange and revised two major food groups, the vegetable and the rice groups. An evaluation of its effectiveness on disease management and clinical outcome is recommended.

Keywords: *food exchange list, meal planning, healthy diet, diet counseling, DOST-FNRI, macronutrients, disease management, Nutrition*

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Rice fortification technology made affordable

Saises, Marcela C.

Based on the Food and Nutrition Research Institute (FNRI) 2013 National Nutrition Survey, about 40.5% of the total infants aged 6 to 11 months and 25% of the pregnant population are anemic. RA 8976 mandates rice fortification with iron to address the problem of anemia mostly due to iron deficiency anemia. Thus, DOST-FNRI initiated a study on the design and fabrication of low cost blending machine for scaling-up rice fortification. The general objective of the study was to design, fabricate, and test a blending machine for rice fortification that will not damage grains and has an acceptable blending ratio and uniformity in wide limits of capacity to encourage rice millers to adopt the iron-fortified rice (IFR) technology. The blending machine for rice fortification was designed by DOST-FNRI and fabricated by Industry partner. The mechanical design of the blending machine was conceptualized by the project team based on compactness, affordability and efficiency to cater the small to medium rice millers interested in rice fortification. Results showed that the machine has an acceptable flow rate capacity of 30kg/min, with a high percent whole grain test (95.1%) comparable to the control (95.8%). About ninety-five percent (95%) of the collected samples were within the acceptable blending ratio of 0.004 to 0.006 using the fabricated blending machine with bucket elevator. The fabricated blending machine cost approximately P250,000 with a savings of 35% to 65% compared to other fabricated machines. The fabrication of blending machine was technically and mechanically feasible. The fabricated blending machine performed well in terms of stability, robustness, compactness, affordability, capacity and breakage testing except for homogeneity test. The fabricated blending machine can benefit iron-fortified rice producers, rice millers, and population groups at-risk to micronutrient deficiencies. It is recommended to develop a smaller conveyor and bucket elevator for the fabricated blending machine and conduct pilot scale productions at the mill site.

Keywords: *Nutrition, rice fortification, DOST-FNRI, iron deficiency, iron-fortified rice*

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(Filipiniana Analytics)

Risk assessment of total aflatoxin (AFT) and aflatoxin B1 (AFB1) through consumption of corn and peanuts by adult Filipinos

Buiser, Paola Bianca M.

Aflatoxin contamination in agricultural crops has been one of the serious threat in health and causes economic loss in tropical Southeast Asian countries including the Philippines (Leong *et al.*, 2011). Staple foods such as corn and peanuts are the two most common agricultural crops susceptible to infestation of molds (Fig.1) at both pre- and post-harvest that results to aflatoxin production by three species of *Aspergillus* namely *A. flavus*, *A. parasiticus* and *A. nomius*. Long term exposure of consumers to small amounts of aflatoxins especially the aflatoxin B1 (AFB1) type, which is considered as a human carcinogen, can lead to the development of hepatocellular carcinoma (HCC) or liver cancer (WHO, 2010). Moreover, hepatitis B virus (HBV) infected individuals are more prone to aflatoxin-induced liver cancer due to damaged liver. With these concerns in food safety, the Philippine National Standard/Bureau of Agriculture and Fisheries Product Standards (PNS/BAFPS) harmonized with Codex and US standards has set the Maximum Tolerable Limit (MTL) for aflatoxins at 20 g/kg for Filipino consumers' health protection. This study estimated the exposure and health risk of the general population of adult Filipinos within 18-to-65 years old, with or without HBV infection, to aflatoxin-induced liver cancer or HCC from the consumption of aflatoxin-contaminated corn and peanuts. Secondary data were collected from published local and international journals (1999-2004) on AFT and AFB1 studies in the Philippines. Then, hazard identification and characterization were measured from the incidence of aflatoxin contamination, Hepatitis B infection & liver cancer and comparison of concentration of AFT and AFB1 in raw corn and peanuts from the MTL. Next, exposure assessment was achieved by computing the estimated daily intake (EDI) using the 2013 NNS Consumption data of Adult General Population with 57.7kg body weight (kgBW) and finally, risk characterization through estimation of cancer potency among hepatitis B virus (HBV) infected/carrier and non-infected adult Filipinos and computation of margin of exposure using the EFSA benchmark dose level (BMDL). Limited data on aflatoxins in the Philippines especially for raw peanuts were gathered (Table 1). Publications by

Arim *et al.* in 1999 and Arim R.H. were used to compute for the total aflatoxin and aflatoxin B1 concentration of raw and unprocessed corn. Meanwhile, only the study of Palomar, M.K. was used for raw peanuts. The average aflatoxin levels for both commodities have exceeded the PNS/BAFPS standard maximum tolerable limit (MTL) at 20 g kg⁻¹ that signified adequate pre- and postharvest measures or practices to manage aflatoxin contamination particularly in peanuts were not observed (Table 2). Based on the 2013 National Nutrition Survey (NNS), the consumption of corn by adult Filipinos is 12.15 g/person/day and 0.31 g/person/day in peanuts. The average Estimated Daily Intake (EDI) of AFB1 from the consumption of aflatoxin contaminated corn is higher than in peanuts (Fig.3). Even with lower level of aflatoxin contamination in corn, adult Filipino corn consumers have higher exposure to AFB1 that can develop to HCC or liver cancer. High prevalence of chronic hepatitis B (CHB) in the Philippines was reported at 16.7% of the population, equivalent to 7.3 million CHB adults. Results showed that adult Filipinos infected with or as carriers of Hepatitis B are the most susceptible population to develop liver cancer through chronic exposure to aflatoxin contaminated corn and peanuts (Fig. 4). The highest estimated annual liver cancer cases that can develop from aflatoxin exposure were evident among adult Filipino corn consumers with CHB at an average of 2.52 (AFT) and 1.96 (AFB1) annual HCC incidence/100,000 persons than in peanuts at 0.43 (Fig.4). The total potency of AFT (0.109) and AFB1 (0.084) to cause liver cancer among adult Filipinos is higher from exposure to aflatoxin contaminated corn than in peanuts (0.02-0.03). Moreover, the lower estimated margin of exposure (MoE) to AFB1 in corn (26.23) than in peanuts (118.0) indicates higher exposure of adult Filipinos to DNA-damaging and cancer-causing AFB1 from consumption of AFB1 contaminated corn (Fig. 5). Estimated MoE values

Keywords: *aflatoxin, corn, peanuts, Filipino adults, Aspergillus flavus, A. parasiticus, A. nomius, hepatitis B infection, liver cancer, contamination, risk assessment, DOST-FNRI, Nutrition*

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0578

Satiety responses and changes postprandial concentration of plasma ghrelin with consumption of white rice and brown rice in Filipino adults

Gubat, Maria Julia G.

While several economic, health and nutrition advantages of brown rice over white rice have been reported scientific data on their differential effects on satiety are largely limited. This study compared satiety responses of healthy Filipino adults with intake of white and brown rice utilizing visual analogue scales (VAS) and ghrelin as biomarker. Participants (n=34) aged 20-49 years old completed a 6-week randomized crossover study. In the first 2 weeks, participants were randomly assigned to consume breakfast test meals with either brown rice (n=17) or white rice (n=17) matched in energy (~500 kcal) and macronutrient content (55% carbohydrates; 15% protein; 30% fat). A 2-week washout period followed and a crossover in rice assignments in the last 2 weeks. 100-mm VAS were used to measure changes in appetite parameters (hunger, fullness, desire to eat and prospective food intake) before consumption of the test meals (pre-prandial=0 minutes) and at 15, 30, 45, 60, 90, 120, 150, 180 and 240 minutes after consumption of the test meals (postprandial). Changes in ghrelin levels from 0, 30, 60 and 120 minutes after eating were determined by radioimmunoassay (RIA). While fullness ratings differed significantly (p=0.022) between white and brown rice, ratings for hunger (p=0.136), desire to eat (p=0.056) and prospective food intake (p=0.127) were not significantly different between both types of rice. Similarly, changes in ghrelin concentration were not significantly different between brown and white rice. Both types of rice reached a nadir at 60 minutes (brown rice=281.3±17.2 pg/mL; white rice=274.9±15.8 pg/mL, p-value=0.755). In the present study, although brown rice contained higher dietary fiber than white rice on a weight-for-weight basis, it was not sufficient to elicit significant differential effects on satiety. Future studies to investigate effect of varying effects of brown rice on other appetite-related hormones, e.g. PYY, cholecystokinin, GLP-1 and leptin.

Keywords: *Plasma ghrelin, White rice, Brown rice, postprandial concentration, biomarker, DOST-FNRI, rice consumption, satiety response, Nutrition*

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Scaling-up rice fortification program through techno-transfer: a strategy towards nutrition security (project 2: evaluation of impact of iron fortified rice and program sustainability)

Angeles-Agdeppa, Imelda, Ph.D.

The Food Fortification Law (RA 8976) mandates fortification of staple foods like rice with iron. The FNRI has conducted series of studies: laboratory scale, technology generation and the development of iron rice premix (IRP), pilot-scale and large-scale commercialization of iron fortified rice (IFR). In 2013, the FNRI rolled-out the scaling-up of the rice fortification program through technology transfer in Davao Region. To evaluate the effects of consuming IFR on the prevalence of anemia among targeted school children and identify mechanisms for program sustainability. Eighty-two (82) anemic children aged 6 to 9 years from Compostela Valley were fed IFR for 120 days. Anthropometric measurements and hemoglobin levels were assessed before and after the feeding. Sustainability efforts like nutrition education among parents; series of meetings with various national institutions and local government units (LGUs); millers, and food establishments were conducted. Children who consumed IFR had significant decrease in anemia (100% to 13.9%), significantly improved weight, height and body mass index (BMI) as compared with those children fed with unfortified rice. Nutrition education using culturally acceptable modules on health and nutrition resulted in the improvement in test scores on knowledge, attitude and practice (KAP) of parents. The multi-sectoral meetings with government and non-government institutions and LGUs resulted to the issuance of Provincial Ordinance on the sale and use of IFR and more adoptors were recruited to produce IFR and IPR. IFR is efficacious in improving nutritional status. Sustainability efforts like the conduct of advocacy campaigns among investors, millers and food industries resulted in engaging adoptors of the technology. The series of meetings with LGUs convinced them to release a provincial ordinance for enforcement. At the household level nutrition education among parents resulted in positive knowledge, attitude and practice (KAP) towards health and nutrition. More investors should be recruited to provide continuous supply of IFR to make it more available, affordable and accessible to all Filipinos. Scaling-up rice fortification program to other parts of the country is recommended.

Keywords: *rice fortification program, technology transfer, nutrition security, iron-fortified rice, sustainability, DOST-FNRI, anemia, iron deficiency, Nutrition*

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Screening exposure assessment of Filipinos to sodium, total sugar, total fat, saturated fat, trans fat, and cholesterol from commonly consumed food

Apilado, Ruby J., Ph.D.

Nutrients are essential for human growth and development, sustenance, and satiety, however, too much intake can be damaging to health. Specifically, excessive intake of sodium, total sugar, total fat, saturated fat, trans fat, and/or cholesterol was associated with high prevalence of several non-communicable diseases (NCDs) including cardiovascular diseases, cancer, and diabetes. This study aimed to assess the exposure and characterize the risk of Filipino population to selected nutrients from commonly consumed foods. The results were then used to identify priority such as the most susceptible Filipino population and the major food contributors to high nutrient exposure—for further refined exposure studies. Data generation of concentration data of nutrients and food consumption data of commonly consumed foods through food matching, statistical analysis, and use of databases from FNRI projects. Exposure assessment of Filipinos to selected nutrients by combining nutrient data and food consumption data. Furthermore, the main food group distributors for each nutrient exposure were identified. Risk characterization by comparing daily nutrient intake with the upper limit by WHO and FNRI. This phase determined the population group(s) at risk for high nutrient exposure. Results showed that mean intake of all subjects (which includes both consumers and non-consumers) across all population groups were below the upper limits for daily nutrient intake. The dietary exposure of average consumers across all the population groups were also below upper limits for daily nutrient intake with one exception—average consumers among children slightly exceeded the upper limit for daily sugar intake at 35g (103% UL). Meanwhile, high-level consumers (HLC) across

all population groups were highly exposed to sodium, total sugar, and saturated fat at 1888 to 2467mg (122 to 140% UL), 53 to 87g (106 to 257% UL), and 18 to 26g (111 to 118% UL) daily intake, respectively. HLC among children were highly exposed to trans fat at 2.24g (150% UL) daily intake. HLC among the general population and women of child-bearing age (WCBA) were highly exposed to cholesterol at 322 to 357g (107 to 119% UL) daily intake. Instant noodles (19-21%), table sugars and instant coffee (11-16%), cooking oils (27-28%), pork and processed meats (16-34%), and chicken eggs (42%) were the major dietary sources for sodium, total sugar, saturated fat, trans fat, and cholesterol exposure of the general population and WCBA, respectively. Overall, high-level consumers among the general population, children below 6 years, and women of child-bearing age were highly exposed to the majority of the nutrients which means exceeding the recommended upper limit. The results of the study can aid in the development of intervention programs, health recommendations and policy guidelines in improving the nutritional status of identified vulnerable groups. Furthermore, the study could also be used in decision making and developing risk management strategies to be implemented in addressing the current issue on the high prevalence of death caused by non-communicable diseases like cardiovascular diseases and diabetes. It was recommended to conduct refined exposure assessment on priority areas for a more accurate exposure assessment and risk characterization of the Filipino population to selected nutrients.

Keywords: *exposure assessment, growth and development, sodium intake, total sugar, total fat, saturated fat, trans fat, cholesterol, non-communicable disease, food consumption, DOST-FNRI, Nutrition*

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0581

Screening level exposure assessment for selected food additives and food contaminants and nutrients and commonly consumed foods

Apilado, Ruby J., Ph.D.

Ochratoxin A (OTA) and histamine are food contaminants that are present in food as a result of poor storage conditions while glyphosate is a pesticide used in agricultural products. Exposure to high levels of OTA, glyphosate, and histamine may result in health problems. The study aimed to estimate the exposure and characterize the risk of the Philippine general population, children less than 6 years old, and women of child-bearing age (WCBA) to OTA, glyphosate, and histamine. The dietary exposure was estimated using individual food consumption data from the Philippine National Nutrition Survey (NNS) 2008 combined with permissible maximum limit (PML) for OTA, maximum residue level (MRL) for glyphosate, and no observed adverse effect level (NOAEL) for histamine set by European Union Commission Regulation No. 123/2005, Philippine Bureau of Agriculture and Fisheries Standards (BAFS), and United States Environmental Protection Agency (EPA), respectively. Risk characterization was evaluated using Margin of Exposure (MOE) approach for histamine poisoning, acceptable daily intake (ADI) for glyphosate, and permissible tolerable weekly intake (PTWI) for OTA. Results revealed that the Philippine population was minimally exposed to glyphosate at levels within established ADI in which rice (86%) and cereal grains and flours (98%) were observed to be the major contributor to dietary intake. Likewise, calculated margin of exposure for histamine (>100) signifies low risk of the Philippine population to histamine poisoning where unprocessed marine fish (55.95%) was found to be the major dietary source. However, average consumers among the general population were found to be exposed to OTA at levels exceeding the ADI from 86 - 313%. Children and WCBA groups were highly exposed to OTA mainly through consumption of bread and rolls (57%) and maize (31%), respectively. From the exposure estimates of the three contaminants, consumers particularly children and WCBA posed the highest risk to adverse effects of high exposure to OTA. It is therefore recommended to conduct exposure assessment and risk characterization using actual OTA values from cereal grains and flours to further validate the screening exposure assessment results.

Keywords: *ochratoxin A, food additives, food contaminants, food nutrients, histamine, glyphosate, dietary exposure, Filipino children, DOST-FNRI, Nutrition*

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Shelf-life study of rice-mongo based complementary blends and snacks foods

Lainez, Wenefrida N.

The FNRI-developed protein and energy dense complementary food of rice and mongo were used in feeding interventions in the communities where malnutrition is high. The Rice-Mongo based complementary and snack foods, extruded Rice-Mongo Instant Baby Food Blend (RMBF), Rice-Mongo-Sesame Ready-to-cook Baby Food Blend (RMS), Rice Mongo Curls (RMC), and Rice-Mongo Crunchies (RMCr), were packed in plain Polyethylene bags and manually packed. For the products to compete in the market and prolong its shelf-life, changes in its packaging is necessary. To estimate the shelf-life and determine the changes in sensory evaluation, chemical, microbiological and physico-chemical properties of the four (4) Rice-Mongo based complementary blends and snack foods—RMBF, RMS, RMC and RMCr. The complementary food blends (RMBF and RMS) were packed in PET/foil/PE Laminate and RMCr in PET/VMPET/PE, while Rm Curls were packed in PET/foil/PE Laminate with nitrogen flushing using autopacking machine. All samples were kept in plastic containers and stored at room temperature (26-32 °C). Periodic sensory evaluation and physico-chemical analysis, chemical and microbiological analysis were conducted to determine the quality of the product during storage. The products had a shelf-life of 10 months when packed in PET/foil/PE Laminate, except for the Rice-Mongo Crunchies (RMCr) with a shelf-life of four (4) months. All products were acceptable based on the 9 Point Hedonic Rating Scale with an average sensory score of 7 (like moderately). Statistically, based on Wilcoxon Test using SPSS v.16, there was no significant change or difference on the results of physico-chemical analysis during storage. The blends contained 4g protein and 120 Kcal (energy) per 30g serving portion. RM Curls contained 130 Kcal and 4g protein while RMCr contains 170 Kcal and 2g protein per 30g. The products are safe for human consumption up to 10 months for the ready-to-cook Rice-Mongo-Sesame Blend and Instant Rice-Mongo Blend and four (4) months for the Rice-Mongo Crunchies and Rice-Mongo Curls. This technology can compete with available foods in the market and serves as basis for technology transfer to LGUs, NGOs and entrepreneurs.

Keywords: *shelf-life, rice-mongo, complementary food blend, snack food, DOST-FNRI, food storage, Nutrition*

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Simultaneous determination of B-vitamins in selected fresh and processed food products via liquid chromatography-UV method

Biona, Kristine T.

The water-soluble vitamins of the B-complex are originally thought to be a single vitamin due to the similarity of roles they play in nutrition. The B- vitamins usually refer to thiamine, riboflavin, pyridoxine, niacin, niacinamide/nicotinamide, pantothenic acid, biotin, cyanocobalamine and folic acid. Most of the official methods of analysis for free B-Vitamins (microbiological assay) require more reagents and time for sample extraction. To address this problem, a High-Pressure Liquid Chromatography (HPLC) method for the simultaneous determination of these B-Vitamins was studied and developed. The study aimed to optimize, develop and validate a compatible extraction and chromatographic method for quantitation of the free B-Vitamins, specifically thiamine, riboflavin, pyridoxine, niacinamide and pantothenic acid present in commonly consumed fresh and processed foods. Food samples were taken from ten (10) collection points in Metropolitan Manila markets. Screening of chromatographic columns, mobile phase and extraction solution optimization were done using a HPLC in isocratic mode. The method developed was optimized and validated based on Eurachem Guide. The selected fresh and processed foods were prepared, homogenized and extracted. The extract products were analyzed using the developed method. Chromatographic separation of B-Vitamins was achieved on a reverse phase C18, 5 µm, 4.6 mm x 150 mm with UV detection at ambient temperature. Proportions of an ion-pairing reagent, acetonitrile and acetic acid at a flow rate of 1 mL/min were used as the mobile phase, in isocratic mode. Samples were extracted in acetic acid-acetonitrile-water solution and filtered through a membrane filter. The method was validated for linearity, range, limit of detection, limit of quantification, specificity, precision, accuracy and system suitability. The summary of the method validation showed that the method developed was fit for its intended purpose. Analyses of the B-Vitamins per 100 gram of edible portion of the food samples ranged

from: 0.0 – 20.11 mg for Niacinamide, 0.0 – 1.36 mg Riboflavin, 0.0 – 2.18 mg Pyridoxine, 0.0 – 1.08 mg Thiamine and 0.0 – 0.05 mg Panthothenic Acid. Extraction and chromatographic method for quantification of free B-Vitamins present in commonly consumed fresh and processed foods were developed, optimized and validated. Furthermore, the analytical method developed for free B-vitamins could be applied for routine analysis and stability studies of B-vitamins quantification in processed and fresh foods.

Keywords: *B-complex, food products, liquid chromatography-UV method, extraction, quantitation, DOST-FNRI, Nutrition*

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0584

Smoking and alcohol consumption among 4Ps members

Javier, Charina A.

The Philippines' Conditional Cash Transfer (CCT) Program known as Pantawid Pamilyang Pilipino Program (4Ps) is considered as one of the largest social safety net programs implemented in the world according to The World Bank. However, one of the criticisms of CCTs is that beneficiaries may spend the money on vices, like cigarette smoking and alcohol drinking, which are indicative of wasteful and potentially welfare-reducing use of funds. This study determined the prevalence of smoking and alcohol consumption among 4Ps members, 10 years old and above in 2013 and 2015. It also compared the proportions of current smokers and alcohol drinkers in 4Ps households against non-recipient bottom 40% households with the same eligibility characteristics. Secondary data analysis was done using the Socioeconomic, Clinical and Health and Government Program Participation Components from the 8th National Nutrition Survey (NNS) in 2013 and Updating Survey in 2015 conducted by the Department of Science and Technology-Food and Nutrition Research Institute (DOST- FNRI). Informed consent was obtained before administering the pretested structured questionnaires through a face-to-face interview. Proportions were analyzed using test of proportions. Difference-in-difference (DID) method was used to estimate the effect of 4Ps on smoking and alcohol consumption. DID is used to estimate the effect of a specific intervention or treatment by comparing the changes in outcomes over time between a population that is enrolled in a program (4Ps participants) and a population that is not (non-4Ps recipients) but with similar characteristics. There was a significant increase in the proportion of individuals from 4Ps households who never smoked among 19 years old and above from 2013 to 2015. There was also a significant decrease in the proportion of former smokers among 19 years old and above, especially males (Figure 1). However, the treatment effect on the treated is +1.2% for current smoking. This means that, there were more members who smoke tobacco attributed to 4Ps than if they did not receive the program (Table 1). In terms of alcohol consumption, there was a significant increase in the proportion of lifetime abstainers particularly 19 years old and above females, proportion of former drinkers for all age groups, and a significant decrease in the proportion of current drinkers (Figure 2). The treatment effect on the treated is -1.6% for current alcohol drinking. This means that, there were fewer members who drank alcohol attributed to 4Ps than if they did not receive the program (Table 2). Based on the study variables, a negative impact of 4Ps in the reduction of current smokers and a positive impact in the reduction of alcohol drinking among 4Ps recipients were noted. Emphasis on the ill effects of smoking and alcohol consumption during Youth Development Sessions (YDS) and Family Development Sessions (FDS) conducted for 4Ps beneficiaries should be underscored to encourage quitting or never start smoking and alcohol intake among household members.

Keywords: *smoking, alcohol consumption, 4Ps, conditional cash transfer, national nutrition survey, household, DOST-FNRI, Nutrition*

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SNP frequencies and their potential association with intakes of brown and white rice and blood glucose levels among selected government employees in Bicutan, Taguig City

Timoteo, Vanessa Joy A.

According to the International Diabetes Federation, the Philippines is an emerging hotspot for diabetes. A national prevalence of 5.4% has been reported in the 8th National Nutrition Survey. Notwithstanding the contribution of lifestyle-related factors, several single nucleotide polymorphisms (SNPs) and genes were shown to be involved in the pathophysiology of type 2 diabetes. This study determined the frequencies of SNPs associated with type 2 diabetes and the potential association of these SNPs with intakes of rice, blood glucose levels, lipid profile, anthropometric indices, and other clinical measurements among selected government employees in Bicutan, Taguig City. A total of 105 employees (M/F: 26/79) from the Department of Science and Technology and Taguig City University, aged 30-64 years old, were genotyped for the SNPs reported to be associated with type 2 diabetes (TCF7L2 rs7903146, rs12255372, rs11196205; GLUT4/SLC2A4 rs121434581; PPARG rs1801282, rs1805192; ADIPOQ rs17846866; CDKN2A/B rs10811661). The group was further screened based on their blood glucose levels, randomized, and enrolled in a dietary intervention utilizing optimized RC160 brown rice and RC160 white rice for the intervention (n=36) and control (n=38) group, respectively. On the basis of their usual rice intakes, cooked rice was delivered to participants during office days while raw rice was distributed for weekends for 6 months. Monthly monitoring of fasting/pre-prandial blood glucose, post-prandial blood glucose, weight, body mass index, waist and hip circumferences, waist-hip ratio, and blood pressure of the participants was conducted. Baseline, midline, and endline measures of glycosylated hemoglobin and lipid profile were also taken. Changes were also compared based on the SNP genotypes of participants.

Keywords: *SNP genotypes, Type 2 diabetes mellitus, health status, single nucleotide polymorphism, government workers, DOST-FNRI, blood glucose, dietary intervention, Nutrition*

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Sprinkle your way to optimum nutrition with the enhanced MGM 15 powder

Saises, Marcela C.

The latest National Nutrition Survey conducted by the Department of Science and Technology- Food and Nutrition Research Institute (DOST-FNRI, NNS, 2015), revealed that anemia and stunting are still prevalent among Filipino children. In 2013, DOST-FNRI started developing a multi-nutrient growth mix (MGM) powder with 6 to 9 micronutrients specifically formulated for children aged 6 months to 5 years. The DOST-FNRI rice-mongo blend complementary food (BigMoTM) sprinkled with MGM 9 powder was found to be efficacious in improving the nutritional status of children 6 months to 3 years old as evidenced by the study conducted by Goyena et al. (2018). The study aimed to improve the existing MGM powder with nine (9) micronutrients by adding six (6) more important micronutrients to further enhance its nutritional value. The study also conducted stability test, retention in some complementary foods and common household recipes, and acceptability tests for the MGM among 15 DOST-FNRI sensory panelists. The enhanced 15 micronutrient powder underwent thorough research using extrusion and mixing process to come up with an optimized and standardized formulation. The physico-chemical (color and moisture), nutrient (iron, zinc, iodine, selenium, copper and vitamins A, B1, B2, B3, B6, B9, B12, C, D, and E), microbiological and sensory properties of the product were monitored for 12 months or until unacceptable results were observed. Two (2) grams of MGM 15 was sprinkled to a single serving of commonly consumed foods or household recipes and the acceptability of the fortified food was evaluated by DOST-FNRI sensory panelists. A daily intake of one (1) serving of food containing 2g sachet of MGM 15 powder provided approximately one-fourth (1/4) to one-third (1/3) of the 15 important micronutrients based on the Philippines Dietary Reference Intakes (PDRI 2015) for children aged six months to 5 years. The food products containing MGM 15 were rated as “like moderately” to “like very much” by panelists. The micronutrients present in the enhanced MGM powder, together with the color and moisture values were still within the acceptable limits after the storage period. Microbiological test showed that the powder is safe for human consumption. The laboratory scale production of MGM with 15 micronutrients was found to be technically feasible. The product is

safe for human consumption, acceptable to sensory panelists, and is stable for 12 months when stored properly at room temperature. It is recommended that studies on efficacy, pilot scale production and consumer acceptability be conducted to facilitate licensing of the technology and commercialization.

Keywords: *enhanced MGM 15powder, multi-nutrient growth mix, rice-monggo blend, complementary food blend, DOST-FNRI, Nutrition*

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0587

A survey on the nutritional status, lifestyle practices, and stress risks factors of selected Filipino working adults
Angeles-Agdeppa, Imelda, Ph.D.

