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Physical Sciences

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AIR POLLUTION IN PESHAWAR (RATE OF DUSTFALL)

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Rate of dustfall measurements were under taken in urban area of Peshawar at four sites during the period 1993-1998. The average rate of dustfall has increased from 1993 to 1998 and the overall average rate of dustfall was found to be 27.65 tons/km² month. It was observed that dustfall varied from place to place and from month to month. Meteorological conditions have marked effect on the rate of dustfall pollution. Chemical analysis of the dustfall indicated that it has contribution from particulate emission from automobile exhausts, construction activities, soil and sand particles of the surrounding area.

Key words: Dustfall, Pollutant, Meteorological conditions.

COLORIMETRIC DETERMINATION OF PARACETAMOL IN RAW MATERIAL AND IN PHARMACEUTICAL DOSAGE FORMS

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A rapid, accurate and simple method is proposed for the determination of p-acetaminophen (paracetamol) in raw material, tablets and syrups. The method is based on measuring the intensity of the yellow color that developed when acetaminophen is allowed to react with p-dimethylaminobenzaldehyde in 2M HCl after heating.

The color which absorbs in the visible region of λ 450nm is stable for several hours and the intensity is directly proportional to the concentration of the drug, that is, Beer-lambert law is obeyed. The method can be used to analyse paracetamol in raw material and in pharmaceutical dosage forms.

Key words: Paracetamol, Pharmaceutical dosage forms, P-dimethylaminobenzaldehyde.

ASSESSMENT OF THE PHYSICOCHEMICAL STATUS OF A TEXTILE INDUSTRY'S EFFLUENT AND ITS ENVIRONMENT

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Physicochemical status of an industrial textile's effluent and its environment (soil and agricultural product-cassava tubers) at Ado-Ekiti, Nigeria was assessed. Results showed that great variation existed among the parameters (pH units, temperature, conductivity, total hardness, total alkalinity, bicarbonate and hydroxide hardness, calcium and magnesium hardness, chloride and metal elements) down the channel, significant difference ($P < 0.05$) existed among the minerals in the effluent, soil sediments and cassava tubers in the three different zones. Fe, Mg, Ca, Na, K and Ni were found to be more concentrated in the effluent whereas Co, Zn, Cu, Pb, Cd and Mn were more concentrated in the soil sediments. However, Fe, Pb and Mn were more concentrated in the effluent than in cassava tubers. Mg, Ca, Zn, Cu, Cd, Na and K were more highly concentrated in cassava tubers showing evidence of bioaccumulation.

Key words: Physicochemical status, Textile effluent, Bioaccumulation, Cassava tubers.

DETERMINATION OF SOME HEAVY METALS IN *Oreochromis niloticus*, *Clarias gariepinus* AND *Synodontis spp* FROM THE COASTAL WATER OF ONDO STATE, NIGERIA

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Some heavy metals (Pb, Ni, Fe, Cu, Zn, Cd, Co, Mn, and Cr) were determined in *Oreochromis niloticus*, *Clarias gariepinus* and *Synodontis spp* obtained from the coastal water of Ondo State. All metals examined and detected in all fish samples. Iron, manganese and cadmium were found to be the most abundant metals in the fish samples with an average values of 35.8, 31.3, and 12.5 mg kg⁻¹ respectively. Except for manganese, iron and cadmium, *Synodontis spp* has the highest concentration for virtually all the metals under examination.

Key words: Heavy metals, Coastal water, *Oreochromis niloticus*.

SYNTHESIS OF SOME NOVEL 5(1'-ARYLPYRAZOL-4'-YL) 1,3,4-OXADIAZOLES

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Various 1-aryl-pyrazole-4-carboxaldehyde benzylhydrazones were cyclized with polyphosphoric acid to give 5(1'-arylpyrazole-4'-yl) 1,3,4-oxadiazoles (3-8) in good yields. Confirmation of their structures was based on the results of elemental analyses, infrared and proton magnetic resonance spectra.

Key words: Hydrazones, Pyrazole-4-carboxaldehydes, Cyclizations.

