

Physical Sciences

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VIBRATION MONITORING AND FAULT DIAGNOSIS OF AN I.D.FAN AT A CEMENT PLANT

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I.D.fan (Kiln) of a Cement plant consisting of a motor, two mechanical couplings, a hydraulic coupling and a heavy fan (approx. two tons) was giving high vibrations at some locations. This was monitored at all the bearing locations and its vibration symptoms were recorded for analysis purpose. Frequency domain and phase analysis were made to diagnose the root cause of vibrations. On the basis of this analysis, fault observed was mainly with the fluid coupling. The vibration spectra and phase data are presented in this paper.

Key words: Vibration monitoring, Cement plant, Mechanical coupling, Rotating machinery.

SPECTROPHOTOMETRIC METHOD OF THE DETERMINATION OF GOLD (III) BY USING IMIPRAMINE HYDROCHLORIDE AND PROMETHAZINE HYDROCHLORIDE

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Imipramine hydrochloride [IPM·HCl] and promethazine hydrochloride [PMT·HCl] were used for the spectrophotometric determination of gold (III) in the aqueous solution. The halides complexes of gold (III) created a coloured coupling with the studied drugs which were extractable in chloroform. These new compounds were characterised by IR, UV-VIS spectra and thermal and elemental analysis. Rapid and sensitive spectrophotometric method for the determination of gold (III) in the aqueous solution is described. The absorbance was found to be linear function of the gold (III) concentration in the range from 0.2 to 20 $\times 10^{-1}$ mg. The ratio of complex $[\text{AuX}_4]^-$ to the organic cation from drug in the obtained compounds was determined as 1:1. The method was satisfactorily applied to the analysis of gold (III). A great advantage of the proposed method is that the trace amounts of gold (III) can also be examined.

Key words: Imipramine hydrochloride, Promethazine hydrochloride, Gold(III) halides complexes.

Short Communications

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A FLAVONE FROM THE SEEDS OF *CARUM CARVI* L. (UMBELLIFERAE)

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Short Communication

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CONDENSATION OF SOME HETARYL SUBSTITUTED DIKETONES WITH AROMATIC DIAMINE

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Short Communication

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EFFECT OF PART REPLACEMENT OF SILICA SAND WITH CARBON BLACK ON COMPOSITE PROPERTIES

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Biological Sciences

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STUDIES ON THE PRODUCTION OF SPORE CRYSTAL BY *BACILLUS THURINGIENSIS* C-3-023 IN THE STIRRED FERMENTOR

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RELATIONSHIPS BETWEEN HEAVY METAL CONTENT AND BODY WEIGHT OF SELECTED FRESHWATER FISH SPECIES OF THE LOWER IKPOBA RIVER IN BENIN CITY, NIGERIA

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The relationships between the heavy metals content and body weight of edible muscle of selected freshwater fish species of the lower Ikpoba river in Benin City Nigeria, were studied using the atomic absorption spectrophotometry technique. 27 samples of *Clarias gariepinus* (average wt: 110.80 ± 36.31 g); 36 samples of *Channa obscura* (average wt: 65.20 ± 27.20 g) and 18 samples of *Chromidotilapia guentheri* (average wt: 80.10 ± 31.70 g) were used for the study. Mean heavy metals concentration ($\mu\text{g/g}$ dry wt.) varied from Cd (0.02 ± 0.01), through Cu (0.25 ± 0.07), Pb (0.40 ± 0.60) to Zn (6.0 ± 1.03) in *Clarias gariepinus* and through Cd (0.02 ± 0.03), Cu (0.04 ± 0.02), Pb (0.27 ± 0.05) to Zn (2.10 ± 0.02) in *Channa obscura* and through Cd (0.02 ± 0.05), Cu (0.30 ± 0.05), Pb (0.40 ± 0.2) to Zn (6.15 ± 1.70) in *Chromidotilapia guentheri*. Relatively low metal values were recorded in *Channa obscura*. Significant correlations were recorded between cadmium, lead, zinc and copper and body weight of *Clarias gariepinus* and *Chromidotilapia guentheri* ($P < 0.05$). However, in the predatory *Channa obscura*, statistical analysis showed that copper and zinc contents were significantly correlated while cadmium and lead were not ($P > 0.05$).