Developing nations like the Philippines need to break the cycle of poor health and nutrition; work-related stress; and productivity as these affect or influence productivity. This study assessed the nutritional status, food intake, lifestyle practices and stress levels of selected Filipino working adults. This is a cross-sectional survey that involved 1264 selected working adults aged 19 to 59 years old from randomly selected work sectors: business process outsourcing (BPO), factory, hospitality and food service, administration, sales, and healthcare. BMI was calculated using weight and height measurements. Usual food intake was computed from a 2 day non-consecutive 24 hr recall. Dietary diversity questionnaire was used to assess types and frequency of foods consumed. Stress level was collected using the Perceived Stress Questionnaire. Results of the study showed that overweight and obesity prevalence was 47.15%. The respondents did not meet the daily Estimated Energy Requirement. The percentage contribution to total energy of fats (58%) and protein (34%) were excessively high. Consumption of fruits and vegetables was 30% to 40% of the Recommended Nutrient Intake. Salt intake was 52% above the Adequate Intake. The prevalence of nutrient inadequacy were: iron (99%), folate (97.9%), riboflavin (95.8%), calcium (94.7%), vitamin C (87.3%), and thiamin (76.6%). Current smokers were 22%, 71% drank alcoholic beverages, and 59% were physically inactive. Results of the Perceived Stress Scale indicated that 8 in 10 respondents (82.04%) had either moderate to high perceived stress, with the sales sector having the highest percentage (86.54%). Psychological problems like stress (54.5%) and physical elements like noise, heat/cold, radiation and vibration (52.3%) were the most claimed health and safety risks in the workplace. Overweight and obesity, inadequate and poor quality food intake, undesirable lifestyle practices and high stress level are common among the working adults. The workplace is an effective venue to implement the availability of more nutrient-dense foods, fruits and vegetables; impose physical activity and anti-smoking policies. Improving work environment to prevent physical stressors must be a prime concern of organizations for better productivity.

Keywords: *nutritional status, lifestyle practices, stress levels, Filipino working adults, recommended nutrient intake, Nutrition*

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0588

Tabang MARAWI (malnutrition alleviation and health restoration through after-war interventions)
Dorado, Julieta B.

Nutrition is vital to children's survival, growth and development. However, the occurrence of a man-made disaster can disrupt children in reaching their optimal growth and development, or may even worsen the malnutrition problem, like in the case of children in Marawi City, Lanao del Sur. The project aimed to contribute in improving the nutritional status of internally displaced households with young children through a food and nutrition intervention during the recovery phase of a man-made disaster. A 120-day complementary feeding for children

6-35 years old was implemented using rice-mongo based complementary foods produced by the DOST-FNRI's adoptors in Mindanao, along with nutrition education among their mothers/caregivers. Weight and height/length of children were measured, and pre- and post-tests were administered to mothers/caregivers by trained research assistants-nutritionists before and after the intervention. Children aged six to 35 months old (n=225), regardless of their nutritional status, participated in the complementary feeding. Results showed that the number of children with normal nutritional status remained after the feeding, and there was a significant change in the weights of children. The mean weight and height of children-participants significantly increased after the feeding ($p=0.00$, $p=0.00$). No significant change was observed in the knowledge of mothers/caregivers after the nutrition education sessions despite their high percentage of attendance during sessions. Appropriate complementary foods should be given priority to prevent growth faltering caused by inadequate feeding practices. Recommended complementary feeding practices should be implemented for longer period to attain more positive effects on the nutritional status of children. The complementary foods should be included in the family food packs distributed during emergencies. Policies on nutrition management in emergencies and disasters should give emphasis on the concern for the quality and quantity of food packs provided to affected households.

Keywords: *Marawi, malnutrition, health status, after-war, interventions, complementary feeding, DOST-FNRI, Nutrition*

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0589

Technology transfer and production of complementary blends and snack foods

Tobias, Joyce R.

In support of the Millennium Development Goal (MDG) of reducing the prevalence of underweight among 0-5 year old children to 13.6% by 2015, the Malnutrition Reduction Program (MRP) is being implemented as an expansion of the DOST-FNRI Intervention to address malnutrition in all regions of the country. The feeding intervention was field-tested in 2011 in Antique, Iloilo, Occidental Mindoro and Leyte where the prevalence of malnutrition among 0-5 year old children was high. With the positive results of the field testing, FNRI-DOST continued the same strategy under the MRP. In 2012 funds from DOST-MRP was granted to FNRI for the procurement of equipment to produce the FNRI-developed Rice-Mongo (RM) complementary foods. The program identified 16 beneficiaries in strategic areas in the country. In 2013 equipment grants were given to eight (8) Local Government Units (LGUs), State Universities and Colleges (SUCs) and a private foundation. Likewise, two (2) entrepreneurs also adopted the technology, purchased the equipment and commercialized the FNRI RM complementary food. In 2014, MRP Phase 2 provided equipment and transferred the technology to another eight (8) beneficiaries composed of LGUs and SUCs who expressed intention to commercialize the products and conduct feeding programs in their areas. The main objective of the project was to facilitate the adoption and sustain the production and commercialization of the FNRI developed nutritious complementary foods by providing basic equipment to make the complementary food readily available in all regions. The eight (8) remaining LGUs/SUCs beneficiaries for the equipment grants were assessed for the readiness of their production plant. Upon compliance with the requirements, the equipment were delivered and installed. Debugging/commissioning of the production equipment, technology transfer and training on producing the complementary food were also undertaken. Seven (7) LGUs are one (1) SUC in strategic areas of the country with high prevalence of malnutrition and with strong commitment to the program were granted equipment for producing the FNRI-developed RM complementary food. Trainings on the use of the equipment for the production of complementary foods were conducted. Provision of equipment for the production of complementary foods can enhance the production, commercialization and distribution of the complementary foods. Encouraging LGUs, NGOs and entrepreneurs to adopt and commercialize the FNRI-developed complementary foods is recommended. More promotional activities among LGUs and private entrepreneurs should be conducted to increase awareness on the benefits of the FNRI developed complementary foods.

Keywords: *malnutrition reduction program, technology transfer, complementary food blend, snack food, rice-mongo, local government units, DOST-FNRI, Nutrition*

**Updating of the Philippine Food Composition Tables (FCT) using indirect method:
Phase 1: total dietary fiber, total sugars, sodium, available carbohydrate and energy**
Rodriguez, Regina G.

The nutrient composition of foods is important in areas of nutrition and health, and other related disciplines such as food science, agriculture and trade. In the country, the Philippine Food Composition Tables (FCT) 1997 is the current publication of the nutrient data of foods. However, this has no data on nutrients with health implications, such as total dietary fiber (TDF), sugar and sodium (Na). Direct method which involves chemical analysis is a reliable method for data generation, but when analytical resources are limited, indirect method which involves gathering data from literatures, borrowing from other FCTs or databases or doing recipe calculation is a practical alternative. The study aimed to update the Philippine FCT through the addition of new food components using indirect method. Specifically, the study was conducted to compile TDF, total sugars and Na data of the 1997 Philippine FCT food items; compute the available carbohydrate and energy; and prepare a database with these new food components. Food items were food matched based on INFOODS Food Matching Guidelines Version 1.2. TDF, total sugars and Na data were borrowed from foreign databases, and adapted to the water content of Philippine FCT food items. Combination foods with no exact food match were calculated following the recipe calculation module under the INFOODS Compilation Tool. Available carbohydrate and energy were computed from compiled TDF data. A total of 1246 food composition data were generated for TDF, 1163 for total sugars and 1298 for Na through data borrowing and recipe calculation. Available carbohydrate and energy were calculated for 1246 food items. These data were compiled in a user database. Continuous improvement of the Philippine FCT through the addition of new food components and use of analyzed data for staple foods is necessary to meet the local and global demands for food composition data which is useful in nutrition, health and other related areas.

Keywords: *food composition table, indirect method, total dietary fiber, total sugar, sodium, carbohydrate, DOST-FNRI, Nutrition*

**Utilization of mangosteen peels and coffee pulp powder for the development of
functional food products for women of reproductive age**
Arcangel, Trinidad II T.

Women of reproductive age (WRA) refers to all women aged 15-49 years old. It is the time when a woman can become pregnant and bear a child. Women of Reproductive Age (WRA) are considered vulnerable group because of the health issues that occur during pregnancy and lactation. For WRA, pregnant, and lactating women, essential nutrients must be provided as this will contribute not only to their health but also to their babies. The Department of Science and Technology-Food and Nutrition Research Institute (DOST-FNRI) previously developed powders with high dietary fiber and antioxidant properties from mangosteen peel and coffee pulp, typically considered processing wastes in the production of coffee and mangosteen-based products, through enzyme-assisted extraction. This study utilized these powders in the development of food products for WRA. The general objective of the study is to generate a technology for the production of food products for women of reproductive age utilizing mangosteen peels and coffee pulp powder. Specifically, it aimed to (1) develop food products using coffee pulp and mangosteen peels powder; (2) evaluate the physical, chemical, microbiological, and sensory properties of the developed food products; and (3) determine the shelf-life of the food products. The activities conducted in the study were: trial formulations to come up with acceptable products, optimization runs to determine optimum formulation of products, standardization runs to determine the repeatability of the process, evaluation of products in terms of physico-chemical, chemical, microbiological and sensory properties, and

estimation of shelf-life of 4 product prototypes through actual shelf-life evaluation. Formulation of four (4) food products were optimized and standardized, namely: chocolate oatmeal cookies and cereal flakes, both with mangosteen peel powder, and burger patties and choco pancake premix, both with coffee pulp powder. The products contain less than 5g of dietary fiber per serving. The products were rated “like moderately” to “like very much” by DOST-FNRI in-house sensory panelists. Shelf life study showed that chocolate pancake mix packed in metallized polyethylene (PET/VMPET/PE) pouches and stored at 30-35°C was stable for 10 months. Burger patties packed in 32oz round microwavable sealed containers and stored at freezer temperature of less than -4°C was stable for 9-10 months. Chocolate chip cookies packed in Kraft brown paper stand up pouches with metallized polyethylene lining (Kraft/PET/VMPET/PE) and stored at 30-35°C was stable for 8 months. Cereal flakes packed in aluminum foil laminated PET film, stored at 30-35°C was stable for 9 months. The microbial load of samples was within the acceptable limits until the end of shelf-life. The study showed that incorporation of coffee pulp powder in burger patty and chocolate pancake premix and mangosteen peel powder in cereal flakes and chocolate chip oatmeal cookies for WRA are feasible without compromising sensory acceptability, microbial safety and product shelf-life. The developed products can be used as alternative healthy food products for WRA. It is recommended that products be subjected to clinical trial studies, *in vitro* and *in vivo* methods, and other intervention studies on biomarkers and mechanisms for the establishment of the health benefits and functional claims. Pilot-scale production of the developed products is also recommended prior to commercialization.

Keywords: mangosteen peels, coffee pulp powder, functional food products, Filipino women, reproductive age, dietary fiber, antioxidant property, DOST-FNRI, Nutrition

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0592

Validation of method for determination of zinc concentration in serum: tool in assessing zinc status of the population *de Leon, Marco P.*

Zinc is an important micronutrient since it is involved in growth, metabolism and hormone regulation. Early reports associated zinc deficiency with dwarfism, delayed sexual maturation and anemia. It is also suspected that poor families are vulnerable to zinc deficiency. The interest in determining the zinc status among Filipino is increasing since it has impact on the population nutriture. A reliable analytical method is essential to address this need. This project validated an analytical method in determining zinc in serum using atomic absorption spectrophotometer (AAS) that is reliable and accurate. Serum samples and reference materials were directly aspirated using 0.1N hydrochloric acid and n-butanol as sample diluent in an Agilent FS-240 Atomic Absorption Spectrophotometer. Following the EURACHEM guidelines on method validation, the experimental parameters such as linearity, method sensitivity (limit of detection LOD and limit of quantitation LOQ), accuracy and precision by reproducibility and repeatability were performed. The zinc level in serum is reported as microgram per deciliter (µg/dL). Results showed that the sensitivity parameters LOD and LOQ were 2.6 and 8.7 µg/dL, respectively. The standard calibration curve with the range of 25 to 500 µg/dL was found to be linear ($r=0.9990$). The accuracy of the analytical method was 97.75% or 17.02 ± 0.24 µg/dL using SeronormTM 1598A with the target value of $17.4.2 \pm 0.82$ µg/dL. The repeatable precision resulted to HorRat* value of 0.002. The reproducibility or 7 days analysis of pooled serum gave an acceptable HorRat* value of 0.009 as well for the SeronormTM 1598A which is 6.8×10^{-4} . The validated method was found fit for the purpose and therefore, is suitable to determine zinc concentration in serum since most of the acceptance criteria for method validation were met. *HorRat or Horwitz ratio describes the acceptability in terms of precision (reproducibility) of the analytical method (acceptable HorRat <2.0).

Keywords: zinc concentration, serum, zinc status, micronutrient deficiency, method validation and assessment, DOST-FNRI, Nutrition

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Validity and reproducibility of a semi-quantitative food frequency questionnaire to estimate sodium intake in a selected group of adult Filipinos

Santos, Noelle Lyn C., RND, MSPH

Valid dietary assessment methods are crucial in establishing correct associations between food intake and disease development. The present study examined the validity and reproducibility of a semi-quantitative food frequency questionnaire (SQFFQ) used to estimate sodium intake. Validity was assessed by comparing the SQFFQ with 24-hour urinary sodium (24hrUrNa) and three-day nonconsecutive dietary record (3-day DR). Reproducibility of the SQFFQ was determined through test-retest method with an interval of 30-days between each administration. Repeated measures ANOVA followed by paired t-test with Bonferroni adjustments, Spearman's tests, and paired t-test were used in the statistical analysis of the unadjusted and energy-adjusted sodium intakes. A total of 76 Filipino adult participants were recruited in the study. Even with adjustments applied, validity between SQFFQ and 24hrUrNa was poor ($r=0.17$) while relative validity between the SQFFQ and 3-day DR ($r=0.22$) was acceptable although higher sodium intakes were recorded in the SQFFQ ($p<0.0001$). For reproducibility, statistically significant correlation coefficient between food groups ranged from 0.32 (spices and condiments) to 0.65 (cereals and meat products). Statistically significant mean difference of seven out of the 12 food groups between two points of SQFFQ administration were also observed. The validity of the SQFFQ was considerably poor when compared against the 24hrUrNa. An acceptable relative validity ($r=0.20$ based from Lombard *et al.*, 2015) with comparable results to other studies was revealed between comparison of the SQFFQ and 3-day DR. Reproducibility of the SQFFQ is within the acceptable outcome. Future studies can further improve the food item listing and order of food items of the developed SQFFQ and address limitations on homogenous setting and sample size. This study showed the importance of performing evaluation studies before use of any dietary assessment tool for epidemiological studies.

Keywords: *dietary assessment, food intake, disease development, SQFFQ, sodium intake, Filipino adults, DOST-FNRI, Nutrition*

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Validity of household dietary diversity score as a measure of food insecurity among households in Lucena City, Quezon

Arias, Frances Pola S.

Food security is a multifaceted issue experienced by nations worldwide. A trend currently being explored in recent studies in measuring food security at the micro level is the Dietary Diversity Score (DDS). Household Dietary Diversity Score (HDDS), a type of DDS, obtains a snapshot of the economic ability of a household, making it an effective food insecurity indicator. The objective of this study was to assess the validity of the HDDS as a tool for measuring food insecurity. The study employed a cross-sectional analytic design with 368 study households in Lucena City, Quezon Philippines. Household Food Insecurity Access Scale (HFIAS) and Household Mean Adequacy Ratio (HHMAR), being two of the most frequently used methods in measuring household food insecurity, were used as reference standards to assess the validity of the HDDS in identifying food insecure households. Receiver Operating Curve (ROC) Analysis was done to determine the appropriate HDDS cut-off for identifying food insecure households. The areas under the curve (AUC) obtained (0.618, 0.70, 0.701, 0.743), classified HDDS as a fair indicator of food insecurity. HDDS of 6 was identified as the optimal score when evaluating food insecurity with consideration of sensitivity and specificity. In this study, HDDS was proven to be a valid measure of food insecurity. It shows the great potential of this quick assessment tool in identifying population-at-risk, which is crucial in the design of a timely and appropriate intervention to alleviate food insecurity and other nutrition and health-related problems which may arise.

Keywords: *food security, dietary diversity score, nutrition, household dietary diversity, dietary assessment, Nutrition*

Visual color evaluation is more than what meets the eye: building-up competency on color analysis using trained sensory panellists

Malibiran, Claire S.

Consumers often judge the quality of food by its color and appearance. Color perceived by the eyes is useful in determining food quality. Color can give important information when measured properly. Color of an object depends upon the spectral composition of the incident light and the spectral reflectance of the object. Light waves reflected by an object enter the eye and fall on the retina. The retina contains receptor cells, known as rods and cones, which convert this light energy into neural impulses that travel via the optic nerve to the brain. Psychologically, brains have short memory retention; our eye can experience strain or fatigue and adaptation and generally, judge's individual experiences can be the big source of variability in the experiment. These limitations can be improved by establishing standard protocol for using human as instrument in sensory evaluation. The project aimed to build the capability of FNRI Sensory Evaluation Laboratory (SEL) on visual color evaluation. Candidates were screened for color blindness using Ishihara plates. The condition for testing was controlled lighting and neutral grey surrounding. Geometric conditions for illumination and viewing were also considered. Visual and instrument correlation using CIELab units L^* , a^* and b^* were plotted against the visual ratings. Using samples with spike of quinoline yellow (CAS No. 8004-92-0) and grey color (CAS No. 7782-42-5), the selected panelists were able to rank increasing yellowness in liquid samples and increasing greyness in powder sample. Significant result of ranking test ($\alpha=0.05$) showed that the panelists have a discriminatory ability with changing concentration of grey and yellow stimuli. Figure 3 displays color measured by spectrophotometer for a) yellow and b) grey. The CIELAB color units a^*b^* and L^* for increasing intensity of grey and yellow were used to illustrate that visual rating changes as concentration of spike increases and $L^*a^*b^*$ value changes. The color coordinates with good correlation is b^* value for yellow ($r=0.99$). b^* value is a measure of yellowness (the higher the b^* value, the yellower the specimen), but this is not true for grey. Ratings for grey are strongly correlated with readings of L^* or the measure of whiteness. Comparison of 2016 selected panel and 2017 selected panel is showed in Figure 3a. Both panels agreed with the intensity of yellow color of Y5 sample with a rate of 8.4. However, there is a poor agreement between the panels for the samples Y7 and Y8. The panel consisting of the old selected panelists gave lower scores than the other panel. Compared to the 2016 panel, the newly selected panelists who were trained for color analysis were able to clearly discriminate the samples as seen by the wider spread of scores for each sample. The experiment was able to establish the conditions for testing, to specify the qualifications of panelists and to verify the performance of panelists using actual food samples. It was inferred that when test conditions are in place and sensory panelists were trained, the panel was able to perform as objective instrument in evaluating the color quality of food products. FNRI-SEL pool of trained panelists and its capability to conduct color analysis were developed and will be beneficial to many studies such as interrelationship between color intensity, flavor, consumer perception and acceptability. It has application in the developments of natural colorants in terms of establishing color specification and establishing stability of colorants. It is recommended that the result of color analysis to be consistent which will be achieved through programs of training and method verification. The pool of trained panelists can be involved in future studies about the influence of color in consumer perception and decision making. The limitation of spectrophotometer to describe color characteristics maybe supplemented with the use of other instruments.

Keywords: *visual color, color analysis, trained sensory panelist, color blindness, sensory evaluation, illumination, color difference, pigment, color rating, DOST-FNRI, Nutrition*

Is vitamin A supplementation enough?: factors affecting vitamin A status of Filipino children 12-59 months old

Javier, Charina A.

Vitamin A deficiency (VAD) when severe may cause visual impairment or increase the risk for illnesses and mortality due to childhood infections. Improving the vitamin A status of children through supplementation enhances resistance to diseases. The Department of Health (DOH) provides vitamin A supplements twice a year to children 12-59 months old through the Garantisadong Pambata Program. However, the prevalence of VAD among preschool children aged 6-59 months was still considered a “severe” public health problem at 20.4% (NNS, 2013). This study determined the association of vitamin A supplementation (VAS) schedule, immunization, reported illness and dietary intake of vitamin A-rich foods on vitamin A status of Filipino children 12-59 months old. Secondary data analysis was done using the 2013 National Nutrition Survey data which included socio-demographic characteristics, serum retinol and haemoglobin analysis, dietary intake using individual 24-hour food recall, participation in selected government programs and reported illness in the past week prior to the survey. Test of means and logistic regression analysis were performed to determine predictors of vitamin A status. Majority (86.2%) of the children received VAS at least once in the past 12 months prior to the survey. Mean serum retinol of children did not significantly differ between those who did not receive VAS and those who received once or twice in the past 12 months. Significantly higher mean serum retinol was noted among children who were fully immunized, participated in deworming, and with higher intake of vitamin A-rich foods such as liver, green leafy vegetables and fats and oils, belonging to higher wealth status and with mothers who have higher educational attainment and lesser number of children below 5 years old in the household. The total vitamin A intake from the diet was significantly higher among children with normal serum retinol (392.4 mcgRE) compared with those who were vitamin A deficient (309.5 mcgRE). Immunization, deworming and appropriate complementary foods are important factors affecting Vitamin A status of preschool children. VAS is not significantly associated with serum retinol level of the children. It is recommended that immunization with basic vaccines such as BCG, OPV, DPT, measles and Hepa B vaccines and appropriate complementary foods that include vitamin A-rich foods should be provided to complement the semi-annual VAS to improve the Vitamin A status of children.

Keywords: *vitamin A deficiency, supplement, Filipino children, DOST-FNRI, Nutrition*

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PHYSICS

Air particulate matter, black carbon, and elemental concentrations and source apportionment in Calaca, Batangas

Bautista, VII, Angel T. , Yee, Jhon Robin , Punzalan, Jervée M. , Magtaas, Remjohn Aron H. , Tuso, Christian Amor T., Pabroa, Preciosa Corazon B.

Urbanization is among the leading causes of increased air particulate pollution in Southeast Asia. This situation puts Calaca, Batangas – a first-class rural municipality transitioning to a renowned industrial hub – at risk of the harmful effects of air particulate matter (PM). To determine the composition and possible sources of air pollution in Calaca, ambient air particulate samples were collected from December 2018 to March 2019. A total of 52 filter samples, 26 each from the PM_{10-2.5} and PM_{2.5} fractions, were collected and analyzed for PM₁₀, PM_{2.5}, multiwavelength black carbon (BC), and elemental concentrations. Average PM₁₀ and PM_{2.5} mass concentrations were $34.01 \pm 12.03 \mu\text{g}/\text{m}^3$ and $10.62 \pm 4.86 \mu\text{g}/\text{m}^3$, respectively. These concentrations comply with the annual National Ambient Air Quality Guideline Values (NAAQGV) of the Philippine Clean Air Act of 1999 but exceed the prescribed guideline value of the World Health Organization (WHO). Results from energy-dispersive x-ray

fluorescence (EDXRF) spectroscopy, a nuclear analytical technique, showed 14 elements present in the PM_{2.5} fraction – namely S, Si, K, Fe, Ca, Al, Cl, Mn, Na, Ti, Zn, Ni, Sc, and Cu arranged in decreasing average concentrations. Average biomass (BBC) and vehicular black carbon (VBC) concentrations from multiwavelength analysis were $0.7 \pm 0.3 \mu\text{g}/\text{m}^3$ and $0.7 \pm 0.6 \mu\text{g}/\text{m}^3$, respectively. By reconstructing masses using these data, contributions of different sources of air PM were determined to be salt (0.54%), soil (11.31%), (NH₄)₂SO₄ (61.15%), VBC (6.33%), and BBC (6.28%). Conditional probability function (CPF) determined that sources of PM are likely located at the 30–60° and 180° directions from the sampling site. This study provides baseline data for the chemical composition and source identification of PM in Calaca, Batangas.

Keywords: Air pollution, CPF, Philippines, PM_{2.5}, MABI, XRF, Physics

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0598

Assessment of the effect of gamma irradiation on total carotenoid content of *Mangifera indica* L. cv. Carabao puree using Raman microspectroscopy

De Luna, Marie Josephine M. , Betos, Christy Mae T. , Garcia, Jerome Carlo P.

It has been established that the use of gamma radiation is effective in prolonging the shelf life and improving food safety of processed products. However, ionizing radiation poses the risk of affecting the product's quality including its vitamin content. In this research, Raman microspectroscopy was used to assess the effects of gamma radiation on the total carotenoid content of *Mangifera indica* L. cv. Carabao puree. The pulps of Carabao mangoes collected from a local farm in Bataan, Philippines were homogenized and irradiated using various doses ranging from 0.2 to 15kGy at the Cobalt 60 Multi-Purpose Irradiation Facility of the DOST-PNRI. The Raman spectra of the mango puree samples were obtained, showing the characteristic carotenoid peaks at 1156 cm⁻¹ and 1519 cm⁻¹. The integrated areas of these peaks were used in quantifying the relative changes in carotenoid levels with increasing dose. Results show that radiation doses of up to 1 kGy have no significant effect on the total carotenoid content of mango purees. However, doses higher than 1 kGy resulted in a significant decrease of the total carotenoid content. There is a good correlation between the gamma radiation dose and the decrease in the total carotenoid content. The results of this study will be useful in the optimization and standardization of the gamma irradiation treatment for mango puree.

Keywords: Carotenoid, Gamma irradiation, Mango, Raman spectroscopy, Physics

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0599

Capacity building in nuclear science and technology in the Philippines through the use and operation of small neutron sources for education, training, and research

Guillermo, Neil Raymund D. , Saligan, Pablo P. , Olivares, Ryan U. , Romallosa, Kristine Marie D. , Jecong, Julius Federico M. , Hila, Frederick C. , Ramo, Ma. Elina Salvacion Kristina V. , Astronomo, Alvie A. , Dingle, Cheri Anne M. , Bautista, Unico A.

For the past three decades, the Philippines' expertise in nuclear science and technology (S&T) has diminished resulting from the shutdown of the Philippine Research Reactor-1 (PRR-1) in the 1980s. In addition, the mothballed Bataan Nuclear Power Plant (BNPP) and the low confidence in nuclear technologies led to the non-prioritization of nuclear science in the country. Consequently, new nuclear facilities were never re-introduced, and the transfer of knowledge declined and nuclear applications were limited to radiation and isotopic studies. If the current initiatives of the Philippines in the use of nuclear energy will push through, the country will need

competent human resources who will be responsible for building the nuclear facilities and their safe operation. To augment the declined nuclear expertise in the country, the DOST-PNRI implemented capacity building activities to reestablish and sustain knowledge and expertise in nuclear S&T in the country. Activities that were implemented include the development of training materials for undergraduate students and the development of research facility using isotopic neutron sources. This paper discusses the capacity building strategies implemented and their significant outputs, as well as plans for sustainability and continual development.

Keywords: *Capacity building, Isotopic neutron source, Neutron laboratory, Philippines, Physics*

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0600

Community-Led volcano alert level actions: the case of Barangay Abelo, San Nicolas, Baangas

Sanico, Lucille Rose D. , Salcedo, Joan C. , Villegas, Ma. Mylene M. , Tungcul, Lyca Marie A. , Doloiras, Dynie F., Lamela, Ruben C.

This study aims to identify action plans of the Barangay Disaster Risk Reduction and Management Committee (BDRRMC) for Taal Volcano Alert Levels. Based on historical records, San Nicolas (also known as Old Taal) was affected by major eruptions of Taal Volcano particularly in 1754. One of the prone barangays in the area is Barangay Abelo, which is 11 kilometers from the main crater of the volcano. Part of their Disaster Risk Reduction Plan is the formulation of actions per Taal Volcano Alert Levels. This will guide the community to make right decisions, during emergencies to reduce damage to properties and loss of lives. Through focus group discussions, community officials were able to develop their preliminary action plan per alert levels scenario. They have also identified existing resources and revalidated the BDRRMC Structure, Roles and Responsibility. The results of this study are expected to be integrated with their enhanced Barangay Disaster Risk Reduction Management (BDRRM) Plan specific for volcanic event.

Keywords: *Volcano Alert Levels, Disaster risk reduction plan, Volcano scenario, Taal Volcano, Physics*

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0601

Criticality safety assessment of Philippine Research Reactor-1 fresh fuel storage vault

Astronomo, Alvie , Gatchalian, Ronald Daryll E.

The PNRI Philippine Research Reactor-1 (PRR-1) is in possession of fresh low-enriched nuclear fuel that has been in dry storage for 30 years. Recently, a storage vault was constructed to further secure these fresh fuel rods. As a nuclear facility, it is essential that the storage remains subcritical with an effective neutron multiplication factor, $k_{eff} < 1$, to ensure that fission chain reaction cannot be sustained and the possibility of inadvertent criticality is remote even in worst case scenarios. To determine the subcriticality of the system, we prepared a detailed model of the fuel storage vault containing 15 unirradiated TRIGA fuel rods. The model was used to calculate the k_{eff} of the system with MCNP5v.1.6, a Monte Carlo radiation transport code. Calculations were performed with a criticality calculation control of 1,100 cycles with nominally 10^4 neutrons per cycle. Results show that the system has a k_{eff} of $0.06879 \pm 2.05 \times 10^{-4}$ at the 99% confidence level. We also performed an accident analysis assuming that the storage vault was completely inundated. This accident scenario resulted in a k_{eff} of $0.37821 \pm 4.75 \times 10^{-4}$ at the 99% confidence level. The increase in k_{eff} is due to addition of water in the system that can reflect and moderate neutrons more effectively than air. Our results show that in all normal and accident conditions, the facility will remain deeply subcritical and criticality accident is highly improbable. The substantial safety margin is due to measures such as restrictions in the shape and dimension of the system to a favorable geometry, limiting the mass

of fissile material, and controlling the moderation of the system. These demonstrate that the design of the PRR-1 fresh fuel storage vault is criticality safe.

Keywords: *Nuclear criticality safety, Monte Carlo simulation, Neutron multiplication factor, Physics*

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0602

Dependence of response of active personal dosimeters on different calibration methods

Romallosa, Kristine Marie , Fernandez, Jhenize Carvina , Amparado, Jhon Ray , Garalde, Ave Ann Nikolle M., Pineda, Camille U.

Active personal dosimeters (APDs) are used by occupationally exposed workers to measure the dose equivalent of radiation that they were exposed to. These dosimeters need to be calibrated to ensure that the dosimeters are accurate. There are two methods for which the APD can be calibrated: the accumulative method and the staggered method. However, there is no recommendation on which of the two calibration methods is most suitable for use. This study aimed to investigate the dependence of the response of APD with various detectors on the two calibration methods. In this work, APDs were irradiated to different dose values of 0.5, 0.1, and 1.5 mSv using accumulative method and staggered method at the Secondary Standard Dosimetry Laboratory – Radiation Protection Services Section (SSDL-RPSS) of the Department of Science and Technology – Philippine Nuclear Research Institute (DOST-PNRI). The results showed that APDs have better response in the staggered method compared to accumulative method and best reflects the practical conditions in the use of the APDs in the field. The results of the study could, therefore, be a basis in developing a more standardized protocol and procedure for the calibration of APDs.

Keywords: *Active personal dosimeter, Calibration, Detector, Response, Physics*

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0603

Development and validation of a Serpent-2 model for the former 3 MW TRIGA core configuration of the Philippine Research Reactor-1

Guillermo, Neil Raymund D. , Romallosa, Kristine Marie D. , Gatchalian, Ronald Daryll E. , Astronomo, Alvie A. , Dingle, Cheri Anne M. , Hila, Frederick C. , Jecong, Julius Federico M.

The 3 MW TRIGA (Training, Research, Isotopes, General Atomics) Philippine Research Reactor-1 (PRR-1) at the DOST-PNRI achieved its first criticality on 08 Mar 1988 after its successful upgrade from a plate-type reactor. However, due to unresolved technical problems discovered weeks after the upgrade, the PRR-1 was considered inoperable and has been in shutdown status since then. The slightly irradiated TRIGA fuel rods of the PRR-1 are currently in an interim storage tank and are planned to be utilized in a subcritical reactor assembly. As part of the project to reuse the fuels, simulation models for both present and proposed configurations are important. In this work, we present the complete model of the former configuration of PRR-1 with 115 TRIGA fuel rods developed with the Serpent Monte Carlo code version 2 for simulation of criticality and neutronic analysis. The model of the TRIGA fuel rods was validated in the fresh fuel configuration through the benchmark analysis described in the 1988 reactor criticality report. The effective multiplication factors from the Serpent-2 simulation ($k_{eff} = 1.0690 \pm 0.0012$) and measured value of 1.0661 have been found to agree with a deviation of 259 pcm. Neutron flux and fission power distribution simulations using the same reactor configuration were also presented to serve as reference for future burn up calculations and fuel characterization.

Keywords: *Flux distribution, Monte Carlo, Serpent 2, TRIGA research reactor, Physics*

Development of the Philippine National Dose Registry as a tool for the tracking and assessment of occupational radiation exposures and risks in the Philippines

Panlaqui, Angelo A. , Piquero, Ronald E. , Grande, Marianna Lourdes Marie L. , Pineda, Camille U. , Pascual, Elisha John W. , Romallosa, Kristine Marie D., Betos, Christy Mae T.

The rise in the number of occupationally exposed workers in the Philippines has made tracking, monitoring, and assessment of occupational exposures more difficult. Over the years, other than the DOST-PNRI, various private companies have started providing individual monitoring services (IMS). Although these providers are duly recognized by the regulatory agencies, it has resulted in a decentralized database of occupational exposure records in the country. To help address this and as required by the International Atomic Energy Agency (IAEA), a web-based National Dose Registry (NDR) was developed to maintain a centralized dose repository of occupational external exposures in the country. The NDR can automatically record and track an individual's exposure history, provide an annual dose summary of the worker and facility, notify incidents of doses exceeding the regulatory limits, and allow regulatory agencies to have ready access to dose information, among others. The NDR also provides exposure profiles of workers according to the type of practices. The average annual doses due to external exposures received from various practices during 2013–2018 were evaluated in terms of personal dose equivalent $H_p(10)$. Results show that in conventional radiology practices, more than 70% of workers did not receive doses above the recording level. In industrial radiography (IR) and nuclear medicine (NM) practices, on the other hand, workers received the highest average annual doses of 1.02 mSv and 0.44 mSv, respectively – with incidents of doses exceeding the limit of 20 mSv/yr. Practices in IR and NM, thus, pose higher risks of occupational exposures to workers. The NDR, therefore, can be used in recording, tracking, and assessing occupational exposure profiles and risks. The NDR can also be tool to aid in the development of better regulations and thereby help in strengthening radiation protection in the country.

Keywords: Dose assessment, Individual monitoring, National dose registry, Occupational exposures, Occupational radiation protection, Radiation risks, Physics

Dose rate analysis of upgraded storage drums for disused sealed radioactive sources by a multivariate interpolation program developed using MCNP5

Jecong, Julius Federico M. , Marcelo, Editha A. , Dingle, Cheri Anne M. , Astronomo, Alvie A. , Piquero, Ronald E. , Hila, Frederick C.

The DOST-PNRI maintains a centralized radioactive waste management facility (RWMF) that performs conditioning of disused sealed radioactive sources (DSRS). These radioactive wastes are encapsulated in stainless steel and deposited into storage drums, which are in turn piled within the facility. This work describes the enhancement of the storage drum design using a dual-layer shielding of lead and concrete. This enables the drums to contain a total of three stainless steel encapsulations, therefore minimizing radioactive waste volumes within the facility. For this design, the MCNP5 code was used to verify that the surface contact dose rate limits will not be surpassed, for all drums to be fabricated. Each drum will be designed with a lead thickness that depends on the strength of radioactive waste to be contained. In order to account for different volumes, activities, and radionuclide types of the encapsulated waste as well as the required lead shielding, series of simulations were prepared to create a program in Microsoft Excel that will interpolate results based on these variable parameters. This program was subsequently applied to three existing source capsules. Results were verified with good agreement by PHITS

Monte Carlo (MC) models. Using the program, design parameters were also optimized by acquiring the optimum source volume fractions per capsule, activity insertion ratios, and the maximum insertable radioactivity per drum. The degree of dose rate reduction within the old single-layer design and the enhanced dual-layer design was shown by mesh diagram. The interpolation program can be used as a tool for rapid fabrication of enhanced storage drums that can increase the capacity of the facility due to minimization of radioactive waste volumes.

Keywords: *Cs-137, Co-60, DSRS, MCNP5, MS Excel, PHITS, Physics*

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0606

Effect of radiation-modified kappa-carrageenan on the morpho-agronomic characteristics of mungbean [*Vigna radiata* (L.) R.Wilczek]

Abad, Lucille V. , Aurigue, Fernando B. , Montefalcon, Djowel Recto V. , Gatan, Mary Grace B.

Initially, the effects of radiation-modified kappa-carrageenan (RMKC) at different concentrations (20, 40, 60, 80, and 100 mg/L or ppm) as plant growth promoter were determined on plants of mungbean variety NSIC 2002 Mg 13 (Pagasa 21). RMKC at 60 ppm proved to be the most effective in inducing plants to flower, promoting plant height, and increasing seed yield by enhancing the length of pod and number of seeds produced. In a second experiment, the effectivity of RMKC was compared with those of an inoculant (I), inoculant and inorganic fertilizer (I + F), and a seaweed-based commercial foliar fertilizer using the variety NSIC 2004 Mg 14 (Kulabo). Likewise, in a third experiment comparing RMKC with seaweed extract (SE) irradiated at increasing dose levels, RMKC also enabled the production of higher yield on Kulabo by increasing the length of pod, number of seeds/pod, and 100-seed weight even in the absence of an inoculant. It has been found to be more effective than a seaweed-based commercial foliar fertilizer as well as SEs that have been irradiated with 10, 20, and 30 kGy of gamma radiation probably due to the availability and stability of low molecular weight (Mw) fractions of κ -carrageenan and the micro-nutrients present in it. The use of RMKC as seed treatment and foliar application for Labo, Pagasa 7, and Pagasa 19 at 1 wk, 3 wk, and 5 wk after seedling emergence produced taller plants and gave higher yield. The increase in pod and seed yields are attributed to more flowers that become fruits (higher number of pods), longer pods with more seeds, and extended flowering and fruiting so there was longer harvesting time (number of priming doubled from 3 to 6). Seed yield of mungbean plants grown after rice or corn can be increased by application of 100 ppm RMKC as foliar spray three times – at 1, 3, and 5 wk after germination – with or without the use of a seed inoculant.

Keywords: *Foliar spray, Kappaphycus alvarezii, Plant growth promoter, Seaweed extract, Physics*

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0607

Experimental, computational, and analytical methods for the characterization of a neutron field for calibration of neutron monitoring instruments in the Philippines

Dingle, Cheri Anne M. , Garalde, Ave Ann Nikolle M. , Betos, Christy Mae T. , Grande, Marianna Lourdes Marie L., Hila, Frederick C. , Romallosa, Kristine Marie D.

Despite the many emerging applications of neutron radiation in the Philippines, there is a gap in the country's capability to calibrate neutron radiation monitoring instruments that are necessary for measuring the radiation hazards in the workplace. In this study, the neutron field of a bare Californium-252 source was characterized and established for calibration of radiation monitoring instruments. The fluence rate of the neutron field was experimentally characterized using the shadow cone method, and the results were compared with Monte Carlo

simulations and analytical methods. The neutron fluence rate of the neutron source with a nominal activity of 200 MBq was measured at distances of 100 cm, 130 cm, and 150 cm with a reference He-3 spherical proportional counter in a Bonner sphere. The measured fluences were found to be $\phi_{100} = 151.09 \text{ cm}^{-2}\text{s}^{-1}$, $\phi_{130} = 89.13 \text{ cm}^{-2}\text{s}^{-1}$, and $\phi_{150} = 67.31 \text{ cm}^{-2}\text{s}^{-1}$, respectively. Results also show that the experimental values are agreeable with the computational and analytical methods to within 10%. The characterized neutron field is the first of its kind in the Philippines, and can now be used for calibrating neutron radiation monitoring instruments. This study will, therefore, help improve the accuracy of radiation measurements and support the radiation protection program of neutron facilities in the country.

Keywords: Calibration field, Dosimetry, MCNP, Neutron, Secondary standards laboratory, Physics

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0608

Fractionation of rice bran (*Oryza sativa*) VA-286 variety using supercritical carbon dioxide (SC-CO₂)

Malaluan, Roberto M. , Malaluan, Lloyd Arvin D.

Oryza sativa, VA-286 is a common rice variety in Caraga Region, Philippines, from which rice bran is obtained. The rice bran is usually used as a fuel for agricultural factories in this region. This study conducted fractionation using supercritical carbon dioxide and fatty acid profiling as the first data for this variety. Different oil extracts under three different parameters were obtained, 10 megapascal (MPa), 20 megapascal (MPa), and 30 megapascal (MPa) at constant temperature of 40° Celsius. The highest oil yield was obtained at 20 MPa with an average of 2.98% followed by 30 MPa at 2.49%, and 10 MPa at 2.24%, from all extracts done in triplicates. Oil sample (10 MPa) was subjected to gas chromatography-mass spectrometry (GC-MS) analysis. Five compounds were obtained with Y-oryzanol and campesterol as the major compounds. For fatty acid profiling 20 MPa and 30 MPa samples were subjected to gas chromatography (GC) at DOST-ITDI and were compared. Nine fatty acids were observed with oleic (C18:1) as highest (w/w) for both 20 MPa and 30 MPa extracts. Both essential fatty acids linoleic (C18:2) and linolenic (C18:3) were found in the 20 and 30 MPa extracts. This study shows that this technique of fractionation using supercritical carbon dioxide can provide valuable products from rice bran aside from its use as fuel, which can boost the local coconut industry.

Keywords: Rice bran, VA-286, Supercritical carbon dioxide, Fatty acid, Gas chromatography, Mass spectrometry, Physics

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0609

Gamma irradiation for the inactivation of *Aspergillus flavus* link in copra (dried *Cocos nucifera* L. meat)

Sia Su, Glenn I. , de Asis, Darcy L., Tumlos, Roy B.

Aspergillus flavus is a known source of aflatoxin and other carcinogens that contaminates perishable goods such as copra, one of the top exports of the Philippines. Fungal contamination in perishable products has caused post-harvest losses and a significant threat to food safety and security. Existing methods to control or prohibit the growth of fungi have been a tedious process proven to be open to subsequent contamination. This study assessed the capability of gamma irradiation in inactivating *A. flavus* in copra. Locally acquired copra was inoculated with 5.8×10^3 CFU/ml of *A. flavus* spores. The contaminated copra was irradiated with varying doses of gamma radiation (0.3, 0.7, 1, 3 kGy). Results showed a decreasing trend in the fungal count as the absorbed doses of

gamma irradiation increased. Irradiation of 0.7 kGy achieved a significant reduction of fungal count satisfying regulatory limits. The largest reduction in the fungal count was achieved by 3 kGy with $< 1 \log$ CFU/ml molds and yeast count (MYC). This study concludes that gamma radiation is effective in inactivating *A. flavus*.

Keywords: *Aspergillus flavus, Copra, Food irradiation, Food safety, Radiation processing, Physics*

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0610

Optimization and characterization of activated carbon from cacao pods *Llaneta, Kristine C. , Godez, Diana Rica B. , Macalalad, Angelica A., Magoling, Bryan John*

Most commercial activated carbon products are expensive. Thus, extensive researches on the production of low-cost, more effective and environment-friendly activated carbon that is equivalent to those commercially available have been conducted. Cacao pods are a possible source of activated carbon. Thus, this study was conducted to produce activated carbon from cacao pods and to evaluate its efficiency and effectiveness as an adsorbent for treatment of industrial wastewater. This study aimed to determine the percent Cr (VI) removal efficiencies of the cacao pods activated carbon (CP-AC) prepared at varying concentration of H_3PO_4 , activation temperature and holding time. Response surface method (RSM) using a central composite design (CCD) of experiment was utilized to determine the optimum activation conditions. Characterization of the functional groups present in the optimized CP-AC and its surface morphology were determined using Fourier transform-infrared spectroscopy, Boehm titration, Scanning electron microscopy and Brunauer-Emmett-Teller analysis. The optimum activation condition for the production of CP-AC were established at 37.56% H_3PO_4 , 799.87 °C and 88 minutes, resulting in 88% removal efficiency from 50 ppm Cr (VI) solutions. The optimized CP-AC contained a well-developed pore structure, and a high surface area of 212.343 m^2/g and pore volume of 0.036 cm^3/g . The pore diameter was determined to be 3.861 nm and a particle size of 300 μm , indicating that the sample was in the mesopore region. The surface and pore characteristics of CP-AC and coconut husk activated carbon (CH-AC) prepared in a previous study were compared. The optimized CP-AC was found to have a larger surface area and wider pores than CH-AC.

Keywords: *Activated carbon, Cacao pods, Central composite design, Chromium (VI), Response surface methodology, Physics*

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0611

Optimization and performance evaluation of a symmetric direct ethanol fuel cell based on PtCo/C electrocatalyst

Tongol, Bernard John V. , Garcia, Jonyl L. , Geronimo, Hannah Grace D. , Ricafort, Jarren Neil D.C.

Fuel cells are promising alternative sources of energy with research efforts geared towards low-loading Pt electrocatalysts. In this study, the performance of PtCo/C electrocatalysts was evaluated towards ethanol (EtOH) oxidation (anode) and oxygen reduction reactions (ORR) (cathode) as symmetric electrocatalysts (i.e., those that utilize the same material for anode and cathode) for direct ethanol fuel cells (DEFC). The performance was compared to commercial Pt/C (Premetek™), both for half-cell (using cyclic voltammetry, chronoamperometry, and rotating disk electrode voltammetry) and full-cell (single-stack fuel cell testing) configurations. As anode, the PtCo/C electrocatalyst performed significantly better than Pt/C, with current density of 17.82 mA/cm^2 for the former versus 14.57 mA/cm^2 for the latter (at 2.75 M EtOH in 0.5 M H_2SO_4). As cathode, PtCo/C electrocatalyst gave greater ORR activity (in O_2 -saturated 0.5 M H_2SO_4) with current density of 2.04 mA/cm^2 as compared to that for Pt/C (0.67 mA/cm^2). Furthermore, the ORR for both PtCo/C and Pt/C were shown to proceed via the

desired four-electron route. However, chronoamperometry revealed that Pt/C as cathode electrocatalyst has greater electrochemical stability (7.87% current loss vs. 28.49%) and EtOH tolerance (4.77% current loss vs. 13.39%) than PtCo/C. Co is known to enhance the activity of Pt towards EtOH electrooxidation via the bifunctional mechanism, which in turn reduces the ethanol tolerance of PtCo/C during ORR. Full-cell testing showed that PtCo/C-based symmetric DEFC exhibited higher open circuit potential (0.31 V) and power density (1.33 mW/cm²) compared to one based on Pt/C (0.26 V, 0.93 mW/cm²). These results suggest that PtCo/C could be a cheaper alternative to Pt/C in symmetric DEFC systems, a step which could lead to the economical production and commercialization of DEFCs.

Keywords: *Symmetric direct ethanol fuel cell, PtCo/C, Premetek, Physics*

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0612

Radiation-modified kappa-carrageenan improves productivity of peanut (*Arachis hypogaea* L.) in Bukidnon, Northern Mindanao, Philippines

Aurigae, Fernando B. , Duna, Lorena V. , Tigbao, Jemseal R. , Bongalos, Jerald B.

The use of radiation-modified kappa-carrageenan (RMKC) solution as a foliar spray to supplement the Farmer's Practice in Bukidnon, Northern Mindanao, Philippines was tested in peanut with or without the inoculant Nitroplus® for two seasons. During the wet season (Sep–Dec 2017), the combination of RMKC and inoculant gave the highest yield advantage of 33.5% and 99.7% over the Farmer's Practice for Ilocos Pink (3,113.33 kg/ha) and Namnama 2 (2,176.70 kg/ha), respectively. For the dry season (Jan–Apr 2018), a similar trend was observed. The combination of RMKC and inoculant resulted in a yield increase of 41.9% and 55.6% for Ilocos Pink (1,790 kg/ha) and Namnama 2 (1,690 kg/ha), respectively. The increase in weight of pods per plot and 100-seed weight, which contributed to higher yield could be attributed to the plant growth-promoting effect of RMKC that has been analyzed to contain significant amounts of micro-nutrients and gibberellic acid (GA3). Thus, Carrageenan PGP as RMKC should be supplemented to the Farmer's Practice in Northern Mindanao, Philippines as foliar spray at 100 ppm 7–10 d after seedling emergence and every 7–10 d after the previous application for a total of four applications during the entire growing season to increase yield.

Keywords: *Foliar spray, Inoculant, Kappaphycus alvarezii, Plant growth promoter, Physics*

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0613

Use of gamma radiographic testing to determine the number of disused Californium-252 radioactive sources inside a source rod

De Vera, Cecilia M. , Mundo, Mary Rose Q. , Tugo, Joseph R. , Barro, Norman Jay V. , Barrida, Andrew C. , Sulit, Ramoncito F. , Nohay, Carl M.

DOST-PNRI licensees have three options once their radioactive sources become depleted or disused, either to a) return back the source to its principal of the country of origin, b) transfer to an authorized end-user, or c) dispose of to the Radiation Protection Services Section (RPSS) of DOST-PNRI for proper waste management. The concern began when it cannot determine the exact pieces of Californium-252 (Cf-252) piled inside a disposed source rod at RPSS due to conflicting records and lack of coordination between the user and other parties involved. The possibility of applying gamma radiographic testing has been realized as the most practical, fastest, and safest method among the other perceived techniques to determine and validate the exact quantity of Cf-252. In radiographic testing, gamma rays or X-rays are employed to check the internal structure of an item for any defects

like cracks or flaws. Two radiographic shots were performed at two different angles using an Iridium-192 (Ir-192) gamma radiographic exposure device. The radiographs show the exact pieces of the Cf-252 inside the source rod disposed of at DOST-PNRI.

Keywords: *Californium-252, Exposure time, Gamma radiographic testing, Gamma radiographic exposure device, Geometric unsharpness, Physics*

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SCIENCE AND TECHNOLOGY

0614

AYUSH: Modi's innovation in Indian health systems

Santarita, Joeje Buga ay

This study was conducted as the first attempt of reviewing Prime Minister Narendra Modi's almost four year-old ministry as an innovative health policy. Modi's administration has employed innovative strategies such as the embracement of indigenous transformation of health system side by side with the strengthening of modern medical technology and practices. This facilitated the birth of the Ministry of AYUSH. This paper analyzed the processes involving the development and implementation of Modi's innovations in India's health sector.

Through contextual analysis, data were generated from various online sources including reports and modules available in the Ministry of Ayush and other government offices' websites.

It showed that the set of trends identified by Cavalcante and Camoes was present in the ministry as a public management innovation in health care in India. These are the improvement of transparency mechanisms, open government and accountability; promotion of e-government; ease access and citizen participation in public administration; new public policies that encourage more active role of citizens in the creation of political capital; networks and partnerships of state actors, social and private enterprises; and expansion of information technology to increase the quality and efficiency in the delivery of public services.

The establishment of the Ministry of Ayush and the policy on Indian System of Medicine and Homoeopathy is another example of indigenous transformation in public management in Asia which brings synergy between the traditional wisdom of AYUSH and modern diagnostic tools and technology.

Keywords: *innovation, India, health, traditional system, Science and technology*

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0615

Improving user experience to the FNRI's proficiency testing and reference materials portal

Dajay, Leah C.

Despite the availability of a local proficiency testing (PT) and reference materials (RM) provider and high demand for this type of services, the participation is quite low due to difficulties encountered in transacting and insufficient awareness of its availability. The study allowed the preliminary use of the developed Proficiency Testing (PT) and Reference Materials (RM) portals, by the participants and customers in joining FNRI PTs and purchase RMs, respectively. This project aimed to improve and maintain the developed Proficiency Testing and Reference

Materials E-Access portal in iFNRI. Software enhancement, additional features and functionalities to the PT and RM portals were included to improve users' experience. Available reference materials were uploaded and contents were continuously updated in the RM portal. In the PT website, two PT Rounds were created to help in the provision of feedback from customers. A total of thirty three (33) participants joined the PT Round on FNRI PT 18-01 (Corn-based Snack Food) and nineteen (19) participants joined the FNRI PT 18-02 (Wheat Flour). To continuously offer the best service to the participants and/or customers, this project improved and maintained the developed PT and RM E-Access portals in iFNRI website. The use of the PT portal for the two PT Rounds uploaded can be considered a factor that increased the hits for the portals (PT portal=6480; RM portal=1035). Furthermore, visitors of the portals do not consist only of locals but also of other foreign countries (e.g. United States, Hong Kong, Germany, China, Israel, Russia, etc.). The established and improved PT portal enabled the online organization of two (2) PT Rounds. Simultaneous beta-testing was performed for the added features and functionalities. Overall, enhancement in the portals, including the self-system-generated quotation for immediate request have well-assisted participants/customers. The FNRI-PTL suggests on making its designs mobile-ready to improve its users experience in terms of enhanced portability. Furthermore, this will also provide better transaction process in the RM portal that can be similar to common e-commerce websites.

Keywords: *proficiency testing, reference materials portal, DOST-FNRI, user experience, electronic access, e-commerce, Science and technology*

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0616

Keeping up with the NuGen™ lab: its journey towards becoming a competent molecular biology testing laboratory *Jacalan, Frances Isabelle B.*

DOST-FNRI has always been active in fighting malnutrition with accurate data, correct information, and innovative technologies. One of the innovations undertaken was in Nutritional Genomics. To support this endeavor, DOST-FNRI capitalized on establishing its own molecular laboratory. The NuGen™ Lab instigated quality in its management system by adhering to the requirements for competence and positioning the laboratory towards ISO/IEC 17025:2005 accreditation. The project aimed to establish and implement a QMS in compliance to the requirements of ISO/IEC 17025:2005 at the NuGen™ Lab. Members of the Quality Assurance Committee (QAC) documented its Quality Management System (QMS) in accordance to the Philippine National Standards, ISO/IEC 17025:2005 Standard and Guidance Documents from the Philippine Accreditation Bureau (PAB). The implementation of the QMS commenced with controlling all of its documents and records. Analytical methods were subjected to validation in terms of accuracy, precision, and robustness prior to use. Quality assurance and quality control measures were set in place in all testing areas to assure the quality of test results. The NuGen™ Lab was able to document its QMS in accordance to the standard and requirements set forth by PAB. The management system of the laboratory was driven by its quality objectives and was monitored by means of key performance indicators. The conduct of internal audit and management review enabled NuGen™ Lab to come up with ways to continuously improve its QMS. On the other hand, quality assurance was implemented in all aspects of its technical operations. Its personnel were found to be competent in performing genotyping. The equipment and methods used to genotype target genes were found to be fit for its intended use. Lastly, the results generated by NuGen™ Lab were found to be comparable to other molecular laboratories abroad that are already ISO/IEC 17025:2005 accredited. Accomplishing all the requirements needed, the NuGen™ Lab submitted its application for ISO/IEC accreditation to PAB. A quality management system was established and implemented. It is with high hope that the NuGen Lab will be a premier ISO/IEC 17025:2005 accredited molecular laboratory in the Philippines; providing its customers with InDEPTH (Innovative, Dedicated, Excellent, Proficient, Timely and Holistic) analyses and quality results.