Key words: Heavy metal, Body weight, Fish muscle, Lower Ikpoba river, Benin City, Nigeria.

CYSTIC ECHINOCOCCOSIS IN DOMESTIC RUMINANTS IN COX'S BAZAR OF BANGLADESH

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This investigation was carried out to describe the local epidemiological pattern of cystic echinococcosis among the indigenous domestic ruminants in the Cox's Bazar district of Bangladesh. Home visits and family interviews revealed several socio-economic and cultural characteristics which are thought to be involved in the transmission cycle and widespread occurrence of cystic echinococcosis in the area. Fecal examination of stray and house dogs showed high infection levels (50.65%) with *Echinococcus granulosus*. A significantly higher ($p < 0.00$) prevalence of cystic echinococcosis was recorded in sheep (52.11%) than buffaloes (36.11%), cattle (30.62%) and goats (14.73%). The values of chi-square test and regression-coefficient analysis strongly indicate that age is an important risk factor of being higher infestation with cystic echinococcosis. While sex had no influence on the prevalence of the disease. Lungs of all ruminant hosts were the most common predilection site for *Echinococcus* cysts, liver ranked second, followed by spleen, kidneys and heart. Fertility rate of the cysts was recorded high in sheep (65.43%) than buffaloes (16.33%), goats (14.80%) and cattle (8.11%). The high level of infection with cystic echinococcosis in domestic ruminants and dogs suggests that there is an urgent need for control measure against the disease in the Cox's Bazar area.

Key words: Cystic echinococcosis, Prevalence, Local epidemiology, Domestic ruminants, Cox's Bazar.

THE FOOD AND FEEDING HABITS OF FISHES OF THE JAMIESON RIVER, NIGERIA

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121 specimens of teleosts comprising of 23 species, 17 genera and 11 families were examined in the study of the ichthyofaunal food habits of the Jamieson River. Cichlidae (34.78%) was richest in species number, and a Bagridae, *Chrysichthys furcatus* (28.93%) was the most numerical species. Analysis of the stomach contents revealed algae, diatoms, macrophytes, zooplankton, shrimps, insects, fish, fish scales, detritus, sand and unidentified material as the main food categories selectively eaten by Jamieson River fishes. The fishes exhibited benthopelagic exploitation and grazing tendency.

Key words: Food and feeding habits, Fishes, Jamieson River.

ESTIMATION OF LEAF DAMAGE OF BANANA AFFECTED BY BANANA LEAF AND FRUIT BEETLE, *NODOSTOMA VIRIDIPENNIS* MOST. (COLEOPTERA: EUMOLPIDAE) IN BANGLADESH

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The study was made to evaluate the nature, extent of damage and susceptibility of banana leaf (furled leaf, freshly open leaf and mature leaf) affected by leaf and fruit beetle, *Nodostoma viridipennis* Most. in an orchard in Bangladesh Agricultural University, Mymensingh from October, 1997 to October, 1998. The beetle produced damage symptom with the sign of scars and dried feeding areas on banana leaf. The greatest damage was done to furled leaf bearing 69.8 scars which was 1.3 and 2.0 times higher than freshly open and mature leaf, respectively. The furled leaf being suitable feeding was more susceptible than other categories of leaf and seemed to be the target of colonization of leaf and fruit beetle in the orchard. The growth and development of banana leaf was affected by the damage of *N. viridipennis*. There was significant reduction in size of infested furled leaf. The difference of leaf size in case of freshly open and mature leaf was not so marked.

Key words: Banana leaf, *Nodostoma viridipennis*, Leaf damage.

PHYTASE PRODUCTION BY FERMENTATION

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To maximize the yield of enzymes by *Aspergillus niger* nutritional and culture conditions were manipulated. The results of the study indicated that 30 –35 percent moist heat sterilized and fortified with 2-5 mg ammonium phosphate per 100 g rice bran in static cultivation, produced maximum amount of phytase in 10-17 days period.