Keywords: *NuGen lab, molecular biology, testing laboratory, nutritional genomics, DOST-FNRI, Science and technology*

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Market acceptability of the designed packaging material for dried ube (*Dioscorea alata*) using the automated multi commodity heat pump dryer (AMCHPD)

Gocheco, Alyx Danielle V., Notarte, Christine Mae B., Macalalad, Marta B.

Packaging has been developing because it is one of the main attributes a product has. Innovations are everywhere for the consumers to be more attracted and have the interest to buy a specific product. Purple yam (*Dioscorea alata*) is commercially grown in the Philippines which is the only supplier in the world market. Thus, the crop is considered one of the important export banner crops. Generally, the study determined the acceptability of the packaging material developed for the AMCHPD- Dried Ube among college students. Specifically: a) How does the packaging affect the customer's interest in buying the product? b) Does it increase the acceptability in the market? The study used descriptive design and questionnaires were distributed to 100 college students from a population of 5,000. Descriptive statistics was used to analyze the results. Students wrote their own perceptions on the color, imagery, attractiveness and other attributes of the designed package. Results of the survey showed that the most chosen packaging 1 was delightful to look at and attractive for its colors, with nutritional information highlighted. Packaging 3 was chosen next because of its simplicity and attractive slanted cover at the top. The least chosen packaging was the one with a handle.

Keywords: *Packaging material, Ube, Automated multi commodity heat pump dryer, Science and technology*

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Technology foresight of FNRI-developed stabilized brown rice (SBR) utilization in the Philippines through scenario building

De Juan, Jaypy S.

Historically, Filipinos ate mostly brown rice until Westerners introduced the modern milling process that produced white polished rice which soon dominated the market and eventually changed our cultural tradition on rice preference. In 2010, the Philippines became the biggest net importer of rice, which becomes a challenge for the country's program on rice self-sufficiency. Today, brown rice is gaining popularity primarily due to its nutritional and health benefits. Shifting to brown or unpolished rice, on top of more government investments in sustainable agriculture is one of the solutions to achieving rice self-sufficiency. However storage of brown rice is a major problem among rice miller due to unstable state within a month. DOST-FNRI successfully determined in 2012 the optimum condition for extending the shelf-life of brown rice. With this the S&T solution offered by the Institute, may make our rice producers to be more confident in supplying brown rice in the market. The FNRI-developed Stabilized Brown Rice (SBR) Technology is the focal issue of this special project wherein the researcher undertake a foresight exercise using scenario building, defining the future situation of brown rice utilization in the country. This effort created scenarios that would foresee the future situation affecting or influencing the utilization of SBR Technology in the country in 2020. With the challenges and issues that triggers the development of SBR Technology - a management of this technology becomes crucial. A tool like technology foresight in management of technology is very important for an organization to manage its technology strategically and maximize the socioeconomic benefits. To determine the future of the FNRI-developed Stabilized Brown Rice (SBR) utilization in the Philippines through scenario building and the critical factors influencing/affecting brown rice utilization in 2020. Focus group discussion was conducted by organizing members to lay the ground for the scenario building process. The participants who had experience and discipline on the field of technology management, community nutrition, food technology, public management and enterprise development were asked to undertake the scenario building exercise particularly on the identification and ranking of predictable variables and critical uncertainties towards the development and assessment of the scenario. Identification of the following challenges and issues such as rice importation, micronutrient deficiency, emerging health problem and rice sufficiency program through environmental scanning triggered the development of FNRI-developed Stabilized Brown Rice Technology, as the focal issue of this project - the future of SBR Technology. The participants came up with ten (10) predictable variables and six (6) critical uncertainties that might have

impact on the future utilization of SBR technology. From the predictable variables, four (4) clusters were formed. The clustered variables and critical uncertainties were ranked according to the degree of impact and uncertainty to established key driving forces. The overall ranking was used to develop scenario logic which resulted to the following three (3) scenarios and names as follows: Scenario 1–The Dominant 3–Technology, Society, & Market (TSM) Influence-(which exhibits high impact-low uncertainty), Scenario 2–The Return of Brown Influence-(exhibit medium impact & uncertainty) and Scenario 3–The Vague Influence-(exhibit high uncertainty-low impact). The implication of these three (3) scenarios highlighted the determinants of utilization which is clear that different scenarios have different key driving factors relevant to its objective of utilization and commercialization however with different degree of importance and uncertainties. Given the practical importance of understanding the process and the critical factors influencing/affecting technology utilization and commercialization a promising economic and social benefits of the FNRI-developed Stabilized Brown Rice Utilization in 2020 will likely shape the future as described as how the relationship of the scenarios will occur in the future is driven directly with the influence of the determinants of utilization such as the institute, the government, and the industry.

Keywords: *stabilized brown rice, scenario building, rice consumption, utilization, economic benefit, health benefit, DOST-FNRI, Science and technology*

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2015,
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SOCIAL SCIENCES

0619

Academic performance and experiences of the junior high school learners under the specialization program schedule in science

Mutia, Florabel P.

Spiral Progression approach has greatly influenced the science curriculum particularly the content and transitions of four the disciplines in science, namely, Earth Science, Biology, Chemistry and Physics. Teachers of varied specializations in college are adapting to the new curriculum which demands in-depth content training to master all the disciplines. It is difficult to teach something, in which one does not have the necessary mastery. The proposed intervention is the Specialization Program Schedule where teachers would only teach his specialization following the schedule from grade 7 to 10. The study was experimental in nature and employed quantitative and qualitative research. There were two assigned groups, the experimental group under the Specialization Program Schedule in Science and the control group followed the usual scheduling from Grade 7 to Grade 10. A pretest and posttest were administered which served as quarter examinations. The period of observation was from first quarter to second quarter transitions only. Applying independent t-test, the mean scores of the two groups from grade 7 to 10 had significant differences. The proposed intervention had an effect on the performance of the learners as reflected in the mean percentage scores. Learners perform academically better under the Specialization Program Schedule. Using Pearson correlation, only the performance of the Grade 9 from first to second quarter had a significant relationship. Other grade levels had no significant relationship. Students and teachers had varied experiences in terms of delivery of content, execution of strategies and availability of resources. Furthermore, Specialization Program Schedule must be monitored carefully to ensure its impact on the academic performance of the learners.

Keywords: *Academic performance, Experiences, Specialization program, Social sciences*

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Against federalism: why it will fail and bring us to the brink

Ocampo, Romeo B.

The proposed shift to a federal form of government is unlikely to succeed and may lead instead to the dismemberment of the Philippines. Given the dominant Pimentel model of the proposal, federalization will critically weaken the central government by sharing its sovereign powers, devolving most of its functions, and substantially more of its resources with the new component states. Rather than promote equitable development, federalization, according to this model, will promote interstate competition and thus enable the better-endowed regions to develop farther ahead of the others. The central government will be too emaciated to equip weaker states to catch up, aggravating their laggard conditions and may further fuel secessionist sentiments. While one possible effect of federalization may be to inhibit centrifugal tendencies, it also risks sufficiently arming defection-prone states to secede and leads to the breakup of the nation-state. This article argues that, for all its faults, the existing unitary system is better because it can do at least one thing a federal government can no longer do, that is, redress imbalances in favor of lagging regions and retrieve devolved power if it is misused. Moreover, the parliamentary system that the proponents put on top of their federal structure may be able to do far fewer things faster and will be less democratic than the central as well as areal division of powers embodied in the existing unitary system of the Philippine government.

Keywords: *federalism in the Philippines, federal vs. unitary, government systems, Pimentel model, Social sciences*

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2017/12,

(Filipiniana Analytics)

Analysis of relationships of approaches to happiness and job satisfaction to job performance of public secondary school teachers in selected schools in the Division of Cavite

Urrutia, Jackie D. , Magana, Raymond A. , Castillo, John Carlo D. , Borja, Paolo Christopher R., Jacolbia, Rovelina B.

The study analyzed the relationships of approaches to happiness and job satisfaction to job performance. This research endeavors to educate and inspire public academic institutions to focus on the happiness and job satisfaction of their teaching staff and see if it will bring out high job performance rate. A sample of two hundred and eighty-three (283) public secondary school teachers was taken from selected schools in the division of Cavite calculated based on Cochran's formula and using simple random sampling technique. The researchers used descriptive statistics such as frequency distribution and weighted mean to present the data. Pearson Product Moment Correlation Coefficient r and multiple linear regressions (MLR) model were used to determine the association and test statistical significance between all studied parameters. Data analysis was done using Statistical Package for the Social Sciences (SPSS). The findings of this study indicated that the extent of correlation between the approaches to happiness and job performance and between the job satisfaction and job performance are both significant. When these variables are linked with job performance, the outcome revealed that higher degrees of happiness—in terms of pleasant life, good life, and meaningful life—and job satisfaction lead to very satisfactory job performance.

Keywords: *Happiness, Job satisfaction performance, Division of Cavite, Social sciences*

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2019 July,

(Filipiniana Analytics)

NP

Anxiety-attachment, avoidance-attachment and gender as predictors of empathy

Parcon, Apryl Mae C.

From two-factor scales (i.e., affective and cognitive components), recent researches in the study of empathy showed that three factors (i.e., emotional contagion, emotional disconnection, and cognitive empathy) accounted for an integrative view of empathy (Carre, Stefaniak, Bensalah, & Richard, 2013). Given the recent developments, this study aimed to see the significant predictors for each of these empathy components. Three-hundred thirty seven participants ($n=337$), ages 15-24 ($M=19.33$, $SD=1.337$) took part in the study. Regression analyses showed that females were more likely to experience emotional contagion and cognitive empathy, while males were more likely to experience emotional disconnection. Further, high anxiety-attachment and low avoidance-attachment predicts emotional contagion. On the other hand, high avoidance-attachment predicts emotional disconnection, while low avoidance-attachment predicts cognitive empathy. Gender was also seen to significantly moderate the avoidance attachment in terms of their effect on emotional disconnection and cognitive empathy. Males with high avoidance attachment were more likely to emotionally disconnect; while females with low avoidance were more likely to cognitively empathize. The discussion emphasized the relevance of attachment orientation in the development of empathy. Further, implications on interpersonal relations were also explored.

Keywords: *attachment, empathy, emotional contagion, emotional disconnection, anxiety, avoidance, gender, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 1, 77-102
2017,
(Filipiniana Analytics)

Assessment of the implementation of the plastic bag reduction ordinance in Quezon City (2012-2016)

Braganza, Patricza Andhrea T.

The Plastic Bag Reduction Ordinance has been implemented in Quezon City since 2012 to regulate the use of plastic bags in an attempt to address plastic pollution. This study assessed the implementation of the ordinance. Customers' use of recyclable bags was directly observed in four retail stores in the District 4 of Quezon City. A survey was also conducted among 120 residents from six barangays comprising Area 24, District 4 of the city to gather data on awareness of and compliance to the ordinance. Focus group discussions and interviews with city government officials and store managers, among other stakeholders, were also conducted to enrich quantitative data. Survey results showed high level of awareness of the ordinance, but lower level of awareness of the green fund. Results of the chi-square test of independence revealed that awareness significantly differed across barangays. It is also revealed that the ordinance affects stakeholders in different ways, and that it may have somewhat reduced the percentage of plastic waste collected from households in the city. Lastly, retail stores face administrative challenges in translating green fund into meaningful environmental programs.

Keywords: *Plastic Bag Reduction Ordinance, green fund, policy implementation, Quezon City, Social sciences*

Philippine Journal of Public Administration, Volume No. 61 Issue No. 1-2, 20-42
2017/12,
(Filipiniana Analytics)

Behavioral consequences of psychological contract breach: examining the neutralizing effects of organization-based self-esteem

Cayayan, Peter Lemuel T., Tang, Robert L.

Drawing upon social exchange (Blau, 1964) and behavioral plasticity (Brockner, 1988) perspectives, we examined the moderating role of organization-based self-esteem (OBSE) in the relationship between psychological contract breach and organization-directed outcomes: in-role behavior (IRB), organizational citizenship behaviors towards the organization (OCBO), and workplace deviance behavior towards the organization (WDBO). Data were collected from 304 rank-and-file employees belonging to various occupational groups based in Metro Manila. Results indicated that psychological contract breach was negatively associated with OCBO and IRB and positively related to WDBO. Moreover, OBSE moderated the relationship between psychological contract breach and organization-directed behaviors such that individuals with low as opposed to high OBSE reacted more negatively to psychological contract breach.

Keywords: *psychological contract breach, in-role behavior, workplace deviant behavior, organizational citizenship behavior, Social sciences*

Philippine Journal of Psychology, Volume No. 49 Issue No. 1, 1-18
2016,
(Filipiniana Analytics)

Biblical narratives of anger and its contemporary psychological implications

Limbadan, Nelly Z.

The psychology of anger presupposes its natural occurrence along with basic human emotions such as happiness, sadness and many more. Although anger research is not very popular, scientists-practitioners have attempted to investigate and test methods and interventions to manage anger. The current paper is built on four objectives. First, it aims to capture what psychology has perceived of anger by looking at its nature while correspondingly reviewing the literature of what has been done; works of notable researchers and experts are used as theoretical guide. Second, there is an attempt to use the Holy Bible as a subsidiary source for materials that can possibly evoke response and reflection. Thirdly, these experiences are related to the present time via varied psychological analyses; the viewpoints that are raised in this section are from the perspective of a psychology practitioner rather than that of a Bible scholar. Lastly, this analysis is viewed in terms of its applicability to psychotherapy and psychological intervention in contemporary society especially as applied to the Filipino Christian clientele through an anger transformation model.

Keywords: *anger, aggression, hostility, biblical narratives, emotion-focused therapy, Holy Bible, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 1, 143-157
2017,
(Filipiniana Analytics)

Canvassing the Filipino trans man's story: a narrative analysis of transgender men's YouTube video blogs

Castañeda, Nic L.

This exploratory study strives to understand the stories of Filipino transgender men through the lens of narrative psychology. By listening to the narratives of trans men, I explored how their gender and male identity is reconstructed and negotiated within Filipino society. The Youtube video blogs of five Filipino trans men were analyzed using narrative analysis. Nine key events were found and organized under the pre-transition, the

transition, and the post-transition timeline. The nine events revolved around the following themes: (1) realization of identity, (2) coping with gender dysphoria, (3) coming out, (4) decision to transition, (5) undergoing hormone therapy, (6) engaging with the trans community, (7) facing social/institutional challenges, (8) balancing between stealth or coming out, and (9) finding the road to advocacy and resolution. Overall, the findings specified social and psychological challenges that compel trans men to create their own gendered narratives.

Keywords: *transgender men, narrative analysis, video blogs, gender identity, gender transitioning, Social sciences*

Philippine Journal of Psychology, Volume No. Issue No. ,
2019,
(Filipiniana Analytics)

0627

Career and talent development self-efficacy of Filipino students: the role of self-compassion and hope

Alfonso, Maria Kristina S. , Nalipay, Ma. Jenina N.

The recent reforms in the Philippine educational system aim to develop lifelong learners who are competent in their chosen career and capable of contributing to society. Career and talent development self-efficacy is an enabling resource that could facilitate the realization of these goals. The present study examines a model of career and talent development self-efficacy predicted by self-compassion through hope in a sample of Filipino college students (N=620). Results of structural equation modeling revealed that the model has good fit to the data, and that self-compassion has a significant indirect effect on career and talent development self-efficacy through hope. These findings highlight the importance of developing students' personal resources in order to maximize their skills and abilities in developing their talents and being successful in their chosen career.

Keywords: *career and talent development, self-efficacy, self-compassion, hope, Social sciences*

Philippine Journal of Psychology, Volume No. 51 Issue No. 1, 101-120
2018,
(Filipiniana Analytics)

0628

Cognitive insight and cognitive affective vulnerability factor of person living with HIV and using antiretroviral therapy

Ruiz, Wawie DG. , Santiago, Jeremy I.

The Philippines has been experiencing a marked rise in the number of HIV cases in the past years. The HIV incidence in the Philippines has increased by more than 140% between 2010 and 2016, even though the annual number of new cases in Asia-Pacific countries has declined by 13% over the same period of time (UNAIDS Report on the Global AIDS Epidemic, 2016). People with chronic and acute illnesses experience uncertainty about their prognoses, potential treatments, social relationships, and identity concerns. The present study sought to investigate the cognitive insight and cognitive affective vulnerability factors of people living with HIV and using antiretroviral therapy. Participants were 40 gay men aged 20-32 years, diagnosed with HIV and who have undergone medication for at least one year. Results show that persons with HIV tend to have poor cognitive insight. They have also difficulties in regulating emotions and engaging goal-directed behaviors. In spite of having medication, gay men living with HIV are still in the process of reconstructing or reframing their lives. As such, support should be given including developing an active or self-advocating orientation, reframing supportive interactions, withdrawing from nonproductive social situations, selectively allowing others to be support persons, and maintaining boundaries.

Keywords: *People living with HIV, Cognitive insight, Cognitive affective vulnerability factors, Antiretroviral therapy, Social sciences*

Comparing marital satisfaction of male and female BPO night shift workers in the Philippines
Vallejos, Reginald S.

The study presented and compared the level of marital satisfaction of male and female Business Process Outsourcing (BPO) night shift workers. Prior to this study, there are researches that looked into the effect of night shift or nonstandard work schedule on the workers' marital life. There are also studies that tried to connect shift work to the quality of married life of BPO workers in the Philippines but they were conducted using the perspectives of the wives only. Thus this study offered a holistic view on marital satisfaction because it takes into consideration the views of both husbands and wives. Sixty-six males and females in Metro Manila were purposefully selected and surveyed, of whom 11 were interviewed face to face. Data from the survey were analyzed using Mann-Whitney U Test of Significance. Information from the qualitative interview was used to validate quantitative data. Results showed that Male and Female BPO night shift workers were satisfied with their marriage. There is no significant difference in the level of marital satisfaction of males and females. It is very evident from the study findings that economic and financial capacity affects marital satisfaction. This study can also help practitioners of pre-marital counseling. It is found in the study that compatibility of the couples' expectations in the marriage and with each other influence marital satisfaction.

Keywords: *marital satisfaction, night shift work, family life, BPO workers, Social sciences*

Philippine Journal of Health Research and Development, Volume No. 22 Issue No. 1, 19-27
2018/03,
(Filipiniana Analytics)

Context creates compromise: how contextual information and social distance affect moral judgment in Filipino culture
Magno, Jose M. , Magno, Jose F. IV, Quintos, John Gabriel Robert R.

Morally ambiguous activities bear different moral impressions across contexts and cultures. 107 college students were presented with four different vignettes of a person getting intoxicated and then asked to answer a morality-rating scale pertaining to the heavy drinker. The vignettes differed in perceived social distance (the heavy drinker being a close friend versus a stranger) and contextual information (the person drinking because of the internal trait of sensation-seeking versus the external occurrences of peer influence). Results show that a heavy drinker was rated more moral when drinking due to an external occurrence of peer influence rather than an internal trait of sensation seeking ($p=.015$), and that there was no difference in moral judgment when the heavy drinker was a close friend or a stranger. Findings help shed light on the complex interplay of culture and context when examining moral judgment formation in a Filipino context.

Keywords: *moral judgment, heavy drinking, contextual information, social distance, alcohol, social psychology, judgment formation, morality, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 1, 159-170
2017,
(Filipiniana Analytics)

Correspondence bias in the attribution of political attitudes: a replication of Jones and Harris's (1967) experiment on correspondence bias

Nalipay, Ma. Jenina N.

The study investigated correspondence bias in the attribution of political attitudes by finding out if choice and behavior direction would influence participants' estimates of a person's true attitude on a controversial political issue. In a replication of Jones and Harris's (1967) classic experiment on correspondence bias, a sample of 145 college students were randomly assigned in one of the four treatment conditions wherein they were instructed to read an essay that is: a) pro-Reproductive Health (RH) Law, written in choice condition; b) pro-RH Law, written in no choice condition; c) anti-RH Law, written in choice condition; or d) anti-RH Law, written in no choice condition. The participants were then asked to estimate the true attitude of the essay-writer. Results showed that the participants estimated the writer's true attitude as being more in favor of the side of the issue in which the direction of the essay was written, regardless of whether it was written in the choice or no choice condition. Thus, correspondence bias was evident in the participants' attribution of political attitudes.

Keywords: *correspondence bias, politics, political attitudes, replication, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 140-158
2017,
(Filipiniana Analytics)

Critical challenges in implementing the citizen's charter initiative: insights from selected local government units

Saguin, Kidjie Ian

Globally recognized as a best practice, the Citizen's Charters were developed under the paradigm of New Public Management (NPM), which uses business-like perspective and tools by bringing the public as a customer in the center of public service delivery. Building on these successes, the Philippine government launched an anti-red tape program based largely on RA 9485, which mandates the creation of Citizen's Charters for all frontline services of the government including local governments. This paper evaluates the compliance of selected charters to the provision of the law and reveals that the Citizen's Charters developed show absence of stakeholder involvement in their formulation, varying levels of compliance with the required information in the charter, inconsistencies in the information provided, and lack of customization and innovation on the part of the LGUs with respect to content and form of the charter. These findings indicate that the Citizen's Charter as implemented does not consistently hold the basic principles of NPM and "charterism."

Keywords: *Citizen's Charter, new public management, local government, charterism, anti-red tape, Social sciences*

Philippine Journal of Public Administration, Volume No. 57 Issue No. 1, by Kidjie Ian Saguin
2013/06,
(Filipiniana Analytics)

Deconstructing the disaster preparedness and mitigation practices of the indigenous peoples as science-based information

Beluso, Lucy A. , Latoza, Rector John A. , Pimentel, Stephanie S. , Gavino, Nida T. , Virtudazo, Adelfo Z. , Lachica, Louis Placido F. , Bicular, Leo Andrew B., Alfon, Editha C.

Indigenous peoples both in lowlands and uplands are particularly exposed to climate-related disaster risk—they are likely to suffer higher rates of mortality, morbidity and economic damage to their livelihoods. Hence, this

study aimed to deconstruct the knowledge, attitude, and practices on disaster related phenomena of the indigenous peoples in Capiz, Philippines and integrate them into science-based information. It used the qualitative research design employing grounded theory approach from June 2016 to December 2017. Informal interviews and participation, videography, and observations were conducted in inter-acting with the informants. The six (6) informants were chosen using the criteria of Manuel (1955) on three-generation test to triangulate the data. The knowledge, attitude and practices on environment of the indigenous peoples play the vital role in the resiliency towards the occurrence of any disaster phenomena in their places. Their unique way of communicating with the flora and fauna and all parts of the nature serve as their *duna* (natural endowment) that guides them in their daily way of living and coping with environmental stress. Their KAP systems are their very simple way of explaining indigenous science-based practices and information that can be integrated to modern classroom instruction on disaster preparedness and mitigation. The indigenous peoples have developed the capacity and propensity to co-exist with other stakeholders in the forest environment. Being keen to the behavior of plants and animals is always a plus factor in responding to environmental stress.

Keywords: *Cultural ethnography, Disaster risk reduction practices, Social sciences*

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2019 July,
(Filipiniana Analytics)
NP

0634

Defining diskarte: exploring cognitive processes, personality traits, and social constraints in creative problem-solving

Morales, Marie Rose H.

Despite being part of Filipinos' everyday experience, little research has been devoted to *diskarte* as a construct. This review aims to encourage theorizing about *diskarte* by framing it as creative problem-solving. I argue that there are parallelisms between *diskarte* and creativity; specifically, that *diskarte* involves the use of features present in creative ideation in order to respond to social problems. Hence, insights presented in this paper on *diskarte* are largely inspired by more than 70 years of creativity research. This paper further proposes that *diskarte* involves three elements: personality traits, cognitive processes, and social limitations. Cognitive processes include divergent thinking, cognitive flexibility, and making remote associations. Personality variables involve traits such as openness to experience and psychoticism. The role of social constraints in prompting the use of *diskarte* is also discussed. These insights are integrated into a proposed conceptual framework that can be utilized for future studies.

Keywords: *creativity, diskarte, Social Identity Theory, cognitive psychology, Sikolohiyang Pilipino, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 114-139
2017,
(Filipiniana Analytics)

0635

The development of the masaklaw na panukat ng loob (Mapa ng Loob)

Del Pilar, Gregorio E. H.

Studies have shown that trait constructs measured by the two earlier Filipino personality inventories and a lexically based Filipino personality research instrument are well represented by the Five-Factor Model (FFM; Katigbak *et al.*, 2002; Church *et al.*, 1997). On this basis, a 188-item instrument that sets out to operationalize the FFM with Filipino trait constructs was developed, with a core of twenty facet scales, each with eight items, and grouped by four for each of the five domains. In six successive item-testing studies, considerations of internal consistency reliability, content validity, keying balance, and factor structure were addressed. While most of the samples across the six item-testing studies came from the national state university in Metro Manila, data for the last study (total N=576) also included student samples from three other universities (N=192), as well as an adult sample (N=192).

The reliabilities for the final version of the instrument ranged from .65 to .81, with a mean of .72. Keying balance for sixteen facet scales is perfect or near-perfect, with the remaining four having a balance of 2:6. A Principal Component Analysis of the twenty facet scales showed a clear five-factor structure, with each facet loading on its intended factor. Further work on the Mapa ng Loob, which includes the development of a 50-item short form, an English version, and validation studies, are briefly discussed.

Keywords: *Big Five, Filipino trait constructs, Five-Factor Model, personality scales, personality traits, test development, validation studies, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 1, 103-141
2017,
(Filipiniana Analytics)

0636

Dispositional mindfulness and relapse vulnerability as mediated by self-efficacy among persons in recovery from substance use disorders (SUDs)

Tarroja, Maria Caridad H. , Galacgac, Niño B.

The study sought to explain the potential mechanism by which dispositional mindfulness influences relapse vulnerability through self-efficacy among persons in recovery from Substance Use Disorders (SUDs). Data were collected from residential clients (N=206) in both private and government drug rehabilitation centers. Results of the mediation analysis suggest that the trait of being fully attentive to present experiences allows recovering persons to access functional self-beliefs, such as the perceived capacity to accomplish tasks and overcome difficulties. In the face of challenging situations that may trigger relapse, dispositional mindfulness contributes partially to one's sense of command or mastery. Consequently, this helps individuals cope with relapse problems. The findings provide implications for relapse prevention and the utility of mindfulness-based interventions for SUDs.

Keywords: *dispositional mindfulness, relapse vulnerability, self-efficacy, general self-efficacy, substance use disorders, SUDs, Social sciences*

Philippine Journal of Psychology, Volume No. 52 Issue No. 1, 185-208
2019,
(Filipiniana Analytics)

0637

Ecosystem services in the hand of the farmers: what matter most?

Olvida, Imelda DG. , Sobremisana, Marisa C. , Callo, Filma A. , Garcia, Jose Nestor M. , Mercado, Mark Joseph T., Decena, Gracielle R.

The dynamic nature of agro-ecosystem enables it to provide ecosystem services such as provisioning, supporting, regulating and cultural services that are important to humans. However, availability of these ecosystem services in agricultural fields is highly governed by the management practices employed by the farmers resulting in dis-services of some available ecosystem services. The existing services do not only affect the productivity of the agricultural systems but also help in its stability especially in the face of climate change. To determine the factors that contribute to the loss of ecosystem services in the agricultural field, a social survey using a pre-tested questionnaire and one-on-one interview was employed to obtain the socio-demographic profiles of the registered farmers from Barangay Bagupaye, Mulanay, Quezon. While a focus group discussion aimed at determining their level of prioritization and factors that contribute in their decision-making process on what ecosystem services to be mostly rendered. Results show that farmers prefer (1) provisioning and (2) regulating services, followed by (3) cultural services, while the least preferred were supporting services. The study also found that their social networks such as involvement in religious groups, farmers association/organization and financing membership highly affect their decision making more than sex, age, years in farming and educational attainment. It also revealed that farmers tend not to understand fully the ecosystem services concepts in the farming community. Also, their limited knowledge on the dynamics and importance in the different ecosystem services hinders their

appreciation and holistic view of the ecosystem functions as an ecological approach in agricultural landscape thus, affecting the integrity of their farming landscape.

Keywords: *Agroecosystem, Ecosystem services, Agricultural landscape, Climate change, Ecological science, Social sciences*

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2019 July,
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NP

0638

Engaging the family in recovery: outcomes of a community-based family intervention

Co, Trixia Anne C. , Melgar, Maria Isabel E. , Bautista, Violeta V. , Tabo, Chantal Ellis S. , Bunagan, Katrine S. , Hechanova, Ma. Regina M.

The *Katatagan Kontra Droga para sa Komunidad* (KKDK) is a Filipino community-based drug recovery program that addresses individual and family issues. This study explores the changes in the family after the drug users completed the program. Surveys and interviews were used to evaluate changes in family support, quality of family life, and substance use disorder (SUD) symptoms. Results show participants perceived significant increase in family support and quality of family life, as well as decrease in SUD symptoms. Their family members also reported individual and familial changes in the participants as a result of the program. They showed remorse, became more responsible, and communicated better after going through the intervention. There was also an improvement in quality of family life, religious rituals, and time spent with the family. Implications on community-based drug recovery programs focusing on family changes are discussed.

Keywords: *family, community, drug recovery, drug recovery program, Social sciences*

Philippine Journal of Psychology, Volume No. 52 Issue No. 1, 155-183
2019,
(Filipiniana Analytics)

0639

Evaluation of the training and pilot implementation of *katatagan kontra droga sa komunidad*

Acosta, Avegale C. , Calleja, Mendiola T. , Alianan, Arsenio S. , Hechanova, Ma. Regina M. , Yusay, Camil

This study evaluated the training of facilitators and pilot implementation of the *Katatagan Kontra Droga sa Komunidad* (KKDK), a community-based drug recovery program. Paired samples t-test of pre and posttest scores of 111 community facilitators who underwent training revealed significant changes in their perceived competence, motivation, and commitment. The program was pilot-tested among 46 mild-risk drug users. Pre and posttest results revealed moderate effects in substance use dependence symptoms and life skills, and large effects in drug recovery skills and psychological well-being. Correlational analysis of posttest scores revealed a negative relation between life skills and SUD symptoms and a positive relation between recovery skills and psychological well-being. Post-program focus group discussions with participants and interviews with facilitators highlighted the value of building recovery and life skills in enabling change in the participants and their families. However, field observations revealed a number of enablers and challenges in implementation.

Keywords: *substance use, drug prevention, drug recovery, community-based intervention, Social sciences*

Philippine Journal of Psychology, Volume No. 52 Issue No. 1, 65-101
2019,
(Filipiniana Analytics)

An exploration of ethical and methodological challenges in trans-affirmative psychotherapy with Filipino transgender and gender non-conforming (TGNC) clients
Salvador, Divine Love A.

To spark critical and professional discussion on integrating trans-affirmative psychotherapy in clinical and counseling psychologists' general practice, this paper presents and describes some ethical and methodological challenges in doing trans-affirmative psychotherapy with Filipino transgender and gender non-conforming (TGNC) clients, specifically transgender women. Sources of insight for this paper include: a) case notes and observations from a research-therapy project with two transgender client-participants, b) the author's observations from previous clinical work with LGBT clients, and c) the literature on TGNC mental health outcomes and trans-affirmative practice. The challenges described here pertain both to ethical boundaries that circumscribe the practice of psychotherapy and counseling as well as to principles that undergird methodologically sound or effective clinical work. Some proposed resolutions to these highlight the importance of thinking integratively about the ethical and methodological dimensions of practice work.

Keywords: *transgender, trans-affirmative therapy, psychotherapy, counseling, gender non-conforming, Social sciences*

Philippine Journal of Psychology, Volume No. 49 Issue No. 2, 189-216
 2016,
 (Filipiniana Analytics)

An exploration of factors that motivate human rights workers in areas of armed conflict in the Philippines
Chua, Ethan Cedric , Hernandez, John Francis, Dela Paz, Jan Nikko , Teng-Calleja, Mendiola

This study examined the experiences and motivation of human rights workers (HRWs) in areas affected by armed conflict in the Philippines. Six human rights workers from Karapatan responded to semi-structured interviews. Karapatan is a Philippine NGO whose mission is to uphold human rights and document instances of human rights violations. The results described the risks experienced by human rights workers in conflict afflicted areas in the country. Intrinsic factors that motivate HRWs to continuously engage in human rights work despite facing adverse situations include altruism, belief that they are advocating a just cause, feeling a sense of fulfillment, and strongly identifying with their work. Findings likewise show that human rights workers draw strength from the relationships that they have with their partner communities. They are motivated to match the courage of community members (*tumbasan ang tapang*), and are strengthened by the strong and reciprocal bonds that they have with the communities that they serve. Implications on selecting, preparing, developing and providing organizational support to human rights workers are discussed.

Keywords: *human rights, human rights workers, community, armed conflict, intrinsic motivation, Philippines, Social sciences*

Philippine Journal of Psychology, Volume No. Issue No. ,
 2019,
 (Filipiniana Analytics)

Exploring political values of Filipinos using an etic approach
Bernardo, Allan B. I.

An exploratory study was conducted to study political values of Filipinos. An etic approach was adopted using as starting point the theory of core political values (Schwartz, Caprara, & Vecchione, 2010) to explore the political

values of a sample of 699 Filipinos who participated in an online survey. The results of exploratory and confirmatory factor analytic procedures suggest three core political values—conservation, globalism, equal rights—that have distinct motivational directions. Regression analysis revealed distinct patterns of relationships with social axioms, which indicate beliefs about the processes that lead to desired social outcomes. Finally, cluster analysis and MANOVAs indicated four groups of participants that show distinct profiles in terms of endorsement of political values and related social axioms. The results are discussed in terms of the limits of the etic approach, but also in terms of the potential usefulness of core political values in understanding different political attitudes and behaviors of Filipinos.

Keywords: *politics, political values, value types, social axioms, etic approach, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 7-38
2017,
(Filipiniana Analytics)

0643

Faculty perspectives on organizational culture and other key influencing factors of technology infusion

Empaynado-Porto, Analin B.

Quality education is one of the foundations of sustainable development. Integration of innovative tools can bring not only quality education but also accessibility and inclusivity. However, there are other factors that must be considered in the infusion of technology in the educational settings. Thus, this study focused on organizational culture, attitudes and behavior of teachers towards technology (technology acceptance) and teachers' profile as push and pull factors of technology infusion in a university setting. The study utilized a descriptive-correlational research design. The respondents of the study were faculty members from both private and public universities in the Philippines. The study utilized the Organizational Culture Assessment Instrument (Cameron & Quinn, 2005) and the Technology Acceptance Questionnaire (Davis, 1986). The results of the study were interpreted and analyzed using descriptive and inferential statistics. The results of the study reveal that hierarchical culture is the dominant culture that exists in higher educational institution. Most teachers use technology for communications purposes and information gathering. Technology acceptance is high as expressed by the respondents' behavioral intention to continuously use e-learning. Significant relationship exists between infusion of technology and the type of institution as well as academic rank of faculty. Four out of six dimensions of organizational culture also influence technology infusion. Lastly, linear regression analysis shows that all constructs of the Technology Acceptance Model (TAM), predicts actual infusion of technology in an educational setting. While there are several influencing factors revealed in the infusion of technology, results suggest the following: 1. Management of organization's acculturation through empowerment and active involvement; 2. Proper control and monitoring of processes and structures needed in technology infusion; 3. Expectations and performance indicators should be well communicated; 4. Appropriate coordination systems within the organization should be in place; and, if necessary, 5. Benefits and rewards system should be considered.

Keywords: *Open distance learning, Distance education, Educational technology, Management and implementation, Social sciences*

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2019 July,
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Financial stress and well-being of Filipino students: the moderating role of external locus-of-hope

Resurreccion, Katrina Fernando , Bernardo, Allan B. I.

One of the core principles of positive psychology is that character strengths buffer the effects of adverse experiences on well-being. This study investigated whether external locus-of-hope (LOH) moderates the effects of financial stress on Filipino students' well-being. Students from various universities answered questionnaires that included scales for financial stress, internal and external LOH, and satisfaction with life; all the relevant scales had good psychometric properties with the current sample. As expected, life satisfaction was negatively predicted by financial stress and positively predicted by three LOH dimensions. More importantly, external-family LOH moderated the relationship between financial stress and life satisfaction; there was no negative relationship between financial stress and life satisfaction among students with high external-family LOH. But the results also suggest that financial stress moderates the relationship between external-spiritual LOH and life satisfaction; external-spiritual LOH's positive relationship with life satisfaction is found only among those who experience low financial stress.

Keywords: *financial stress, locus-of-hope, hope theory, well-being, life satisfaction, university students, Social sciences*

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(Filipiniana Analytics)

Finding the soul in Philippine regulation: Amartya Sen, social justice and the urban development and housing act of 1992

Flores, Herisadel P.

This study explores the limitations of the economic theory of regulation and finds that: (i) it fails to explain why some regulations pursue ethical and moral objectives; and (ii) it does not provide much normative guidance on how regulation could be used to bring about desirable social outcomes (e.g., social justice). In this light, the ideas of Amartya Sen on social justice are presented as a complementary, if not an alternative, approach in explaining and evaluating the pursuit of ethical objectives through regulation. A cursory assessment of the regulatory provisions of the Urban Development and Housing Act of 1992 and their implementation was done to demonstrate the feasibility of using Sen's approach in this type of undertaking. In doing so, content analysis of the law, as well as a review of existing studies by other authors on its implementation, was employed in a summary study approach. The conclusion summarizes the insights from the assessment exercise and asserts the practicability of Sen's approach.

Keywords: *Amartya Sen, regulation, social justice, urban development and housing, Social sciences*

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(Filipiniana Analytics)

Food inflation, job misery, and hunger incidence in the Philippines: a panel data analysis

Mapa, Dennis S. , Tabao, Maria Lorena , Mendoza, Melrose Ivy , Bagsit, Reniel Louise

Food prices spiked in 2018, after a period of relatively low and stable price regime in 2015 to 2017. Data from the Philippine Statistics Authority (PSA) show that during the first ten (10) months of the 2018, food inflation

averaged to 6.8 percent, compared to just 3.05 percent full year average in 2017. The October 2018 food inflation rate was recorded at 9.7 percent. The increase in food inflation was mainly due to the increasing prices of rice and fish. Higher food prices hurt the poor more since a large percentage of their expenditures is allotted to food. It is not surprising, therefore, that Self-Rated Hunger Incidence, as reported by the Social Weather Stations (SWS) increased to 13.3 percent of all families during the 3rd quarter of 2018, from 9.4 percent in the 2nd Quarter, for a significant 3.9 percentage-points quarter-to-quarter increase. This paper looked at the impact of food inflation and job misery index, defined as the sum of unemployment and underemployment rates, on hunger incidence in the country using panel data. The paper analyzed the impact of food prices and job misery on self-rated hunger using the sub-national panel of the SWS, namely: National Capital Region, Balanced Luzon, Visayas and Mindanao. The paper employed the dynamic panel models suggested by Arellano and Bond. The results showed that food inflation explains most of the increase in self-rated hunger incidence during the 3rd quarter, with job misery index explaining a small, but significant, increase in hunger incidence. Further, the study showed the need to improve government policies in making sure that food prices, particularly rice and fish, are manageable and within the reach of poor families for higher food prices hurt the welfare of the poor families.

Keywords: *Hunger incidence, Food inflation, Job misery index, Dynamic panel models, Social sciences*

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0647

Health as an electoral currency in the Philippines: insights from political ethnography *Arguelles, Cleve V.*

This article aims to contribute to the literature on health and politics in the Philippines. So far, the wealth of studies on the intersection of these two in the local context has been mostly focused on issues of health sector reform and specific health policies/legislations. Unlike elsewhere, the use of health in elections in the Philippines, the most important political activity in any democracy, remain largely understudied. This article attempts to fill this gap by studying the ways health was used in the 2016 Philippines elections. To do this, I mapped the ways health is used as an electoral currency, meaning as a means for vote brokerages, during local elections.

The observations that informed this study are based on a political ethnographic study in Quezon City. In-depth interviews, focus group discussions, and participant observations were conducted among voters and politicians of two vote-rich electoral districts in the city. The transcripts and notes from the data gathered were coded and thematically analyzed.

Voters and politicians use health as means of transactional exchange of votes during local elections- an electoral currency. Politicians use their control of public health facilities and services to secure votes while voters simultaneously use their vote as a leverage to gain access to these health facilities and services and improve its delivery in their communities. So while politicians use health to reinforce patron-client ties during elections, voters take advantage of its opportunities to improve their everyday life.

Keywords: *health, election, politics, ethnography, clientelism, Philippines, Social sciences*

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A historical perspective of the mandatory service policy in the Philippines: a document analysis

Ting, Mikko Anthony L. , Sepe, Demi Arantxa C. , Cengca, Ma. Rhenea Anne M. , Agbon, Azar G. , Avelino, Michelle D. , Lara, Aubrey B. , Bardelosa, Danika Joy D. , Paolo Victor N. Medina,, Guevarra, Jonathan P. , Antonio, Carl Abelardo T.

The Philippines has, mandatory service policies to address the insufficiency and maldistribution of human resources particularly for health services. Despite being perceived as an appropriate intervention to bridge the aforementioned HRH gaps, the past and present implementations of such programs in the country have never been formally studied.

This paper aimed to present the history of mandatory service programs in the Philippines, look at their natures, and see how their different implementations relate to each other. Using a qualitative document analysis method, administrative issuances and reports relevant to past and current implementations of mandatory service policies in the Philippines were obtained and reviewed.

Mandatory service programs have been implemented in the country by institutions from both the private and public sectors as early as 1968. The focus of such has been mostly for government positions and specialized professions including physicians and scientists. While extensive efforts have been made through the years, the policies demonstrated fragmentation and recurring gaps in implementation. Such gaps include the lack of enabling policy mechanisms, formal monitoring and evaluation, and program institutionalization.

The historical narrative of return service programs in the country is a potential source for the development of an overarching mandatory service policy framework for human resources in the Philippines, one that is specific to the context and setting of the country. By articulating policy issues identified, this paper provided a stepping-off point for future mandatory service program policy planning, implementation, evaluation, and institutionalization in the Philippines.

Keywords: *mandatory service, human resources for health, return service agreement, Philippines, Social sciences*

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Improving human resource capacity: exploring certification in local governments *Calugay, Zita Concepcion P.*

The proposed institutionalization of certification pathways for local government officers and staff is a step towards the continuing capacity building to raise the qualifications standards and improve the professionalization of the local government bureaucracy. Certification as a concept serves to validate that the local officers and staff possess and are able to demonstrate the required competencies for the job in accordance with set standards, and thus counteract the common perception that they are inefficient, lacking in skills, and hired based on political influence. Two existing and comparable certifications systems, namely, the Technical Education and Skills Development Authority (TESDA) national certification system for technical and vocational skills, and the Local Government Training Package in Australia are analyzed in formulating a model for local government certification system. The proposed local government certification system will require policy reforms geared towards the recognition of the local government sector as an industry and establishment of a qualifications framework for the local government industry. Different institutional arrangements or modalities including the centralized, collaborative, privatized and mixed models may also be explored in pursuing the certification system.

Keywords: *certification, human resources management, local government, local government personnel, certification in local government, Social sciences*

The indigenous practices of the rural folks with regard to weather-related diseases in the province of Ilocos Norte

Gorospe, Mary Ann B. , Agbigay, Lea C. , Damaso, Erle Stanley G., Damaso, Julie C.

Through time humans have developed measures on how to adapt to disasters in life especially in extreme or hot weather conditions. These conditions can aggravate already existing diseases especially cardiovascular diseases (CVD) and respiratory diseases. Yet their indigenous practices about the intricacies in life have helped them adapt to such environments. Barangays from municipalities in the Province of Ilocos Norte were the study sites. Interviews using a semi-structured questionnaire were employed in gathering data. Respondents who have cardiovascular diseases were culled out from the master list of the Rural Health Unit (RHU). Respiratory diseases were also inquired along with the common illnesses encountered throughout hot weather. The number of respondents was selected randomly at 5% equal distribution from the master list. Respondents tallying to 605 were interviewed. Dialogues with the respondents showed that the indigenous practices commonly employed for cardiovascular diseases were consuming garlic (562) religiously taken in 3-4 cloves. Drinking lots of water (547) was also practiced and consumed as “agua tyempo” (whenever necessary). Additional practices were eating “malunggay” (348), taking a sip of vinegar, and taking a slice of raw ginger. For respiratory diseases, “lagundi” leaves (506) was taken orally followed by consuming juiced “ampalaya”, “herba buena” (449), and guava decoction. Common diseases such as cough was treated with “lagundi” (598) or “anonang” leaves (287) taken by decoction. Dengue fever was also experienced and managed by neem and papaya leaves decoction. Respondents had their own indigenous practices of managing ailments experienced during hot weather. Likewise, it was observed that materials used are endemic in their locality and actually possess health benefits.

Keywords: *Indigenous practices, Weather, Diseases, Social sciences*

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Information-seeking behavior and willingness to pay of the residents vulnerable to volcanic hazards

Arboleda, Mark Dondi , Barroga-Jamaias, Serlie , Sanico, Lucille Rose D.

This study determined the factors that influence the information-seeking behavior and willingness to pay of the residents vulnerable to volcanic hazards in Barangay Gulod, Laurel, Batangas. The study area is one of the lakeshore communities exposed to the various hazards of Taal Volcano. In spite of history of hazards, through the years, population continued to increase because of abundant aquatic resources (fishery) as one of the main sources of income. Data were gathered from March to April 2018 among 147 respondents chosen using stratified random sampling. Results of the study showed that the current sources of information used among residents were television, barangay announcements, and radio. While for their preferred sources of information, they rely on barangay officials as credible source and accessible whenever an emergency or disaster occurred. Majority of the respondents are willing to pay for disaster preparedness services such as mobile phone DRR information and alerting, emergency insurance, and for DRR training. The more they trust the information sources and the more willingness to pay for DRR related services, the higher their chances to practice disaster preparedness for volcanic eruption. These results will be a valuable input to the enhancement of disaster risk reduction and management plan of the barangay and in the formulation of communication strategy for disaster preparedness at the municipal level.

Keywords: *Disaster risk management, Volcanic hazards, Risk communication, Taal volcano, Social sciences*

Islam, Bangsamoro and democracy
Rasul-Bernardo, Amina

Despite its potential for growth and development, the Bangsamoro region has seen decades of demographic marginalization, repression, and underdevelopment. These social problems, which were attributed to colonialization, are further aggravated by armed conflict between rebel groups and the government, and weak legal framework for regional autonomy. In her speech, Amina Rasul-Bernardo argues that the Bangsamoro conflict can only be addressed with a better understanding of its history and context. Rasul-Bernardo urges the passage of a Bangsamoro Basic Law that strengthens regional autonomy and ensures genuine, sustainable development in the region.

Keywords: *Bangsamoro conflict, Bangsamoro history, regional autonomy, Social sciences*

Life satisfaction predicts positive workplace outcomes among Filipino guidance counselors

Salanga, Maria Guadalupe, Mateo, Niño Jose

The study tested the broaden-and-build theory of positive emotions (Fredrickson, 1998; 2003) in the field of counseling practice. The researchers hypothesized that counselors' life satisfaction would predict outcomes relevant in practice: counseling self-efficacy, emotional awareness, and flow state. Participants (n=137) completed measures of counseling self-efficacy, flow state, life satisfaction, and emotional awareness. Age, gender, civil status, and degree earned were identified as covariates and their effects were controlled in the regression analyses. Findings revealed that life satisfaction positively predicted flow state and emotional awareness. Counselors who expressed greater satisfaction with their lives seem to see the counseling experience as rewarding and are more attuned to their emotions. This finding is consistent with the key postulate of broaden-and-build theory on the beneficial consequences of positive affect on psychological resources.

Keywords: *life satisfaction, emotional awareness, flow state, counseling self-efficacy, Filipino counselors, Social sciences*

Lived experiences of stigma among Filipino former drug dependents: an interpretative phenomenological analysis

Yabut, Homer J., Cunanan, Angela Lorraine P.

This study is a qualitative phenomenological investigation on the experiences of Filipino former drug dependents who were subject to stigmatization. Seven semi structured interviews were conducted and analyzed using

interpretative phenomenological analysis (IPA). The analysis revealed four themes: (1) discrimination after discovery, (2) psychological consequences, (3) ways of coping, and (4) sense of purpose. Findings suggest that the process of experiencing and overcoming stigma lies in the interplay of social, structural, and internal processes and is underpinned with a desire to improve oneself. Despite these experiences, participants have also learned to move beyond their stigmatized identity and attain a sense of purpose and hope. The role of stigma on help-seeking attitudes and practical implications for intervention and policy reform are also discussed.

Keywords: *stigma, experiences of stigma, drug dependence, substance use stigma, interpretative phenomenological analysis, Social sciences*

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0655

Measuring risk attitudes influenced by emotions: an audial experiment *Sy, Hans Rubayne R. , Romero, Carlos Joaquin Miguel D. , Esguerra, Paulo Gabriel L.*

Laboratory experiments in the field of experimental economics and behavioural finance have shown that there is an undeniable effect of emotions on decision making. Past studies prove that risk tolerances of individuals are measurable in controlled environments and the usual form of emotion induction is through the use of audio-visual stimuli. In this study we examined the influence of music on an individual's emotions and in turn their investment decisions, as we believe music is an overlooked source of emotional bias. Here we extend the literature by using a continuous double auction format where participants can simultaneously sell off and buy assets at the prices they prefer, all while under the influence of emotional treatments through music. The high-intensity emotions were excitement and fear, and these two emotions were compared to a low-intensity, calm emotional treatment. Through the use of music as our emotional priming method, we found that participants induced with fear were on average more risk-seeking than those induced with excitement and calm emotions. This deviates from the findings of previous studies that made use of audio-visual treatments where those induced with fear as well as excitement, were found to be notably more risk-seeking than those induced to feel calm.

Keywords: *Emotions, Music, Priming methods, Risk tolerance, Social sciences*

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0656

Merging strategy and talent management: challenges and practical applications *Maramba-Turqueza, Joy Noree*

People who research and publish on personality and social psychology tend to be, in the main, academics. While we assume that our theories and findings are relevant to the wider world of work, business, and social interaction where we expect them to play out, few career researchers have a day-to-day engagement with these domains. Not only is this a blind-spot—it can distort the relationship between science and industry, both of which are co-constructors of the social realities that interest us. As a useful way to correct our usually inward and in-group discussions, we have invited a contributor to provide a view from the “head office”, and how our science might be informed by the problems that preoccupy people on the front-lines of human resources and management. The picture we get tells us much about how and why our work often fails to be relevant to the people we expect to benefit the most from it, and the pragmatic urgency that tends to compete with the value of searching for fundamental answers.

Keywords: *personality types, social psychology, strategy management, talent management, work-life balance, job requirements, competency, Social sciences*

Motor vehicle safety promotion program: its effects on the knowledge, attitude, and behavior of drivers

Balila, Jolly S. , Estrada, Miriam R. , Castillo, Eleanor C. , Jacinto, Melanie Joy A., Mergal, Vicky C.

This study determined the effects of a motor vehicle safety promotion program among male drivers. It utilized the quasi-experimental design, using two group pretest-posttest designs. The participants are late adolescent and middle-aged adult male vehicular drivers particularly from ages 18 to 60 years in Barangay Tartaria at Silang Cavite. Forty participants were assigned in each of the study groups. The experimental group was exposed to an intervention program for a period of one month. At baseline, the experimental and control group had a failing mark on knowledge. Both study groups had *positive* attitude and a *good* driving behavior was also noted in both groups. At the endline, the participants from the experimental group had a passing mark in knowledge. Although the attitude and driving behavior remained to be *positive* and *good* respectively, the experimental group showed an improvement in these aspects. However, the control group still had a failing mark in knowledge and retained a *positive* attitude and *good* behavior towards motor vehicle safety. An increase in the gain score was also noted in knowledge, attitude, and driving behavior of the respondents from the experimental group was observed, which was not noted in the control group participants. There was no significant difference in the gain score considering age, monthly income, educational attainment, and number of years driving with a license in both experimental and control groups. However, when vehicle type and personality traits were considered, there was a significant difference in the gain score of the experimental group. The results of the study suggest that the intervention program was effective in enhancing the knowledge, attitude, and driving behaviors related to motor vehicle safety among male drivers.

Keywords: *Motor vehicle safety, Knowledge, Attitude, Behavior, Social sciences*

A narrative analysis of the experiences of barangay officials involved in community-based drug rehabilitation

Hechanova, Ma. Regina M. , Melo, Kyla Jann , Gumb, Norman Gabrielle M. , Allado, Mark Angelo D.

The purpose of the study is to understand the phenomenon of community-based drug rehabilitation (CBDR) in the Philippine context from the perspective of barangay officials involved in CBDR. The research investigated the narratives of officials, both treatment facilitators and program overseers, regarding their experiences in implementing CBDR programs. The research used Murray's (2000) framework and elicited data on three levels: ideological, positional, and personal. The findings revealed ideological narratives of CBDR as an alternative response to the government's approach, CBDR as effective solution to treating drug use, and as part of a holistic approach to drug recovery. The positional narratives complement the ideological narratives as they described their roles as protectors, facilitators of growth, and partners. Similarly, their personal narratives revealed experiences of frustration, fulfillment, and commitment and personal growth. Implications of the findings regarding the implementation of CBDR and the promotion of restorative justice are discussed.

Keywords: *narrative, community-based drug rehabilitation, drug rehabilitation, barangay officials, Social sciences*

Narratives of identity reconstruction among recovering drug dependents

Tolentino, Patricia Ellyn C. , Ty, Welison Evenston G. , Santos, Juan Lorenzo D. , Teston, Raya Sofa A.

This study explored the recovery narratives and identity reconstruction of seven recovering Filipino drug dependents in a rehabilitation center. Extant literature on drug abuse in the country has been limited to etiology and treatment, as well as the difficulties experienced by drug dependents following release from the rehabilitation center. The narratives culled in this study, however, gave depth and continuity to the experiences during rehabilitation and recovery. This study highlighted the role of Filipino values in driving the narrative forward. Using narrative analysis and self-positioning theory, seven main plots of the recovery narrative and the respective self-positions emerged. The plot progressed from etiology, to admission, and to recovery. Meanwhile, the positions showed participants' transition from an addict identity to a non-addict identity, within the rehabilitation process. Findings from this study offer new insights into drug abuse recovery as an attempt to fill the methodological and epistemological gap in addiction studies; moreover, this research shows how the combination of narrative analysis and positioning theory offers researchers a rigorous method that can contribute to studies that focus on identity and change, thus expanding the understanding of drug abuse beyond pathology.