Key words: Phytase, *Aspergillus niger*, Nutritional and culture conditions.

DETERMINATION OF PROTEIN, NITRITE AND NITRATE IN ANIMAL PROTEIN SOURCES IN NIGERIA

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The protein, nitrite and nitrate levels were determined in the body parts of twelve different types of fish, snake, prawn, amphibian and camel, they all serve as animal protein sources. The parts examined for these parameters were: head, gills, internal organs, muscle, bone and skin. All the samples yielded high levels of protein with values ranging between 21.71 g/100 g–98.80 g/100 g. The nitrite levels ranged between 4.2 mg/kg – 112.06 mg/kg and the nitrate levels ranged between 168.46mg/kg - 4580.67 mg/kg. Nitrate is sparingly used in Nigeria to cure fish and meat. Hence the results of the nitrite and the nitrate might have been due to their levels in the samples. Most of the coefficient of variation values were low in the various sample body parts showing almost homogenous distribution of protein, nitrite and nitrate levels. While the nitrite levels were within the maximum permitted levels, many of the nitrate levels exceeded the maximum permitted levels.

Key words: Determination of protein, Nitrite, Nitrate, Animal protein.

GENOTYPE X ENVIRONMENT INTERACTION IN RELATION TO DIALLEL CROSSES FOR FLOWER CHARACTERS IN BEAN (*LABLAB PURPUREUS*)

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Diallel analysis includes combining ability effects and components of genetic variation. They were estimated over two environments for flower characters from a half-diallel cross by involving six parents. Both general combining ability (gca) and specific combining ability (sca) were important for all characters with preponderance of additive gene actions. Environment had significant effect on all characters except flowers/inflorescence. Best general combiners were DS52, DS106, DS112 etc. Complete dominance was observed for flowering date in environment-2, flowers/inflorescence in environment-1 and pods inflorescence in both environments. Over dominance was found for flowering date in environment-1 and partial dominance for flowers/inflorescence in environment-2 and for inflorescence/plant in both environments. Characters were governed by asymmetrical distribution of positive and negative alleles. Dominant and recessive genes were equally distributed for flowering date and inflorescence plant whereas unequally distributed for flowers/inflorescence and pods/inflorescence. One or two gene groups were involved in flower characters of lablab bean.

Key words: Diallel analysis, Environmental heterogeneity, *Lablab purpureus*.

ELEMENTAL ANALYSIS OF *CALENDULA OFFICINALIS* PLANT AND ITS PROBABLE THERAPEUTIC ROLE IN HEALTH

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Elemental analysis of crude ethanolic and aqueous extracts of *Calendula officinalis* plant and its individual parts i.e. flowers, leaves and roots reveal the presence of major, minor and trace elements in appreciable quantities. Elements detected in crude ethanolic and aqueous extracts of whole *Calendula* plant are calcium 5319, 2464 ppm, sodium 16990, 14745 ppm, potassium 79782, 71617 ppm, magnesium 6059, 9060 ppm, iron 74.459, 22.94 ppm, copper 8.05, 1.27 ppm, manganese 37.22, 36.96 ppm, zinc 51.50, 34.00 ppm, nickel 5.10, 2.45 ppm, cobalt 1.39, 0.98 ppm and cadmium 0.40, 0.50 ppm. While chromium and lead were found to be present in 1.01 ppm in ethanolic and in traces in aqueous extracts.

Highest percentages of iron 125, 28.16 and copper 80.59, 10.19 ppm were found to be present in ethanolic and aqueous extracts of root portion respectively. The highest quantity of nickel 8.46 ppm was found in aqueous extracts of roots while in ethanolic extract it was 7.10 ppm in flowers. *Calendula officinalis* and its individual parts were found to be rich in calcium, sodium, potassium and magnesium contents which are not only essential but are also required for the haemostatic control of the body.

Key words: Herbal plant, Elemental analysis, *Calendula* plant.