Keywords: *drug abuse, drug addiction, addiction recovery, narrative analysis, positioning analysis, Filipino psychology, Social sciences*

Negotiated co-design of an information system for early warning on deep-seated landslides: case study in Brgy. Umingan, Alimodian, Iloilo

Solidum, Jr., Renato U. , Decena, Eunice , Gumiran, Brian Anthony , Moncada, Fatima

Previous catastrophic deep-seated landslides in the Philippines proved the need for a sustainable early warning system for such hazard. While a monitoring and warning generation system is existing, it uses information and communication technologies (ICTs) and is centrally-operated. Hence, co-design of a proposed community-based early warning system for deep-seated landslides (CBEWS-L) was conducted to empower local communities with limited technology resources. Negotiation techniques were applied to the participatory design (PD) methodology to ensure that the information system (IS) that will support the CBEWS-L fits the interests of all stakeholders. Workshops were conducted to a) understand the process and information needs of a local community in Brgy. Umingan, Alimodian, Iloilo; b) decide on technical and non-technical requirements for their IS; and c) evaluate a prototype in terms of functionality and usability. The community's need for direct participation and the local government's need for centralizing data processing resulted in a multi-stakeholder IS design. Data were collected from the community, processed at the municipal level, and mirrored to a central national system. A mix of ICTs and indigenous monitoring and communication practices were identified as components of the IS. Local authorities and community members designed paper prototypes for the ICT components which were converted into mid-fidelity prototypes for testing. Evaluation results showed that because the stakeholders themselves formulated the IS requirements, the resulting prototype was highly usable and functional. Co-design, through negotiation, is therefore a promising method in developing an IS for CBEWS-L that is both efficient and empowering.

Keywords: *Early warning system, Participatory design, Negotiation, Social sciences*

Negotiating the streets: hidden resilience among grown-up street children in Manila
Wartenweiler, Daniel

This study investigated processes of hidden resilience of grown-up street dwelling children who still live on the streets in an inner city of Manila. Two adult street dwellers were purposively sampled based on their resilient functioning across four domains. A naturalistic narrative design was employed and the collected narratives were thematically analyzed. Results showed that both participants had experienced non-normative adversity, such as severe poverty, death of a parent and of other significant persons, dropping out of school, and exposure to drugs and vice. Six interacting resilience processes led to adaptive outcomes: having a significant adult, early involvement in work, distancing self from peers, delinquency as turning point, early parenthood, and spirituality. The identified processes and their corresponding outcomes reflect an idiosyncratic and context-specific adaptation to adversity, hence providing evidence for hidden resilience among grown-up street dwelling children as an atypical, discursive negotiation between individual and environment. The narratives illustrate the lack of basic rights and the great fragility in the participants' lives, but also enormous perseverance, contentment, meanings made, and generativity. The participants are not depicted as victims or delinquents, but their voices speak of agency, hope, and dignity.

Keywords: *resilience, hidden resilience, street dwellers, street children, Social sciences*

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NPM, business process re-engineering and local governments: the case of local business permitting and licensing system regulatory reform
Ilago, Simeon A

The article explores the process of re-engineering in the business permitting and licensing systems (BPLS) of local governments over a five-year period (2010-2015). Review of secondary data and official documents on the BPLS reform program and process analysis of the streamlining approaches used by two local government units (LGUs) for their BPLS procedures both reveal differences, limitations, and constraints in implementation at the local level. The article argues that, despite the attempt to converge BPLS streamlining efforts by issuing uniform standards and guidelines, implementation varies due to the decentralized and political context, the local government officials' understanding of the process and its elements, and their perception of the policy problem. The article then suggests areas for future research along this line.

Keywords: *new public management, business process re-engineering, business permitting and licensing system, local government units, Social sciences*

Philippine Journal of Public Administration, Volume No. 61 Issue No. 1-2, 1-17
2017/12,
(Filipiniana Analytics)

Personality and motivational patterns of incarcerated women involved in drug use
Esguerra, Janice D. , Bautista, Caitlyn A. , Cabrera, G

This study analyzed the personality and motivational patterns of 175 purposively selected incarcerated women who violated RA 9165 and were detained at a jail facility in Lucena City, Quezon. It also attempted to determine

their demographic profile and explore its association with their personality and motivational patterns. This employed causal-comparative and correlational approaches. The *Panukat ng Ugali at Pagkato* (PUP) by V. G. Enriquez was used to measure personality traits and Marijuana Motives Measure (MMM) by K. B. Carey for the motivational pattern. Results showed: 34.3% of the respondents during the commission of crime were 28-37 years old; 61% of them were high school graduates; 77.1% were from nuclear families; 64% had PhP 7,980 monthly family income; 40.6% were wage and salary earners; and 80.6% had no verdict yet regarding their cases. The PUP revealed that in terms of extraversion, 49.71% of the respondents had below average *lakas ng loob* while in terms of agreeableness, 42.86% were above average in *pagkamagalang*. With other personality traits, majority of the respondents were gauged within average level. The MMM revealed that 70.3% of the respondents used illicit drugs to cope with certain situations. Using chi-square, associations revealed are the following: between agreeableness and educational attainment ($\chi^2=38.81$; $p=0.003$) and family background ($\chi^2=14.008$; $p=0.03$); conscientiousness and age during commission of the crime ($\chi^2=28.682$; $p=0.094$); emotional stability and educational attainment ($\chi^2=15.502$; $p=0.078$) and family background ($\chi^2=7.022$; $p=0.071$); and openness to experience and previous occupation ($\chi^2=16.8$; $p=0.032$). Meanwhile, the respondents' motives were associated with educational attainment ($\chi^2=27.085$; $p=0.008$) and status of the case ($\chi^2=8.707$; $p=0.069$). A correlation between emotional stability and motivational pattern ($\chi^2=19.278$; $p=0.082$) was observed. Programs that promote rehabilitation and well-being of the incarcerated women were recommended.

Keywords: *Personality traits, Motivation, Incarcerated women, Drug use, Social sciences*

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0664

Philippine social welfare and development: institutionalizing organizational performance and result-based performance management system *Bautista, Lloyd C.*

The influence of New Public Management in reforming bureaucracies is manifested in the shifting of government focus from rules and processes to results and outputs, thus, giving premium to the concepts of efficiency and accountability. In the Philippines, part of the national government's effort to reform public expenditure management is the adoption of a results-based management system through the formulation and implementation of the organizational performance indicator framework (OPIF) and the results-based performance measurement system (RBPMS). Performance measurement, as well as employee motivation, is important in the operationalization of the OPIF as a results-based management approach. This article looks into the strategic value of results management in government agencies' efforts to attain its development goals. In the case of the Department of Social Welfare and Development (DSWD), the strategic value of a results management framework is to clearly identify the desired development results, intermediate outcomes, and outputs to be produced. The OPIF contributes to the efficient allocation of resources in the DSWD through results-based monitoring and accounting. Areas of strength and improvement in each of the eight phases in the OPIF and RPBMS were assessed to identify problems, gaps, and challenges encountered in the conceptualization and implementation of results management in the DSWD.

Keywords: *results management, new public management, organizational performance indicator framework, results-based performance management system, Social sciences*

Philippine Journal of Public Administration, Volume No. 57 Issue No. 1, 1-29
2013/06,
(Filipiniana Analytics)

Planning and budgeting linkage at the local level: status, policy responses and prospects *Celestino, Alicia B.*

Linking planning and budgeting functions in both national and local governments is important in producing development results and providing a more effective and efficient delivery of goods and services. This article examined the horizontal disconnect in planning and budgeting at the local level, and the vertical disconnect between national and local government planning and budgeting under a decentralized system of governance. The article provides a historical account of the development of the Philippine government's planning and budgeting functions. The study probed how the government addressed the disjoint in planning and budgeting functions through its policies, issuances, and programs that have been enacted and implemented both at the national and local levels. This study also assessed the prospects and opportunities for a strengthened planning and budgeting linkage at the local level with the end view of producing the desired development results and effecting a more efficient and responsive public service delivery system.

Keywords: *budgeting, planning, planning-budgeting linkage, local government, decentralization, Social sciences*

Philippine Journal of Public Administration, Volume No. 57 Issue No. 2,
 2013/12,
 (Filipiniana Analytics)

The pleasure principle: impulsivity overpowers condom use efficacy among men who have sex with men (MSM)

Balderas, Kirsten Eloise , Mapili, Ruxan Faith , Dy, Hanna Valerie , Cubil, Ma. Lourdes , Batara, Jame Bryan L.

Despite continuous efforts to control the prevalence of HIV/AIDS in the Philippines, the rate of the spread of the virus has skyrocketed. Risky sexual practices among men-who-have-sex-with-men have been identified as one of the top contributors for the heightened spread of HIV/AIDS. There have been growing studies looking into self-efficacy and impulsivity as psychological factors that carry impact toward sexual practices. In the present study, both self-efficacy toward condom use and impulsivity were tested as predictors of risky sexual practices. A total of 93 MSM participated in the survey. Results of hierarchical regression analysis indicates a cooperative suppression effect, that is, the presence of impulsivity as a suppressor increases the capacity of both self-efficacy toward condom use and impulsivity in predicting risky sex. In line with cognitive-experiential self-theory, implications of the findings indicated that the automatic and pleasure-driven impulsivity overpowers the deliberative and reason-oriented ability and knowledge toward condom use in engaging in risky sex.

Keywords: *self-efficacy, impulsivity, risky sex, HIV/AIDS, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 97-113
 2017,
 (Filipiniana Analytics)

Positive psychology research in the Philippines: an introduction *Bernardo, Allan B. I. , Datu, Jesus Alfonso D. , King, Ronnel B.*

Over the past two decades, advances in positive psychology has resulted in an exponential increase in the number of studies concentrating on the dispositional, interpersonal, and socio-contextual factors which can optimize adaptive psychological and well-being outcomes. However, most of these investigations have focused on expanding the science of positive traits, states, and institutions in Western cultural contexts. The generalizability and applicability of these Western models have to be scrutinized and reconsidered when they are transported to

different cultural settings. There is also a need to come up with emic studies that closely reflect the lived experience of peoples across cultures.

Keywords: *research, Filipino psychology, socio-contextual factors, cultural setting, Social sciences*

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2018,
(Filipiniana Analytics)

0668

Preferred motivational strategies of science students: basis for pedagogical enhancement

Rogayan, Jr., Danilo V. , Bautista, Jocelyn R.

A variety of methods was done by teachers to engage students in classroom activities and foster critical thinking which can ignite their interest in the lesson. Through motivational strategies employed by the teachers, the students understand better the concepts and perceive learning as an enjoyable venture. This descriptive-survey research explored the preferred motivational strategies of 106 Grade 7 Science students in a government-run secondary national school in Zambales, Philippines. The study showed that the students moderately preferred visual-auditory motivational strategies, logical-mathematical motivational strategies and kinesthetic motivational strategies. The most preferred motivational strategy is '4 pics 1 word' and the least preferred motivational strategy is 'bingo.' The students chose their most preferred motivational strategies because these are fun and enjoyable. However, they do not prefer some motivational strategies because they are unfamiliar. Science trivia, picture presentation and mini lab work are the most common motivational strategies used by science teachers. The study recommends that teachers vary their motivational strategies to cater to the multiple intelligences of the students. Teachers may use the proposed pedagogical enhancement plan to arouse students' interest in Science learning.

Keywords: *Motivational strategy, Students preferences, Science education, Pedagogical enhancement plan, STEM, Social sciences*

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NP

0669

Prevalent factors that affect the job satisfaction of junior high school technology and livelihood education teachers in public secondary school in District 1 of Marikina City

Urrutia, Jackie D. , Ramos, John Cristian A. , Mortera, Edward Patrick L. , Grafilon, Renee Roseller V., Felices, Lina S.

The objective of this study is to examine the prevalent factors that affect the job satisfaction of Technology and Livelihood Education Junior High School teachers in Public Secondary School in District 1 of Marikina City. Descriptive statistics showed that teachers were agreed in four aspects. However, teachers' responses in Job Characteristics aspect were at least satisfied. Moreover, independent t-test and ANOVA were utilized by the researchers to reveal the significant differences of teachers' job satisfaction in relation to gender, age and type of schools. Furthermore, bivariate correlation was used by the researchers to determine the significant relationship between each aspect. Lastly, regression method was used to examine what aspect of Job Satisfaction is the predictor of teachers' intention to remain on the job. Results showed that Meaningfulness of the Job and Social Benefits are the predictors of the teachers' intention to remain on the job. With these findings, the study recommends to include other educational stakeholders to have a comparison in terms of Job Satisfaction. Administration should provide teachers the clear content and nature of their assigned tasks and give full support to their teachers. Further studies are needed to fully identify the factors that affect the level of satisfaction of teachers.

Keywords: *Intention, Job Satisfaction, Motivation, Multiple Linear Regression, Marikina City, Social sciences*

0670

The priming effect of family obligation on Filipino students' academic performance

Lara, Jhamelyn M. , Ceniza, Desiree Mae S. , Retuya, Claudine O. , Tare, Sheena Grace A. , Quinain, Khael T.

The aim of the present study is to determine the effect of family obligation on Filipino students' academic performance. This study is specifically concerned with family obligation as a motivational factor that would outweigh other motivational factors such as mastery goal and performance goal in influencing academic performance. Since Filipinos value their family, their sense of obligation (Fuligni, Tseng, & Lam, 1999) might cause them to perform well in school. This study was conducted using a single factorial design. Participants (n=163) were randomly assigned conditions with different motivational factors (Family Obligation, Mastery Goal orientation, Performance Goal orientation, Control). Priming was used to activate the different motivations. The results show that students exposed to family obligation had higher scores in academic performance. The findings of the study will contribute to the developing literature on Filipino behavior in schools. The study also highlights the importance of families on the academic lives of Filipino students.

Keywords: *academic performance, family obligation, Filipino students, goal orientation, Social sciences*

0671

Public administration as a scholarly discipline today—and how ICT will affect it

Drechsler, Wolfgang

After sketching out how Public Administration (PA) scholarship looks today, this lecture asks how information and communication technology (ICT) will, or might, influence it in the near future. First, we look at what information and communication technology can already do today and how it has changed our life-world by 2017. Two critical, interlinked phenomena are then analyzed: MOOCs (massive open online courses) and their effects, and the current ability of algorithms to write a certain type of texts. These may have the effect to strongly enforce, even lock in, the current tendencies of PA, but they may also give rise to an altogether different kind of development of scholarly inquiry in the discipline and beyond.

Keywords: Public Administration, ICT, algorithms, MOOCs, Social sciences

0672

Public administration as design

Ocampo, Romeo B.

Since the close of World War II, Public Administration students have been urged to move from the concept of the discipline as doing and deciding to that of designing, i.e. elaborating prescriptions in the manner suggested for policy vs. academic research. Design had long been a part of planning for the built environment (architecture, city planning, and urban design). Since the publication of Herbert A. Simon's *The Sciences of the Artificial*, however, design has been taken up increasingly in the literature of public policy and administration. While still basically

goal-oriented, this literature puts greater emphasis on the institutional context, on problem-definition and alternatives-generation, and on decision-making as a framework. Theoretical perspectives, concepts, strategies, and techniques have been developed for public policy making, implementation, and organizational design. This article attempts to assess the progress of design ideas, glean fundamental points from the literature, and suggest how design may deal meaningfully with some PA issues in the Philippine context, with the hope that they will apply as well to larger contexts.

Keywords: *design, decision-making, policy design, social planning, heresthetics, bricolago, Social sciences*

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2013/12,
(Filipiniana Analytics)

0673

The recovery experience: stress, recovery capital, and personal views on addiction and recovery in posttreatment addiction recovery

Castillo, Therese C., Resurreccion, Ron

The study explored the experiences of individuals in posttreatment addiction recovery. More specifically, the research examined their experiences of stress, their recovery capital, as well as their personal views on addiction and recovery. Existing literature suggests that individuals with addiction require a substantial quality of recovery capital to overcome stress and challenges in all stages of recovery. The research adopted a case study design and interviewed eight participants on their experiences of posttreatment addiction recovery. Interview responses were analyzed through categorizing codes and themes and then submitting these for external audit. Results showed that the recovery experience in posttreatment addiction recovery included dealing with stress during reintegration to the mainstream environment, rebuilding relationships, and returning to daily functioning (getting a job, earning money, fulfilling responsibilities). Recovery connections, social support, and recovery-supportive activities were important factors in sustaining recovery. Addiction was considered as a lifestyle that provides temporary relief and hinders building meaningful relationships while recovery was depicted as an ongoing process requiring support and finding purpose in being in recovery.

Keywords: *recovery, addiction, recovery capital, posttreatment, stress, Social sciences*

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(Filipiniana Analytics)

0674

Refuge and solicitude of the metropolis: an early assessment of the establishment of the MMDA workers' inn

Gomez, Jose Edgardo

Since its inauguration in May 2007, the Metropolitan Manila Development Authority (MMDA) Workers' Inn has served as a fairly successful metro governance experiment in shelter provision for blue-collar workers. Operated as a bed-bath-&-shop facility, the Gwapotel, as it was first nicknamed by its proponents, has come to serve as refuge for the laboring under class, and occasionally, the rejects of urban society—thus drawing MMDA into the role of intermediary between a diverse public of resource-challenged or distressed individuals, and a wider administrative network that is supposed to provide frontline social services, yet which has come to rely on MMDA's growing capacity to handle such problems. The research frames the situation using concepts of institutional coping vis-à-vis the patterns of informality, behavior, and social capital replacement that metro government faces. The research arrives at the tentative conclusion that MMDA's administrative innovation has become a unique but replicable magnet in urban space that inadvertently rises to the position of a dominant social safety net provider for its vicinity in the metropolis. This is a growing role not initially targeted by MMDA, but one which has become a solution that matches unaddressed needs of the population.

Keywords: *workers' inn, Metropolitan Manila Development Authority, new public administration, metropolitan governance, welfare governance, Social sciences*

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2013/06,
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0675

A review of citizen participation issues, responses, and prospects for reform in local development councils

Medina-Guce, Czarina, Galindes, Martha

This article conducts a review of citizen participation in local governance within the context of the local development councils (LDCs). It argues that the Local Government Code has prescribed citizen participation with a limited set of standards, namely, the 25% civil society membership in the LDC and the administrative indicators of activities that the LDC must perform. The Code and subsequent LGU performance measures it influenced have insufficiently addressed the roles to play and capacities needed by civil society to realize higher levels of citizen participation in the LDCs. Moving forward, the study takes stock of citizen participation initiatives that make explicit the roles and capacities of civil society organizations in local decision making and draws lessons to suggest prospects for deepening and increasing citizen participation in LDCs. The article ends with a note that citizen participation should be in the core agenda of proposed amendments in the Code.

Keywords: *local development council, local government units, citizen participation, Social sciences*

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0676

Risk factors for combat-related PTSD: case studies of Filipino active duty soldiers

De Guzman, Rosalito G. , Fajarito, Cariñez Dela Cruz

Military personnel have been consistently exposed to adverse potentially traumatic events (PTEs) leading to a higher risk of acquiring posttraumatic stress disorder (PTSD). Although PTSD is incurred following a traumatic event, not all will have PTSD. Hence, risk factors that make one vulnerable towards PTSD development are noteworthy for investigation. Additionally, more studies are needed to examine PTEs' role in PTSD development. This study contributes to the paucity of research on Filipino soldiers. It aimed to investigate PTE risk factors for combat-related PTSD as experienced by three Filipino active duty combat soldiers diagnosed with PTSD. Data triangulation and convergence were classified according to these PTE risk factor categories: combat-related experiences, precombat and postcombat experiences at work, and nonmilitary experiences. Recommendations are made for the prevention of the development of PTSD among active duty military personnel.

Keywords: *risk factors, potentially traumatic events (PTEs), combat-related PTSD, soldiers, military personnel, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 1, 1-25
2017,
(Filipiniana Analytics)

The role of social perceptions, beliefs, and emotions on support for punitive action toward drug dealers and users

Gastardo-Conaco, Maria Cecilia C., Labor, Paul Danielle P.

Public attitudes toward drug sellers/pushers and users have generally been negative (i.e. Bryan, Moran, Farrell, & O'Brien, 2000; McCorkle, 1993; World Health Organization, 2003) and there is significant support for their harsh punishment (McCorkle, 1993). However, research in punitiveness has not extensively explored the impact of social perceptions (i.e. perceived support for the president, perceived endorsement of harsher measures, beliefs on the country's state visà-vis the drug trade, and perceived relationship between drugs and crime), emotions (i.e. hope, compassion, anger, hatred, and fear), and other cognitive factors (i.e. dehumanization and redeemability) on people's punitiveness toward drug sellers/pushers and users. To address this dearth, two online surveys conducted with differing target objects (viz. drug sellers/pushers vs. drug users) were answered by a total of 436 participants. Hierarchical regression analyses indicate that, when the target objects were drug sellers/pushers, support for punitive action was positively influenced by personal support for the president, perceived endorsement by the president of harsher measures, perceived relationship between drugs and crime, anger and hatred but negatively affected by compassion and redeemability. When punitiveness toward drug users was the issue, the significant predictors were personal support for the president, perceived relationship between drugs and crime, and hatred. Compassion, however, had a negative impact on punitiveness toward drug users. Implications on punitiveness research were discussed.

Keywords: *punitiveness, emotions, social perceptions, dehumanization, redeemability, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 67-96
2017,
(Filipiniana Analytics)

Sanctification of adolescence: a qualitative analysis of thriving among Filipino youth with religious sparks

Buenconsejo, Jet U.

Developmental systems theories have linked religiosity and spirituality with positive youth development (PYD), particularly "thriving". Thriving involves the identification of one's deepest interest or passion in life (termed as "spark") and being nurtured by an environment that supports, encourages, and develops this spark. Considering the need to understand the underlying mechanisms and processes of thriving in culturally, geographically, and racially diverse contexts of religion and spirituality, this study delved into the transcendental experiences of Filipino adolescents. Using the strategies and techniques of interpretative phenomenological analysis (IPA), the researcher interviewed 11 male Filipino Roman Catholics, aged 15 to 20 years old, who were able to identify a religious spark and are active members of a social group that supports their sparks. Results revealed five overarching themes: (a) perception of the nature of spark; (b) family and social groups as providers of guidance and support; (c) religious spark as source of positive experiences; (d) religious spark as source of negative experiences; and (e) compromises and adjustments amidst constancy of spark. Transcendence together with unconditional familial acceptance and appreciation have been found to be very crucial and salient in facilitating thriving. Theoretical and practical implications in promoting PYD are discussed.

Keywords: *adolescent thriving, adolescent, interpretative phenomenological analysis, positive youth development, youth development, religion, spirituality, Social sciences*

Philippine Journal of Psychology, Volume No. 51 Issue No. 1, 121-154
2018,
(Filipiniana Analytics)

Socio-demographic characteristics as determinants of family dynamics and engagement in the *Palayamanan* system approach among agtas in Bicol

Dy, Marison R. , Puerto, Jailyn N., Canilao, Jacqueline Lee O.

Agtas are considered to be one of the Indigenous Peoples (IPs) residing in the mountainous parts of Luzon and some can be found in the Bicol Region. They are still dependent on agriculture in order to generate income and sustain their basic needs. The family dynamics of the Agta farming families were assessed through the tool FACES IV by David Olson. Results of the study showed that there were unbalanced cohesion and unbalanced adaptability level within the family system. On the other hand, communication and satisfaction of the Agta farming families respondents were high. Agta farming families are said to be already engaging in the *Palayamanan* System Approach but their knowledge and skills are still needed to be enhanced to fully maximize the benefits that they can gain from the said approach. Agricultural technologies are said to be not present in the community but according to the data collected, if they are given the opportunity to adapt, they would consider it. Based on the evaluated socio-demographic characteristics of the respondents, gender and educational attainment showed a strong correlation to family cohesion and engagement in the PSA, respectively, therefore, both factors could be considered for effective development interventions to take place. Overall, the Agta communities' geographical condition, culture and beliefs, sources of information have affected their way of living, farm practices, and farm-decision making. There have been very limited studies regarding indigenous people and communities in the Philippines. Thus, this study would serve as an entry point to further understand them and would guide in the formulation of appropriate strategies that will help improve and enhance their lives.

Keywords: Family dynamics, *Palayamanan* system approach, Farm decision-making, Indigenous people, Social sciences

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NP

Stakeholder perceptions on the challenges of financing debilitating illnesses: the case of colorectal cancer and schizophrenia in the Philippines

Manalo, Jorel A. , Guevarra, Jonathan P. , Garcia, Fernando B. Jr. , Cochon, Kim L. , Bermudez, Amiel Nazer C. , Antonio, Carl Abelardo T., Quizon, Romeo R. , Salvino, Roberto P. , Benedicto, Erwin G.

There is a perceived need among policymakers and other actors in the local health system to better address the challenges in financing healthcare, in general, and chronic or debilitating conditions, in particular, in order to develop appropriate policy and program responses. This paper aimed to present perceived issues and challenges in financing schizophrenia and colorectal cancer in the Philippine context, as identified by stakeholders. Verbatim transcription of the proceedings of a moderated discussion of stakeholders in schizophrenia and colorectal cancer care was analyzed for themes on challenges and recommendations in the financing of the two conditions in the local setting. A total of 28 stakeholders representing healthcare providers, professional organizations, health maintenance organizations, patient support groups, and government participated in the meeting. Three main issues on financing debilitating conditions were identified by participants: a) government support for the two conditions is currently limited; b) coverage by third-party payors for schizophrenia or colorectal cancer is either absent or restricted; and c) the process of accessing medicines or alternative modes of financing for healthcare was perceived to be disparate and inconvenient for patients and their caregivers. Participants also provided recommendations in improving the mechanism of healthcare financing. The general picture that emerged from this moderated discussion pointed to limitations in the prevailing mechanisms for financing schizophrenia and colorectal cancer in the Philippines. Improvements in the current financing mechanisms, and identification of alternative modes, is necessary to ensure universal health coverage.

Keywords: healthcare financing, catastrophic illness, perception, Philippines, Social sciences

State audit, budgetary appropriations and their implications to regulatory governance

Muñez, Jephthe Olimpo

With the change of leadership in 2010, a change in regulatory climate has been anticipated. Compliance with statutory requirements and administrative regulations was expected to be further reinforced to strengthen and support regulatory governance reforms through monitoring and control across the main branches of the government, providing symbiotic participation from the private sector and civil society. As defined by law, state audit is “the analytical and systematic examination and verification of financial transactions, operations, accounts and reports of any government agency for the purpose of determining their accuracy, integrity and authenticity and satisfying the requirements of law, rules, and regulations.” It is a function conducted by the Supreme Audit Institution of the country, grounded on the values of integrity, transparency, and accountability. This article explores the relationship between the extent of budgetary appropriations profile across the national government agencies (NGAs), which includes the executive, legislative, judiciary, and constitutional commission, vis-à-vis the NGAs audit compliance profile.

Keywords: *state audit , regulatory governance, budget appropriations, transparency, Social sciences*

Sulong kabataan: design, pilot implementation, and evaluation of a youth substance abuse prevention program

Mendez, Samantha Erika N. , Banzon-Librojo, Lorelie Ann , Ochoa, Danielle P. , Peña Alampay, Liane

Substance abuse prevention is especially important during adolescence given the propensity of young people to take risks during this period. Although prevention programs have been developed and widely evaluated in other countries, they are costly and have not been adapted to the Filipino context. We developed Sulong Kabataan as a community-based life skills program for substance abuse prevention among urban Filipino youth. We discuss the program design process, pilot implementation, and evaluation among 53 adolescents aged 12 to 17 from a low-resource community. The evaluation of the pilot implementation demonstrates the feasibility of the program, especially with close community partnerships. Preliminary evidence for positive impact was shown in participants’ life skills and confidence to refuse alcohol. The strengths of the program include the interactive delivery and positive learning climate, as well as facilitators’ warmth and competence informed by knowledge of adolescent development. Future directions are discussed for improving the program design and evaluation, and developing training programs for facilitators.

Keywords: *adolescence, substance abuse prevention, life skills training, youth prevention programs, refusal skills, Social sciences*

Surface judgments, profound questions: a homosexual male's phlebotomy experience

Dumagay, Teresita E. , Cenizal, Paul Martin Anthony C. , Sy-Su, Chadwick Co

Two of the authors, one heterosexual and one homosexual, both voluntarily donated blood to a well-known health institution in the Philippines. As they were filling out the paperwork, one of the authors' attention was called by one of the questions in the form: "Nakipagtalik ka na ba sa iyong kauri?," which can be literally translated as "Have you had sex with your own kind?". This erroneously phrased question is the sole question interrogated and problematized in the study.

Reviews of Standpoint Theory and the methodology associated with it and, in effect, used in the study, form part of the critique, divided into individual narrations and interpretations by each author. A third co-author, a hematologist, lends her insight on the logistics and issues of phlebotomy. Institutional ethnography is brought to bear on the narratives.

This three-author collaboration is presented as a claim that an interdisciplinary approach may open new vistas to a phenomenon that has long existed but been ignored. Reviews of Standpoint Theory and curriculum planning for health professionals are recommended.

Keywords: *phlebotomy, communication, Standpoint Theory, homosexuality, blood donation, institutional bias, Social sciences*

Philippine Journal of Health Research and Development, Volume No. 23 Issue No. 4, 11-16
2019/12,
(Filipiniana Analytics)

A VSO-Bahaginan framework for active citizenship

Alampay, Erwin Gaspar A.

This article is based on a commissioned work for the Volunteer Service Organization (VSO)-Bahaginan to develop its organizational framework for active citizenship. The primary objective of the paper is to define the role of VSO-Bahaginan in the development of active citizenship in individuals and communities. The resulting framework derived in this paper was based on surveys, interviews and focused group discussion with various VSO-Bahaginan stakeholders, including volunteers and staff. This complemented other workshop outputs and secondary data provided by VSO-Bahaginan. Taken together, these inputs were used in crafting an active citizenship framework that is culturally sensitive to Filipino values. It discusses how VSO-Bahaginan volunteers describe the progression of active citizenship, from kamalayan (awareness) to kamulatan (consciousness) to having a paninindigan (conviction), as an agent of change.

Keywords: *VSO-Bahaginan, active citizenship, volunteerism, civic engagement, Social sciences*

Philippine Journal of Public Administration, Volume No. 61 Issue No. 1-2, 71-90
2017/12,
(Filipiniana Analytics)

War on crime and drugs: understanding support for the anti-crime and anti-drugs campaign

Nerona, Randolph

Drawing on the vast amount of literature on right-wing authoritarianism (RWA), perception of threat, and moral foundations, the present study explores the sociopolitical and moral underpinnings of attitudes toward an anti-crime and anti-drug campaign. The present study examines the association between RWA, binding foundations,

perception of threat, and support for the anti-crime and anti-drug campaign. Path analyses reveal the following findings: (1) RWA directly predicts support for the anti-crime and anti-drug campaign, (2) perception of threat predicts attitudes toward the anti-crime and antidrug campaign via binding foundations, (3) RWA predicts the endorsement of binding foundations via perception of threat, and (3) RWA predicts support for the anti-crime and anti-drug campaign via binding foundations above and beyond its impact on perception of threat. The present study unfolds an integrative and comprehensive model that underlies mechanisms of different sociopolitical attitudes.

Keywords: *perception, threat, RWA, binding foundations, support, crime, drugs, Social sciences*

Philippine Journal of Psychology, Volume No. 50 Issue No. 2, 41-66
2017,
(Filipiniana Analytics)

0686

Women in polygynous marriages: their perceptions and experiences *Boquia, Arbaya H. , Lingga, Juwairiya U. , Ebrahim, Armia U. , Samama, Norkaina C.*

Polygyny or the marriage of a man to two or more women at the same time is not a common norm in Philippine culture but is adopted by the Muslim populace under Shari'ah or Islamic Law. In this study, sixteen Muslim Filipino women from various ethnic groups such as Maguindanaon, Iranun, and Bulakenya participated in focus group discussions and interviews where they described their perceptions about polygyny and their relationships with their husbands as well as their husbands' relationships with their wives and their children. They also described the problems they usually encounter in their families and what their suggestions of a happy or harmonious polygynous family are. Findings reveal that the participants tend to have dichotomous perceptions on polygyny. They perceive polygyny either favorably or unfavorably depending on their Islamic background and marital life experiences. The women, who had favorable experiences in their marriages, tend to have favorable perceptions about polygyny, while those who had unfavorable experiences tend to also perceive polygyny unfavorably. For a polygynous family to be happy, the participants suggested that the woman must accept the marriage based on faith in God, the husband has to fairly treat and provide for his families, the wives must imbue good character and respect for each other, and all family members must maintain open communication and good relationship.

Keywords: *Filipino marriages, Muslim marriage, marital life and adjustment, polygyny, polygamy, Social sciences*

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2017,
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ZOOLOGY

0687

New record of Philippine spiny-bellied orb-weavers (Aranea: Araneidae) *Barrion, Adelina A. , Amalin, Divina M. , Ulilang, Violeta L.*

Three spiny-bellied orb-weavers, *Gasteracantha cancriformis* (Linnaeus), *G. remifera* Butler and *G. sanguinolenta* C.L. Koch are taxonomically treated. They are novel records for the Philippines. Diagnostic descriptions, illustrations, synonymic indications, taxonomic key and information on distribution, habitat and specimens were provided for each species.

Keywords: *Spider species, Spiny-bellied orb-weavers, Spider webs, Zoology*

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	0405	Arcillo, Abdullaziz	0094		
	0233		0254	Awingan, Joan S.	0098
Antonio, Carl	0355	Arco, Susan D.	0179	Ayo, Joyce Mae	0213
Abelardo T.	0362		0204	Veronne R.	
	0375		0191	Ayson, Roseller	0131
	0419	Arguelles, Cleve V.	0647	Azarraga, Alyssa	0046
	0451			Faye N.	
				Baay, Lord M. S.	0123

Babon, Jenny Rose C.	0221	Barba, Bin Jeremiah D.	0202	Baweg, Charizel Mea S.	0221
Bacol, Jasper L.	0249	Barbosa, Roland	0225	Bebillo, Mabelliza E.	0213
Bacolcol, Teresito C.	0250	Barcelo, Teresita I.	0377	Bejarin, Adrian John P.	0413
Bacus, Michael G.	0121	Bardelosa, Danika Joy D.	0648	Belizario, Vicente Y. Jr.	0130 0486
Bagay, Joshua O	0293	Bariquit, Lysinder A.	0319	Beltran, Frederick David E.	0431
Bagsit, Reniel Louise	0646	Barrida, Andrew C.	0613	Beluso, Lucy A.	0633 0405
Baguhin, Israel A.	0264	Barrion, Adelina A.	0687	Benedicto, Erwin G.	0419 0680
Baguio, Mirasol L.	0138 0471	Barro, Norman Jay V.	0613	Benigno, E. A.	0032 0419 0062
Bagundol, April D.	0221	Barroga-Jamaias, Serlie	0651	Bermudez, Amiel Nazer C.	0466 0468 0680
Balderas, Kirsten Eloise	0666	Bartolay, Wilfred Roy O	0293	Bermudez, Lyzza Marizz L.	0224 0642 0644
Baldomero, John Rex N.	0077 0254 0243 0244 0299 0287 0260 0268	Bartolome, Michael Cedric B.	0125	Bernardo, Allan B. I.	0667 0169 0171 0192 0212 0472
Balela, Mary Donnabelle L.	0287 0260 0268	Basco, Daniel M.	0368	Bersabal, Kathleen G.	0198 0153 0607 0598 0604
Balila, Jolly S.	0657 0144	Batallones, Jr., Bonifacio H.	0423	Beza, John Harvey M.	0072
Balolong, Marilen P.	0072 0073	Batara, Jame Bryan L.	0666	Biado, Charlotte Jane C	0304
Balolot, Jerry Rose M.	0469	Bathan, Kim Jana S.	0098 0192		
Baltazar, Jesse Michael E	0242	Baula, Ferlien Mae G.	0206 0224		
Baltazara, Miriam D.	0091	Bautista, Anbel M.	0406		
Bañez, Ma. Arve B.	0320	Bautista, Caitlyn A.	0663 0044 0043		
Bangaoil, Ruth	0412	Bautista, Elpidio R.	0043		
Bantilan, Maria Elaine Therese A.	0169	Bautista, Jocelyn R.	0668		
Banzon-Librojo, Lorelie Ann	0682	Bautista, Lincoln A.	0404		
Banzon, J.A.	0177	Bautista, Lloyd C.	0664 0030		
Baquiran, Amster Fei P.	0558 0491	Bautista, Lloyd C.	0030		
		Bautista, Ofelia K.	0159 0160		
		Bautista, Unico A.	0599 0597 0193 0222		
		Bautista, VII, Angel T.	0193 0222		
		Bautista, Violeta V.	0638		

Biclar, Leo Andrew B.	0633	Briones, Jonathan Carlo A.	0089 0126	Cabug, Lady Angelic C.	0227
Billones, Junie B.	0459	Buag, Judy Ann M.	0114	Cabural, Regine C.	0170
	0187	Buenaflor, Hilda G.	0023	Cacanindin, Jezraline Marie	0442
Billones, Liza T.	0187	Buenconsejo, Jet U.	0678	Cachero, Emelie E.	0196
	0459		0225	Cadag, Maria Rebecca T.	0019
Binag, Sam Dominic A.	0123	Buenviaje, Jr., Salvador C.	0185 0272	Cadiz, Nina M.	0158
Binauhan, Melanie G.	0278	Buhat, Christian Alvin H.	0223	Cagasan, Louie P. Jr.	0050
Bingcang, Angel Grace	0379	Buiser, Paola Bianca M.	0577	Cagayan, Ma. Stephanie Fay S.	0446
Biona, Kristine T.	0393	Buitizon, Rodel R.	0424	Cailao, Maria Victoria T.	0073
	0583		0348	Cajayon, Raquel C.	0399
Bishak, Akhtar Hazrati	0229	Bullecer, Ernani R.	0540	Calagui, Laurence B.	0084 0154
Bitlac, Justine Marey S.	0116	Bulos, Adelina DM.	0220 0381	Calapardo, M.	0177
Blanco, Ma.Tereza A.	0149	Bumanglag, Marietta M.	0506 0508	Caliao, Nolan D.	0281
			0511	Calleja, Mendiola T.	0639
Boado, Kathleen Joyce O.	0444	Bunagan, Katrine S.	0638	Callo, Filma A.	0637
Boadod, Kristoffer Francis P.	0288	Bungay, Alice Alma C.	0070 0113	Calpito, Jahannah Victoria M.	0116
Bongalos, Jerald B.	0612	Burgos, Sammer C.	0121	Calugay, Zita Concepcion P.	0649
Boquia, Arbaya H.	0686	Burlas, Katreena R.	0214	Calungsud, Karlo Jaime N.	0426
Borbon, Irah A.	0221	Cabadonga, Jean L.	0224	Camad, Jeannifer Mae T.	0205
Bordon, Jenn Margarette B.	0046		0245		
			0249		
Borja, Marilyn S.	0033		0264		
Borja, Paolo Christopher R.	0621	Cabahug, Ruel R.	0280	Cambiador, Christian Jay	0139
			0305		
Borja, Valeriano M.	0156		0310	Camon, Jen Jen I.	0224
Borromeo, Teresita H.	0079 0125	Cabahug, Ruth Guinita	0280	Campos, Norman Charles O	0240
Boucher, Shawn Joshua P.	0147	Cabalquinto, Jerameel J	0246	Campus, Jr., Roberto G.	0316
Braganza, Patricza Andhrea T.	0623	Cabangon, Neffretteree P.	0221	Canal, Johanna Patricia A.	0356 0234
Brazas, Jodelyn M.	0046	Cabrera, Annabelle C.	0211	Cañal, Rio Ysabel A.	0288
Briola, Brando	0425			Cañares, Rizamae A.	0219
Brion, Lourdes C.	0408	Cabrera, Gino A.	0663	Canencia, Oliva P.	0083
Briones, Dave P.	0493	Cabriga, Chasin	0303		

Cañete, Rizza May P.	0078	Castor, Aubrey Kaye M.	0470	Ching, Angela C.	0145
Canila, Carmelita C.	0353	Castro-Sandoval, Ma. Evangeline	0346	Chong, Conrad Allan C.	0140
Canilao, Jacqueline Lee O.	0679	Castro, Gina C.	0434	Chong, Rachel M.	0266
Canlog, Archie Glen G.	0181	Castro, Jhulimar	0303	Choresca, Jr., Casiano	0094
Capangpangan, Rey Y.	0199	Castro, Joan M.	0176	Chua, Ethan Cedric	0641
Capanzana, Mario V., Ph.D.	0026 0528	Casuga, Franelyne P.	0414 0426	Chulipa, Loraine T.	0061
Caparos, Marc Thotilo V	0304	Casumpang, Jeremy	0094	Clarete, Kerstein	0303
Capito, Arabelle Kristine D.	0221	Catabijan, Carlo G.	0234 0356	Clemente, Jennyrose C.	0289
Capuz, Maria Karen A.	0231	Catacutan, Jane Nicole N.	0086	Clements, Archie	0312
Carag, Harold M.	0140	Catamio, Marc E. L.	0123	Cleofe, Vince Aron F.	0288
Carillo, Airic	0303	Cayayan, Peter Lemuel T.	0624	Closas, Adonis A.	0301
Cario, Clarito	0442	Cayetano, Mylene G.	0098	Co, Kim Carmela D.	0062
Carmen, Edilene Jane E.	0169	Cejalvo, Reneliza D.	0125	Co, Margaret Francine P.	0432
Caro, Glovelyn S.	0476	Celestino, Alicia B.	0665	Co, Trixia Anne C.	0638 0468
Carpentero, Arvin S.	0238	Celestino, Ma. Theresa F.	0467	Cochon, Kim L.	0680 0466
Carpio, Marinette Rose M.	0098	Cengca, Ma. Rhenea Anne M.	0648	Comia, Erwin Raphael M.	0470
Casalan, Florie C.	0213	Cenidoza, Fidel Bryan B.	0444	Comiso, Jovelle L.	0172
Casimiro, Jerile	0069	Ceniza, Desiree Mae S.	0670	Constantino, Rose E.	0377
Cassera, Maria B.	0175	Cenizal, Paul Martin Anthony C.	0683	Cordero, Cynthia P.	0431
Castañeda, Nic L.	0626 0085 0463 0450	Ceperiano, Arjohn M.	0054	Coritico, Fulgent P.	0152
Castillo, Agnes L.	0479 0433 0414	Cerdeña, Ria Lyka D.	0406	Cornejo, Kelly Loise C.	0190 0081 0144
Castillo, Eleanor C.	0657	Cervera, Rinlee Butch M.	0287	Cornista, Joel C.	0182 0414 0454
Castillo, John Carlo D.	0621	Chakraborty, Soma	0184 0048	Cortez, Angelbert D.	0080
Castillo, M. B.	0166	Chavez, Milagros C.	0496	Cortez, Christine Eden T.	0088 0547
Castillo, Raymond Vincent F.	0100	Chavez, Noreen Mae E.	0434	Cosadio, Alma L.	0003
Castillo, Therese C.	0673	Chin, Ting-Yu	0085	Cosejo-Durano, Cherianne Love	0379

Cruz, Allaine Jean C.	0447	Data, E. S.	0163 0165	de Panay, Charmaine A.	0196
Cruz, Febus Reidj G	0242	Datu, Jesus Alfonso D.	0374 0667	De Vera, Cecilia M.	0613
Cruz, L. L.	0344	David-Padilla, Carmencita M.	0235	De Vera, Essl	0141
Cruz, Maria Katrina Diana M.	0356	David, Mary Coleen A.	0426	Decena, Eunice	0660
Cruz, Reyanne Marie	0376	Davide, C. L.	0344 0351	Decena, Gracielle R.	0637
Cuadrado, Jerry T.	0092	Davide, R. G.	0157	Decena, Katherine Mae M.	0417
Cuasito, Sr., Ruvel J.	0387	Dayag, Jirehjoy L.	0181	Dejeto, Rodrigo V.	0289
Cubil, Ma. Lourdes	0666	Dayaon, Jennyvi P.	0220	Dejillo, Paula Bianca S.	0188
Cuevas, Pearl Ed G.	0377	de Asis, Darcy L.	0609	Del Castillo, Nicolo C.	0296
Cultura, II, Ambrosio B.	0261	De Asis, Leonida S.	0009	del Mundo, Florian R.	0215 0410
Cunanan, Angela Lorraine P.	0654	De Guzman, E. V.	0022	Del Mundo, Jocelyn C.	0060 0370
Curiba, April Mae G.	0245	De Guzman, Ma. Lourdes Rossana E.	0062	Del Mundo, Michael Dominic C.	0060
Cutiongco – de la Paz, Eva Maria C.	0413	De Guzman, Nena C.	0005	Del Pilar, Gregorio E. H.	0635
Dacuya, Aaron C.	0148	De Guzman, Rosalito G.	0676	del Prado, Yñigo Luis C.	0126
Dagoc, Angelie M.	0308	De Juan, Jaypy S.	0618		0005
Dahonog, Luigi	0243 0490	De la Cruz, Benjamin	0485	Del Rosario, Dafrosa A.	0027 0162
Dajay, Leah C.	0500 0615	de la Cruz, Girlie P.	0291	del Rosario, Joanne Marie M.	0130 0329
Daljog, Charmaine S.	0100	de las Llagas, Lilian A.	0486	Del Rosario, Ricardo R.	0338 0004
Dalmacio, Leslie Michelle M.	0072 0073	De Leon, Gerrick James M.	0214 0096		0174
Damasco, Olivia P.	0016	de Leon, Marco P.	0592	Del Rosario, Romeo M.	0178 0210
Damaso, Erle Stanley G.	0650	De Leon, Raiza F.	0259		0218
Damaso, Julie C.	0650	De Leon, Ruby Marie D.	0172	Del Valle, Eunice Mae D.	0426
Daniel, Christy S.	0297	De Los Santos, A. B.	0001	Dela Cruz-Cayapan, Charisma Victoria	0250
Danting, Ma. Jodecel	0094	De Luna, Marie Josephine M.	0598	Dela Cruz, Anessa M.	0307
Dapitan, Jennalyn L.	0171	De Luna, Marjorie S.	0203	Dela Cruz, Dorothea C.	0377
Daquiado, Dimas N.	0294	De Ocampo, Joshua Mari D.	0153		
Darko, Amos	0273				
Dasco, Ma. Lilibeth P., RND, MSAN	0551				

Dela Cruz, Jeane A.	0148	Dingle, Cheri Anne	0605	Duna, Lorena V.	0612
Dela Cruz, John	0140	M.	0607	Dupo, Aimee Lynn	0477
Carlo F.			0599	B.	
Dela Cruz, Thomas	0148	Dionisio-Sese,	0352	Dy, Hanna Valerie	0666
Edison E.		Maribel L.		Dy, Marison R.	0679
Dela Cueva, Fe M.	0016	Docena, Pierce S.	0055	Dytoc Bronne C.	0065
dela Luna, Kim	0540	Dofitas, Adrian	0046	Ebarvia, Madelaine	0148
Leonard G.		Bernard A.		L.	
Dela Paz, Jan Nikko	0641	Doloiras, Dynie F.	0600	Ebrahim, Armia U.	0686
Dela Pena, Eve	0128	Domingo, Clarissa	0467	Echavez, Grace E.	0279
Rosary		Yvonne J.			0272
Dela Peña, John T.	0101	Domingo, Doreen	0069	Edaño, Yasmin D.G.	0225
Dela Vega,	0254	Dones, Luz Barbara	0235	Eder, Marylene S.	0395
Geramheen		P.		Eduave, Dana Maria	0261
Delfin, Evelyn F.	0238		0307	Y.	0294
Delos Reyes, Mitch	0069	Doño, Andrew C.	0306	Edwards, David	0248
Joe			0512	John	0273
Delos Santos-	0452		0523	Egama, Vanessa	0245
Garcia, Aileen S.			0524	Jane D.	
delos Santos,	0256	Dorado, Julieta B.	0529	Egloso, Mary	0317
Nevelyn T.			0555	Bernadette V.	
Demayo, Cesar G.	0398		0559	Elazegui, Erwin P.	0114
Demetrio, Kessel B.	0206		0588	Ellacer, Rioniel	0003
Deroy, Maria Cizel	0251	Doroja, Gerardo S.	0395		0043
U.		Drechsler,	0671	Elmundo, Elizar M.	0044
Desabille, Jade	0171	Wolfgang		Empaynado-Porto,	0643
Bianca S.			0541	Analín B.	
Descalsota,	0016	Duante, Charmaine	0543	Encarnacion, Elyson	0297
Jonathan C.		A., MSc Epid (PH)	0552	Keith	
Desnacido, Josie P.	0515				0079
Destura, Raul V.	0130	Dul-loog, Vic L.	0318	Endonela, Leah E.	0125
Devanadera, Mark	0477	Dulay, Rich Milton	0086		0352
Kevin P.		R.		Endozo, Maria	0126
Develos, Maribel	0354	Dulig, Jorella	0258	Crisselda A.	
Montesa		Francia			0335
Diaz, Dahlia A.	0026		0397	Engr. Adona,	0336
Diaz, Leomir A.	0140	Dumag, Rosemarie	0455	Charlie E.	0343
Dicdiquin, Noimie	0134	J.	0457		0566
Rose B.			0550	Engr. Ermac, Karl	0342
Dichoso, Geleo A.	0007	Dumagay, Teresita	0683	Patrick J.	
Diesmos, Arvin C.	0126	E.		Engr. Garcia,	0161
Diesmos, Mae Lowe	0126	Dumaop, Darren E.	0053	Rosemarie G.	
L.		Dumdum, Jon	0246	Enoc, Irene Cris B.	0212
	0603	Dexter H			

Enoveso, Rose	0417	Feliciano, Jose N.	0368	Galang, Dina D.	0429
Abigail D.		Fellizar, Allan	0412	Galgana, Gerald A.	0250
Enriquez, Angelica	0486	Fernandez-	0115	Galicia, Gladys B.	0224
C.		Gamalinda, Eve V.	0147	Galindes, Martha	0675
	0464	Fernandez, Jerene	0015	Galingan, Zenaída	0068
Enriquez, Ma. Luisa	0425	Bashia B.	0477	C.	0318
Ero, Lyzeil P.	0445	Fernandez, Jhenize		Galut, Christian	
Eseo, John Leonard	0207	Carvina	0602	Mark S.	0289
E.		Fernandez, Jr.,	0290	Galvez, Catherine	0435
Esguerra, Jane	0007	Emmanuel C.		Galvez, Leigh Dee S	0283
Pauline M.		Fernandez, William	0028	Gamalinda, Eve F.	0092
Esguerra, Janice D.	0663	L.		Gamit, Andrei Luis	0145
Esguerra, Paulo	0655	Ferrer, Emmanuel	0262	P.	
Gabriel L.		L.		Gan, Jelaine L.	0109
Espaldon, Aeus	0251	Ferrer, Jovie Ann D.	0181	Gania, Mershen B.	0183
Joshua		Ferrer, Ma.	0090	Gaoat, Cecile	0129
Estacio, Edith	0075	Salvacion R.		Garalde, Ave Ann	0607
Estacio, Leonardo	0361	Fidelino, Jay S.	0109	Nikolle M.	0602
R.		Flor, Enrico G.	0285	Garcia, Editó G.	0478
Estimo, Krisna Mae	0221	Flores, Charles Lois	0260	Garcia, Fernando B.	0680
M.		I.		Jr.	0312
Estoperez, Noel R.	0275	Flores, Erika Louise	0420	Garcia, Jerome	
Estrada, Miriam R.	0657	Flores, Floirendo P.	0337	Carlo P.	0598
Estrada, Samuel	0303	Flores, Herisadel P.	0645	Garcia, Jonyl L.	0611
Estrella, Mitzi Rain	0477	Flores, Q.G.	0401	Garcia, Jose Nestor	0637
R.		Flores, Zyra Fem C.	0441	M.	
Estrella, Paul J.	0123	Folio, Fatima Mae	0133	Garcia, Katherine	0458
Evangelista, Alex	0284	P.		Yasmin M.	
Ray P.		Fontanilla, Ian	0150	Garcia, Kristine	0407
Evangelista, Zyra	0053	Kendrich C.		Eves S.	
M.		Franco, Prima Fe R.	0129	Garcia, Ma. Celina	0430
Fabella, Ronald	0466	Franco, Samuel S.	0307	U.	
Allan M.	0468	Franzblau, Scott G.	0483		0102
Fadrilan-Camacho,	0417	Frogozo, A. T.	0351	Garcia, Roberta N.	0112
Vivien Fe F.		Fuentes, Rolly G.	0175	Garcia, Rosemarie	0026
Fajarito, Cariñez	0676	Furio, Elsa F.	0156	G.	
Dela Cruz		Gaban, Paula Blanca	0076	Garcia, Yra S.	0181
Falcon, Stephen Jay	0190	Gabriel, Alonzo A.	0108	Gardose, Ditche L.	0201
S.		Gadong, Joshua	0046	Garma, Sergia	0131
Faller, Nhadyne C.	0224	Vincent Y.		Garraway, J.L.	0209
Famoso, Erlinda B.	0030	Galacgac, Niño B.	0636		0014
Fano, Jeanie Rose	0213	Galamiton, Euredel	0479	Garrison, M. V.	0029
Fekih, Rym	0143	S.			
Felices, Lina S.	0669				

Gastardo-Conaco, Maria Cecilia C.	0677	Godez, Diana Rica B.	0610	Graves, Nicholas	0312
Gatab, Guille Marri B.	0224 0606	Godio, Jessamin Jhoy	0376	Grey, Roberto R.	0367
Gatchalian, Ronald Daryll E.	0601 0603	Gokhale, Chaitanya	0117	Gringco, Merry B.	0472
Gatdula, Norvida C.	0156	Golez, Cirus Ralph B.	0190	Gubat, Maria Julia G.	0378 0578
Gaudario, Melissa C.	0086	Golloso-Gubat, Maria Julia	0437 0438	Guce, Jezreel Nadine C.	0479
Gavan, Jon Nyner	0247	Gomez, Jose Edgardo A. Jr.	0674	Guerrero, Jan-Ervin C.	0297
Gavino, Nida T.	0633	Gomez, Maria Honolina	0412	Guerrero, Julius Robert B.	0465
Genavia, Shana	0141 0153	Gomez, Norchel Corcia F.	0116	Guevara, Celinne Charmaigne Angeles	0056
Gentallan, Jr., Renerio	0079	Gomez, Rosalie N.	0090	Guevara, Jr., Leonardo	0412
Gentallan, Renerio P.	0125	Gonato, Ma. Kim Syra D.	0469		0466
Geronimo, Hannah Grace D.	0611	Gonda, Erwin J.	0400		0648
Geronimo, Marielle	0141	Gonzaga, Alex C.	0459	Guevarra, Jonathan P.	0468 0680
Gestupa, Lennzy Gel N.	0196	Gonzaga, Gemma Sheila C.	0300		0428
Gestuveo, Rommel J.	0046	Gonzales, Ivan Moses M.	0135		0444
Gheshlagh, Mohammad Bagher Moradi	0229	Gordoncillo, Normahitta P.	0561	Guevarra, Jr., Leonardo A.	0441 0477
Gica, Hannah Deborah A.	0227	Gorospe, Alloyssius E.G.	0244	Guiang, Pamela E.	0135
Gican, Kersey Chene P.	0002	Gorospe, Mary Ann B.	0650	Guiao, Carl Vincent R.	0406
Gironella, Glen Melvin P.	0390	Gorro, Joselle A	0283	Guillena, Junge B.	0471
Gloria, Elisha D.	0433		0495	Guillermo, M.	0215
Gloriani, Nina G.	0428	Goyena, Eva A., Ph.D.	0504 0503	Guillermo, Neil Raymund D.	0599 0603
Glorioso, Ma. Idelia G.	0371	Gozalo, Christian Ellis W	0293	Guinto, Cynthia Claire F.	0172
Go, Dionne Audrey G.	0441	Gozon, Clark Darwin M.	0236 0275		0059
Go, Jan Vincent	0197	Grafilon, Renee Roseller V.	0669	Guirindola, Mildred O.	0556 0557
Go, Marielle	0141	Grageda, Maria Elizabeth M.	0232	Guirinaldo, Sherwin A.	0252
Gochecho, Alyx Danielle V.	0617	Grande, Marianna Lourdes Marie L.	0604 0607	Gumb, Norman Gabrielle M.	0658
				Gumiran, Brian Anthony	0660
				Gutierrez, I.	0340