PHOSPHORUS ADSORPTION IN REPRESENTATIVE SOILS OF PESHAWAR VALLEY (NWFP)

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Soil incubation experiment was conducted to study some aspects of phosphorus (P) cycling in soil series of Peshawar Valley. Phosphorus adsorption before and after incubation was studied, physico-chemical properties and AB-DTPA extractable P were determined. Soil samples containing 19 to 22% (w/w) moisture were incubated at 25°C for 7 weeks. The amount of P adsorbed by the soil from KH_2PO_4 solution (0 to 50 $\mu\text{g/ml}$) before and after incubation was calculated by the difference between the amount of P in solution after 24 h shaking and the initially amount was present. These soils contain CaCO_3 , which might adsorb organic P, or form insoluble Ca phosphates. The adsorption isotherm plots highlight the ability of these soils for P sorption. Soil having high amount of CaCO_3 and clay have more affinity for P adsorption in the soil system.

Key words: Phosphorus, Adsorption, Isotherm, Langmuir, Freundlich.

GENE ACTION FOR SOME QUANTITATIVE CHARACTERS IN UPLAND COTTON (*GOSSYPIUM HIRSUTUM* L.)

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The study, includes a six-parent complete diallel cross of varieties/lines viz. CRIS-15, TH-3/83, TH-28/83, CRIS-9, NIAB-78 and Rehmani of *Gossypium hirsutum* L. It was initiated to determine the genetics of lint weight, seed index, staple length and seed cotton yield per plant. The WrVr graph showed that, lint weight and seed cotton yield were conditioned by over-dominance, while seed index and staple length by partial-dominance type of gene action. CRIS-9 and NIAB-78 x CRIS-9 appeared to be best general and specific combiners, respectively. Hence, they are recommended for future breeding programme.

Key words: Gene action, Genetics of cotton, Breeding potential.

STUDIES ON DETOXIFICATION OF FEEDS AND FEED INGREDIENTS

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Different feed ingredients i.e. wheat, sorghum, maize, corn gluten meal, rice bran, cotton seed meal, mustard seed meal, sunflower meal, soy bean meal, sesame meal, peanut meal and broiler feeds were procured from local market and analyzed for chemical composition and toxic factors. The oilseed cakes and rice bran meal were treated to eliminate the toxic factors. Detoxification of feed ingredients resulted in decrease in gossypol from 0.31 to 0.05% in cotton seed meal, allylisoithiocyanate from 1.55 to traces in mustard seed meal, chlorogenic acid from 3.20 to 0.95% in sunflower meal and trypsin inhibitor from 72.10 to 17.20 mg/g in soy bean meal. Phytic acid contents in oilseed cakes i.e. cotton seed, mustard seed, sunflower, soybean, and rice bran meals before and after treatments were reduced from 2.91 to 0.43, 3.54 to 0.40, 2.84 to 0.52, 3.22 to 0.64 and 2.60 to 0.42%, respectively.

Key words: Feed ingredients, Toxic factors, Cereals, Phytic acid.

Short Communication

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EFFECT OF *RAPHANUS SATIVUS* LINN OIL ON RABBIT SKIN

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Technology

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COMMERCIAL EXTRACTION AND RESOLUTION OF SILYMARIN ISOMERS

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A simple and economical procedure for the large-scale extraction of silymarin from the dried seeds of *Silybum marianum* has been developed. After harvest the cellular and acellular constituents of the seeds are biodegradable. Using the fresh seeds, a viable procedure has been perfected for the extraction of silymarin (yield 1.47 %). The product appeared as a mixture and was resolved into the isomers by centrifugal chromatography. The identity of the product and its isomers were confirmed through comparison with standards using mp, UV, IR, ¹H NMR and Mass spectrometric data and 2,4, dinitrophenylhydrazine assay.

Key words: *Silybum marianum* seeds, Silymarin, Silybin, Silydianin, Silychristin.

Technology

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COMMERCIAL EXTRACTION AND RESOLUTION OF SILYMARIN ISOMERS

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Key words: *Silybum marianum* seeds, Silymarin, Silybin, Silydianin, Silychristin.