Guya, Mildred B.	0482	Iizuka, Takashi	0265	Jemena, Fedelyn M.	0358
Guzman, Santiago V.	0481	Ila, Roselie M.	0469	Jimenez, Gloria R.	0193
Haldos, Juzy	0416	Ilagan, Andrea Paola D.	0184		0222
Halili, Jordan Ferdin A.	0086	Ilagan, Yolanda A.	0077	John Sylvester B.	0145
	0420	Ilago, Simeon Agustin	0662	Nas,	
Hallare, Arnold V.	0072	Illescas, Elaine E.	0432	Johnston, S. A.	0020
	0073	Imbao, Ma. Rio	0444	Jomao-as, Joshua G.	0093
Halos, P.M.	0033	Lauren M.		Jose, Ellaine C.	0156
Halton, Kate	0312	Indig, Agnes B.	0206	Juarez, Anne Krishia	0376
Hata-as, Liza T.	0398	Inovero, Abelardo A.	0208		0448
Hay, Fiona R.	0079	Inson, Mark Jvann C.	0279	Jueco, Nonette L.	0478
Hebron, Imelda U.	0003	Ismaila, Salami O.	0282		0111
	0658	Ison, Luisito G.	0207	Jumawan, Jess H.	0136
Hechanova, Ma. Regina M.	0639	Jabile, Liezl M.	0257	Jumawan, Joycelyn C.	0132
	0638	Jacalan, Frances Isabelle B.	0546	Junsay, Carla Alilie L.	0007
Hernandez, John Francis	0641	Jacinto, Anna Muriel T.	0435	Juntilla, Alyzza A.	0201
Hernandez, Mia Bianca S.	0409	Jacinto, Melanie Joy A.	0657	Kalaw, Sofronio P.	0071
Herrera, Paula	0141	Jacobia, Rovelina B.	0621	Kamantigue, Edmark C.	0107
	0599	Jalbuena, Julita R.	0453	Kanapi, Carmen G.	0075
	0603	Jamero, Charlene May G.	0211	Karmacharya, B.B.	0166
Hila, Frederick C.	0605	Japitana, Michelle V.	0269	Kim, Jillen P.	0145
	0607	Japitana, Rowena A.	0115	Kim, Soon Chul	0012
Hipolito, Josephine H.	0353	Jarrell, Krista Kate P.	0170	King, Ronnel B.	0667
	0032	Javier, Abigaile Mia V.	0011	Kingston, David G. I.	0175
Hoque, Melanda M.	0031	Javier, Charina A.	0584	Klein, Elliot C.	0250
Hyde, Kevin D.	0458	Javier, Richard S.	0358	Klib-Ngern, Pramote	0159
Ibana, Franklin V.	0450	Javier, Starlene M.	0151		0160
Ibarra, Ephraim E.	0257		0599	Kloos, Jeroen P.	0015
Ibut, Meshelyn A.	0172	Jecong, Julius	0605		0018
Icamen, Olivia S.	0479	Federico M.	0603	Kok, Jake Fernando	0376
Ignacio, Jose F.	0277			Kreuzer, Andreas	0180
Ignacio, Katrina Hannah D.	0356			Labor, Paul Danielle P.	0677
	0234			Lacap, Karen L.	0098
Ignacio, Sharon D.	0356			Lachica, Louis Placido F.	0633
Ignas, Louella Bianca L.	0212			Lador, Richie P.	0313

Lagdamin, Pauline Joy A.	0224	Lelis, Myrah Joan H.	0431	Lopez, Edgar Clyde R.	0298 0288
Laguren, Laarni B.	0167	Leonardo, Lydia R.	0486	Lopez, Grace DV.	0134
Lagutin, Pegelou Jhon S.	0249	Lerio, Jefferson Kevin A	0293	Lopez, Mark Louie D.	0137
Lainez, Wenefrida N.	0328 0582	Libay, J. L.	0014 0029	Lopez, Rolando	0412
Lalusin, Antonio G.	0079	Libre, Jr., Kemuel	0121	Lopez, Sarajane O.	0313
Lam, Hilton Y.	0359		0408	Lopez, Simon Miguel M.	0477
Lamberte, Joseph Cloyd L.	0280	Lim-Sylianco, Clara Y.	0460 0461 0462	Loquias, Monet M.	0407
Lamela, Ruben C.	0600			Lorenzo, Lisette Kjell Z.	0215
Landicho, Junar A.	0228	Lim, Antonie Kyna S.	0407	Lorenzo, Lizette	0410
Landicho, Venz Timothy Wesley C.	0348	Lim, Brian M.	0311	Lorido, Mary	0076
Lao, Angelic Gayle J.	0477	Lim, Ciara Christianne Y.	0099	Lorraine F.	0086
Lao, Christine Dianne A.	0372	Lim, G.	0021	Loyola, Mark L.	0402 0403
Lao, Stephanie M.	0419	Lim, Hans Christian M.	0479	Lu, Ramon Jr. E.	0409
Lapuz, Bianca Louise	0420	Lim, Richill Gen A.	0212	Lu, Sophia Francesca DP.	0363
Lapuz, Resean R.	0151	Limbadan, Nelly Z.	0625	Lucas, Josefino C.	0309
Lara, Aubrey B.	0648	Limjoco, Bianca Mae G.	0434	Lucilo, Jayson A.	0399
Lara, Jhamelyn M.	0670	Lin, Chia-Her	0454	Luis, Elsa M.	0033
Lat, Betty S.	0443	Lingdas, Charmaine A.	0358	Luis, Prosperidad C.	0241
Latorre, Angelica Anne E.	0051	Lingga, Juwairiya U.	0686	Lukose, Claramma	0164
Latoza, Rector John A.	0633	Linsangan, Noel B	0242	Luna, Keith	0069
Laude, Antonio F. Jr.	0422	Lituañas, Chris Rey M.	0083	Luniza, Leroy John B.	0249
Lavarias, Ma. Katrina C.	0406	Lizada, Gabriel Sebastian N.	0374	Luspo, Rodelo A.	0266
Ledesma, Carlene Rome	0139	Llamas-Clark, Erlidia	0446	Mabano, Mea C.	0245 0339
Ledesma, Gian Carlo M.	0058	Llanes, Elmer Jasper B.	0413	Mabesa, Linda B.	0332 0346 0447
Lefort, Laurent	0200	Llaneta, Kristine C.	0610	Macabeo, Allan Patrick G.	0458 0180 0483
Legaspi, Enrico D.	0185	Lofranco, Vivian S.	0419	Macadato, Reham B.	0450
Legaspi, Ruth Shane E.	0049	Lombay, Marian Fe Theresa C.	0417	Macalalad, Angelica A.	0470 0610
Lejarde, Godesil G.	0300		0247	Macalalad, Marta B.	0617

Macalla, Gian Paulo B.	0251	Malabad, Cristina G.	0501 0502 0533	Manzano, Ryan B.	0450
Macandog, Damasa M.	0136	Malabuyoc, Julianne Marie A.	0153	Mapa, Dennis S.	0646
Macni, Kristel Joy J.	0149	Malaluan, Lloyd Arvin M.	0608	Mapile, Maria Reynalen F.	0127 0120
Macuha, Richmark N.	0263	Malaluan, Roberto M.	0608	Mapili, Ruxan Faith	0666
Madamba, L.S.P.	0340	Malbog, Kameela Monique A.	0121	Maramba-Turqueza, Joy Noree	0656
Madatu, Sitti Nur-en R.	0415	Maldo, O.M.	0338	Maranga, Lina Dae T.	0450
Madigal James Paul T.	0122	Malibiran, Claire S.	0595	Maravilla, Ana Mikaela B.	0238
Madrid, Jordan F.	0220	Malipot, Jessa Joy C.	0348	Marcelo, Editha A.	0605 0208
Magana, Raymond A.	0621	Mallillin, Aida C.	0538	Marges, Rosemarie L.	0561
Magbanua, Arianne Lorraine P.	0224	Mamon, Gil Carlo H.	0249	Mariano, Lizbeth A.	0292
Magbanua, Francis	0089	Manahan, Lourdes A.	0440	Marquez, Cielo Mae D.	0140
Magdadaro, Charmaigne A.	0472	Manalastas, Eric Julian	0047 0055 0466	Martin, Edwin C.	0013
Magdalita, Pablito M.	0124 0006	Manalo, Jorel A.	0468 0680	Martin, Eunice Nicole A.	0450
Magistrado, Myleen L.	0322	Manalo, Monica R.	0108	Martin, Janine L.	0144
Magnaye, Maria Jannell Feliz A.	0337	Mangaya, Demy Q.	0074	Mary Ann J. Ladia,	0431
Magno, Jose Donato A.	0413	Mangitngit, Jessica D.	0469	Masangcay, Shirlamaine Irina G.	0084 0154
Magno, Jose F. IV	0630	Mangulabnan, Jezzah R.	0311	Mata, Rene Luis S.	0066
Magno, Jose M.	0630	Manikis, Lucia A.	0075	Matelab, Hosea D.L.	0186
Magoling, Bryan John	0470 0610	Manimtim, A. I.	0155	Mateo, Niño Jose	0653
Magomnang, Antonio-Abdu Sami M.	0237	Maningas, Mary Beth B.	0141 0153	Mathias, Mark Lester M.	0483
Magomnang, Dianne Mae M.	0237	Manongtong, Baby Bia B.	0192	Matias, Aura C.	0292
Magpantay, Veneranda A.	0007	Manug, Elaine Mae Y.	0227	Matilac, Gridlin A.	0192
Magracia, Mary Joy A.	0486	Manuyag, Kyle Adriel R.	0426	Matinong, Kathleen Erica D.	0046
Magsadia, Clarita R.	0517	Manzanero-Galvan, Noemie M.	0449	Maureal, Alex L.	0279
Magtaas, Remjohn Aron H.	0597			Mayo, Patricia Louis C.	0450
				Mayor, Anna Beatriz R.	0477
				Medina-Guce, Czarina	0675
				Melgar, Maria Isabel E.	0638

Melo, Kyla Jann	0658	Monilla, Maria	0293	Murao, Lyre Anni E.	0121
Mendez, Samantha Erika N.	0682	Katrina Joy U		Murray, Alyzza Starla M.	0212
Mendioro, Merlyn S.	0124	Montalbo, Reynaldo Carlos K.	0191	Mutia, Florabel P.	0619
		Montefalcon, Djowel Recto V.	0606	Muyargas, Moniq M.	0055
Mendoza, Eden C.	0466	Montemayor, Jen Adrian S.	0432	Muyco, Joanna Therese C.	0212
	0468	Montepio, Roger C.	0269	Naag, Mark Angelo Y.	0259
Mendoza, Eduardo R.	0399	Monzales, Janine M.	0144	Nacido, Ma. Christi B.	0090
Mendoza, Evelyn Mae T.	0023		0012		0230
	0167		0035	Nacionales, Kristine B.	0388
Mendoza, Kristofferson G.	0365		0036		0564
			0037	Nacis, Jacus S.	0382
Mendoza, Melrose Ivy	0646	Moody, K.	0038		0421
			0039		
Mendoza, Sheena Loraine P.	0173		0040		
			0041		
Mercado, Beatriz L.	0010		0041	Nagba, Mitchell Ameen Rey M.	0138
	0019	Mopera, Lotis E.	0337	Nagpala, Michael Joseph M.	0087
Mercado, Mark Joseph T.	0637	Mora-Garcia, Chime	0316	Nalipay, Ma. Jenina N.	0627
Mercines, Monique I.	0052	Morales, Adrian Ceasar C.	0450		0631
Mergal, Beryl Ben C.	0429	Morales, Marie Rose H.	0634		0308
			0170		0228
Mergal, Vicky C.	0657		0190	Namoco, Jr., Consorcio S.	0265
Merida, Rejane V.	0205	Morales, Sonia S.	0205		0274
Metillo, Ephrime B.	0078		0221		0276
Migano, Avegail M.	0426		0236		
Migano, Maria M.	0426	Morcilla, Rojien V.	0275	Narciso, Zenaida V., Ph.D.	0571
Mira, Nona Rachel C.	0570		0281	Narmani, Abolfazl	0447
Mistica, Myra S.	0486	Morong, Lea Joy M.	0104	Natividad, Alessandra D.	0076
Mohd Ali, Mohd Tajudin	0180	Mortera, Edward Patrick L.	0669	Naungayan, Karel Paulo S	0242
Moises, Minerva T.	0090		0171		0420
Mojica, Loida E.	0561	Muaña, Cherie G.	0172	Navarrete, Ian A.	0203
Molina, Victorio B.	0417	Mulig, Justine Christian H.	0102	Navarro, Manuel D.	0482
Molina, Ziljih S.	0078	Mundo, Mary Rose Q.	0613	Navasca, Apple Grace Charish B.	0171
Moncada, Fatima	0660			Nayve, Jr., Fidel Rey P.	0207
Mondragon, Josefino S.	0090	Muñez, Jephthe Olimpo	0681		

Nellas, Ricky B.	0186	Ocampo, Melody	0311		0471
Nelson, Grant	0053	Anne B.			0080
Neri, Anecito C.	0280		0620	Opulencia, Rina B.	0087
Neri, Jemateo B.	0078	Ocampo, Romeo B.	0672	Oquina, Julius R.	0114
Nerona, Randolph	0685		0047	Orendain, Sarah	
Nevado, Jr., Jose B.	0413	Ochoa, Danielle P.	0682	Ruth A.	0170
Ngelangel, Corazon	0442	Oclarit, Jose M.	0392		0572
	0140	Oclos, Ma. Theresa	0094	Orense, Consuelo L.	0575
Nicolas, Marilou G.	0107		0295	Orolfo, Diana	0466
Nique, Jem Erika A.	0417	Ocon, Joey D.	0298	Dalisay A.	0468
	0333	Odulio, Eiana		Orolfo, Estela B.	0157
Nisperos, Myrna O.	0349	Joshier A.	0142	Ortiza, Christopher	
				Llynard D.	0186
Noel, Marissa G.	0004	Ofreneo, Mira	0054		
	0169	Alexis P.		Osa, Johanna Ericka	0251
	0173	Okuda, Noboru	0089	F.	
Nogodula, Judee N.	0201	Oldan, Consorcia F.	0028	Osi, Marina	0182
	0211	Oliva, Efraim M.	0221	Owusu- Manu, De-	0248
			0599	Graft	0273
Nohay, Carl M.	0613	Olivares, Ryan U.	0314	Ozaeta, Emilio U.	0267
Notarte, Christine					
Mae B.	0617	Olorunfemi, Bayode	0282	Pabello, Rhaiza P.	0135
	0332	J.		Pabilona, Leonel L.	0237
Novero, Fe E.	0339	Olvida, Imelda DG.	0637	Pablo, Cynthia B.	0462
			0032		0193
Nuesca, Gerry M.	0215	Olvida, Jaime L.	0031	Pabroa, Preciosa	0222
	0410			Corazon B.	0597
		Omaña, Trisha Mae	0142		
Nueva España, Ma.	0489	G.		Paclibar, Abeizer	0094
Belina N.					
Nuguid, Luzette	0075	Ona, Deborah	0413	Pacoma, Arvin U.	0103
		Ignacia D.			
Numancia, Elsa Mae					0017
M.	0206	Ona, Ma. L. D.	0022	Pacuz, L. M.	0042
		Onda, Deo Florence	0116		
Nuñeza, Olga M.	0477	L.		Padilla, Carmencita	0431
	0027			D.	
Nzima, M.D.S.	0162	Ondoy, Juareyn L.	0124	Padilla, Phillip Ian	
		Ong, Perry S.	0150	P.	0046
Obinguar, Sarah					
Lou	0372	Onggo, Lowela	0121	Paguidopon, Cyril	0046
		Siarot		L.	
Obleopas, Romula					
A.	0130	Ongkeko, Jr., Arturo	0380	Paguio, Jenniffer T.	0235
		M.			
	0216	Ongkho, Edricson		Palanca-Tan,	0315
Obra, Glenda B.	0011	N.	0219	Rosalina	
	0118			Palangan, Nikki	0138
Obusan, Marie	0127	Opelario, Melchi	0434	Karr Mei C.	
Christine M.		Esrom L.			
	0120		0138	Palatino, Maylin C.	0432
	0146	Opena, Edward		Palermo, Eutequio	
		Laurence L.	0436	III Zante L	0240

Palis, F. G.	0032		0248				0247
Paller, Vachel Gay V.	0223	Parreñas, Charmaine Grace M.	0170		Perez, Jem Valerie D.		0298 0288
Pallugna, Reuel C.	0236 0275	Pascasio, Jethro Daniel A.	0295		Perez, Jose Nickolo O.		0116
Palma, Richmund A.	0034	Pascua, Diogenes Armando D.	0251		Perez, Ser John Lynon P.		0191
	0174	Pascual, Bernet Cyril Lois R.	0472		Perlas, Ma. Pamela Milagros S.		0480
Palmes, Nenita D.	0178 0218 0026	Pascual, Elisha John W.	0604		Pernia, Katherine L.		0194 0204
Palomo, Alex M.	0509 0522	Pasicolan, Vivien Leigh F.	0196 0214		Pestaño, Lola Domnina B.		0219
Pambid, Mauro Jay	0291	Pastor, Claire D.	0235		Phukhamsakda, Chayanard		0458
Pamplona, P.P.	0010	Patac, April Mae	0291		Pidlaon, Switzale M.		0107
Pandian, Karl Eric P.	0192		0411		Pilapil, Luis Agustin E.		0458
Panelo, Isabella R.	0081	Patalen, Chona F., MPH	0488 0568 0384		Pilapil, Paolo Nicole Edritz G.		0249
Panes, Vivian A.	0105		0179		Pilar-Arceo, Carlene PC.		0399
Pangan, Gerome C.	0122	Patricio, Jonathan N.	0194 0204		Pili, Arman N.		0126
Pangilinan-Behino, Cecil Margarette E.	0364		0155		Pillado, Michael Ryan		0370
Panizares, Imelda	0461 0462	Payawal , P. C.	0185 0225		Pimentel, Stephanie S.		0633
Panlaqui, Angelo A.	0604 0208	Payawan, Jr., Leon M.	0272				0604
	0163	Pecson, Roland Joshua S.	0279		Pineda, Camille U.		0602
Pantastico, Er B.	0165				Pineda, Rence Marrion M.		0076 0071
Paolo Victor N. Medina,	0648	Pedregosa, Lois Andrea M.	0227		Pinuela, Cathlyn Leigh		0464
Papa, Rey Donne S.	0089 0137 0170	Pedroso, Fiona	0094				0604
Paramo, Orcheliza L.	0173 0221 0227	Pelovello, Marvin V.	0130		Piquero, Ronald E.		0208 0605
Paras, Agnes T.	0400	Peña Alampay, Liane	0682		Plariza, Carl Gabriel L		0290
Parcon, Apryl Mae C.	0622	Peñaflor, Janssen	0303		Plaza, Ma. Krizia E.		0183
Paredes, Vicent John A	0293	Penaloza, Jr., David P.	0195		Pobre, Kathrina M.		0105
Parn, Erika	0273	Pepito, Kynji Kyle Niño A	0240		Pondoc, Dionesio C.		0307
		Peralta, Arnold B.	0235		Poniente, Jennifer A.		0101
		Peralta, C. N.	0344				
		Peralta, Elfritzson	0089				

	0001	Rabaya, Ysabela		Reiser, Oliver	0180
Potts, M. J.	0017	Marie C.	0121	Relacion, Juvie	0246
	0042	Racaza, Olan L.	0310	Pauline L.	
Prudencio, Patricia A.	0482	Racelis, Ma. Elenita L.	0095	Relator, Jayford T	0304
Pua, Christianne Dolor A.	0173	Racho, Joseph Michael D.	0193	Relis, Leonel J.	0052
Pueblos, Kirstin Rhys S.	0483	Racho, Joseph Michael D.	0222	Relleve, Lorna S.	0202
Puerto, Jailyn N.	0679	Rada, Wilfredo M.	0250	Rellin, Maricar T.	0217
Punzalan, Felix Eduardo R.	0413	Ramilo, Rachelle C.	0072	Renovalles, Eunice M.	0238
Punzalan, Jervée M.	0597	Ramirez, Ann Maureen E.	0209	Rentutar, Juleen A.	0145
Purganan, Daniel John E.	0116	Ramirez, Ma. Anna Rita M.	0494	Reposilo, Wagner John L.	0266
Pusad, John Michael G	0246	Ramo, Ma. Elina Salvacion Kristina V.	0599	Requillo, Eleana Jane B.	0188
Putong, Barby Jay G	0290	Ramos, Chester C.	0417	Requina, Teodora	0004
Que, Gerard Clinton L.	0150	Ramos, Glicería B.	0311	Resilva, Sotero S.	0216
Quijada, Jr., Ramir C.	0266	Ramos, Grace C.	0068	Resurreccion, Katrina Fernando	0644
Quilloy, Erwin P.	0238	Ramos, Grace C.	0271	Resurreccion, Ron	0673
Quiming, Noel S.	0140	Ramos, Jelsy Rose C.	0479	Retuya, Claudine O.	0670
Quiming, Noel S.	0107	Ramos, John Cristian A.	0669	Reyes, Jhon Lloyd	0139
Quimio, Julianne Maria Undine Paz H.	0007	Ramos, Maria Cristina	0412	Reyes, Jowela O.	0406
Quimio, Tricita H.	0168	Ranay, Adam A.	0319	Reyes, Julius Ceazar H.	0473
Quimque, Mark Tristan J.	0483	Rañola, Rey Alfred G.	0372	Reyes, Marc Eric S.	0058
Quinain, Khael T.	0670	Rasul-Bernardo, Amina	0652	Reyes, Renato G.	0071
Quiñones, Diwa Malaya	0047	Rasul, Janel Zahra P.	0153	Reyes, Rosalie B.	0250
Quinones, Joan C.	0227	Rayos, Joseph Christopher C.	0321	Rezaga, Bethel Faith Y.	0268
Quintos, John Gabriel Robert R.	0630	Reagen, Mandias	0429		0287
Quiros, Edwin N.	0262	Realubit, Elena B.	0465	Ribo, Annabelle A.	0183
Quizon, Paul Marvin T.	0474	Reaño, Consorcia E.	0079		0188
Quizon, Romeo R.	0680	Redolosa, Ilona Cris G.	0211		0227
Quizon, Romeo R.	0417	Reganit, Paul Ferdinand M.	0413	Ricafort, Jarren Neil D.C.	0611
Rabajante, Jomar	0117			Ricarte, Juan Antonio	0446
Rabajante, Jomar F.	0223			Rideout, John A.	0221
				Rigor, E. M.	0366
				Rimana, Kui-Dong	0186
				Rivera, Adovich S.	0359
				Rivera, Ana Kriselda B.	0375

Rivera, Mary Anne F.	0061	Rosario, Rachel	0442	Salde, Kathyleen	0115
		Roxas, Chelsea	0145	Sales, Kershey S.	0214
Robertson, G. L.	0333	Kaye F.		Saligan, Pablo P.	0599
	0349	Royo, Violly R.	0188	Salingay, Maria	0210
Rodriguez, Evelyn B.	0097	Ruiz, Wawie DG.	0628	Luisa B.	
		Rutab, F. R.	0001	Salolog, Mary Cor S.	0152
Rodriguez, Gabriel D. A.	0123	Sabarez, M. T.	0366	Saludares, Alaica Q.	0145
Rodriguez, J.B.	0340	Sabido, Portia	0410	Salva, Edna T.	0217
		Mahal G.	0215	Salvacion, Maria	0235
Rodriguez, Marietta P.	0389	Sabiniano, N. S.	0329	Lourdes Dorothy S.	0369
	0536	Sagsagat, Karizma Joy	0069	Salvador, Divine Love A.	0640
Rodriguez, Mary Grace dP.	0110	Sagsagat, Maria		Salvaña, III, Camilo Jose S.	0255
Rodriguez, Regina G.	0590	Stephanie Jean D.	0348	Salvino, Roberto P.	0680
Rogayan, Jr., Danilo V.	0668	Saguin, Kidjie Ian	0632	Samama, Norkaina C.	0686
			0082	Samaniego, Arlene A.	0358
Rojo, Jay Noel N.	0394	Sagum, Rosario S., Ph.D.	0334	Samia, Frances Rowena M.	0074
			0563	Samora, Vanessa	0141
Roldan, Marri Jmelou	0085		0331	Samoy-Pascual, Kristine	0013
			0498	Samsam, Charito	0131
Rollo, Edward Peter F.	0237		0521	San Agustin, Jovenal	0460
Rollon, Annaliza P.	0262		0530		0461
	0602		0534		0172
	0599		0535	San Juan, Ma. Eva C.	0190
Romallosa, Kristine Marie D.	0603	Saises, Marcela C.	0548		0196
	0607		0549	San Pascual, Alangelico O.	0224
	0604		0553		0006
			0562		0235
Romero, Carlos Joaquin Miguel D.	0655		0569	Sana, Erlyn A.	0358
			0576		0369
Romero, Kyle Maxinne R.	0348		0586		
			0256	Sanao, Queensette Chelline A	0290
Romero, Rose Glendelyn T.	0100	Salamangkit-Mirasol, Emie	0258	Sanchez, David Anthony L.	0479
Ronquill, Rosecell Ann G.	0171		0291	Sanchez, Kenneth Xavier O.	0126
Roque, Alexandria Marie	0197	Salanga, Maria Guadalupe	0653		
		Salazar, Gerlone M.	0195		
Rosal, Reuben James	0139	Salazar, Jose Mario G.	0432		
Rosales, Cristina Amor M.	0259	Salazar, Lucina Concepcion E.	0407		
Rosario, Aldaba	0004	Salcedo, Joan C.	0600		
Rosario, Joselito	0131				

Sanchez, Patricia Libby R.	0205	Santos, Lourdes Ella G.	0413	Sigue, Alexandra Marie S.	0348
Sandoval, Ma. Jovina A.	0510	Santos, Mudjekeewis D.	0134 0101	Silan, Miguel Alejandro A.	0061
Sangel, Percival P.	0007 0106	Santos, Noelle Lyn C., RND, MSPH	0593	Silvano, Arnulfo M.	0045
Sanico, Lucille Rose D.	0600 0651 0001	Santos, Patrocinio S.	0443	Silvestre, Catherine J.	0431
Sano, E. O.	0017 0042	Santos, Romeo B.	0068 0300	Silvestre, Jose Danilo A.	0064
Sanoh, Nurzeba C.	0195	Sardido, Sharmaine B.	0169	Silvestre, Maries Ann R.	0086
Santander, Dorothy O.	0169	Sare, Merrill T.	0183	Simbahan, Jessica F.	0119
Santarita, Joefer Buga ay	0614	Sarmiento, Jasper A.	0112	Simbulan, Nymia P.	0570
Santaromana, Francis L.	0253	Sarmiento, Lance Ehrold D.	0477	Singh, R.D.	0164
Santiago-Bautista, Myla R.	0477	Sarmiento, Raymond Francis R.	0380	Sinoy, Alejli Anne C.	0189
Santiago, Anna Theresa A.	0317	Sarona, Glory Jane N.	0196	Sio, Christie P.	0047
Santiago, Jeremy I.	0628	Sayarot, Mark J. S.	0123	Soares-Magalhaes, Ricardo	0312
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