Short Communication

Pak J Sci Ind Res 2002 45 (1) 23-25

**FLAME-ATOMIC ABSORPTION SPECTRO-
PHOTOMETRIC DETERMINATION OF
TRACE METALS IN URINE**

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Short Communication

Pak J Sci Ind Res 2002 45 (1) 26

SCREENING OF HETEROCYCLIC COMPOUNDS AS ANTIBACTERIAL AGENTS. I. SOME PYRAZOLE-4-CARBOXALDEHYDE DERIVATIVES

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Short Communication

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SOLVATION PROPERTY EFFECT ON CRYSTALLIZATION THROUGH COOLING

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Biological Sciences

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CHEMICAL COMPOSITION AND FUNCTIONAL PROPERTIES OF THE AFRICAN LOCUST BEAN (*PARKIA BIGLOBOSA*) SEEDS

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The proximate and nutritionally valuable mineral compositions were determined in raw, cooked and fermented African locust bean seeds (ALBS). The functional properties were also evaluated in the fermented sample. Results showed that fermentation improved protein, ash and calcium quantitatively in over cooked sample while fat, carbohydrate, magnesium, sodium, phosphorus, zinc and iron values were more concentrated in the cooked sample. The functional property results showed that fermented ALBS was poor in most functional properties except in water absorption capacity. Protein solubility was high in the acid and alkaline media while the isoelectric point was 7.0 showing that fermented ALBS would be useful in food formulations involving both low and high pH.

Key words: *Parkia biglobosa*, African locust bean, Chemical composition, Functional properties.

CATALYZED ORGANOSOLV PULPING OF SUNFLOWER (*HELIANTHUS ANNUS*) STEMS BY LOWER ALIPHATIC ORGANIC ACIDS

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Sunflower (*Helianthus annus*) stems were subjected to organosolv delignification with acetic, formic and propionic acids. It was found that, among lower aliphatic organic acids, only acetic acid sufficiently delignified this raw material. The kinetics of delignification process was also studied and it was established that optimum acetosolv delignification was achieved with 95% acetic acid, and 0.25% hydrochloric acid as catalyst in 90 min of fractionation time. Further data on measurement and classification of fiber dimensions of this raw material showed the absence of long fibres and abundance of short fibres in the pulp.

Key words: Sunflower stems, Organosolv pulping, Delignification, Fibre dimensions.

EFFECT OF DIFFERENT SOAKING AND COOKING METHODS ON PHYSICAL CHARACTERISTICS, PHYTIC ACID CONTENT AND PROTEIN DIGESTIBILITY OF RED KIDNEY BEANS

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(Received 1 February 2000; accepted 10 February 2001)

Effect of different soaking and cooking methods on some physical characteristics, phytic acid content and protein digestibility of red kidney beans is reported. Soaking of kidney beans in 4% acetic acid solution gave rise to lower hydration capacity, hydration index, swelling capacity and cooking time than soaking in tap water. Phytic acid contents of red kidney beans were reduced to various extents on soaking in different solutions at 30°C and 100°C. However, soaking in acetic acid solution with or without sodium chloride was the most efficient method for reducing phytic acid. Phytic acid was further reduced on cooking by different ways. Cooking in a pressure cooker caused maximum reduction in phytic acid contents. Ordinary and microwave cooking also showed pronounced effect on reduction of phytic acid. Reduction in the level of phytic acid was not found responsible for improving the protein digestibility of red kidney beans.

Key words: Red kidney beans, Phytic acid, Protein digestibility, Reduction, Soaking, Cooking.

LABORATORY STUDIES ON NEEM KERNELS AND LEAVES AS WHEAT PROTECTANTS

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The extracts of neem seed kernels and leaves and their powders were tested for the repellent and antifeedant activities against *Tribolium castaneum* (Herbst) and *Rhizopertha dominica* (Fabricius) respectively. The best repellent activity class (iv) was observed in fresh seed kernels extracted in ethyl alcohol at 150 mg cm². Whereas the benzene, hexane and acetone extracts of the seed kernels were not effective at the same dose. Dry powder of fresh seed kernels protected wheat from infestation upto one year at higher dose.

Key words: Neem, Stored grain, Insect repellency, *Azadirachta indica*, wheat, *T. castaneum*, *R. dominica*.

EFFECTS OF ZINC, NITROGEN AND VARIABLE TEMPERATURES ON SEEDLING GROWTH OF WHEAT

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A nutrient culture experiment was conducted to study the effects of Zn (0.0, 2.5 and 5.0 mg l⁻¹, as a source of Zn SO₄ · 7H₂O), N (0.0, 25 and 50 mg l⁻¹ as a source of NH₄SO₄) and variable temperatures (25° and 28 °C) on seedling growth of wheat (cv Mehran-89). The leaf tips burnt and yellowish green coloured leaves were observed irrespective of the treatments and temperatures. However, such deficiency symptoms were prominent at higher temperatures and at increasing levels of Zn and N. The shoot and root length and fresh and dry weight of shoot increased on the treatment of 2.5 mg l⁻¹ Zn alongwith 25 mg l⁻¹ of N at lower temperature whereas, the fresh and dry weight of root decreased on the similar treatments and temperature. At higher temperature, the root and shoot length and their fresh and dry weight decreased on treatments. It was concluded that at higher temperature alongwith higher levels of Zn and N, the seedling growth decreased, whereas at lower temperature with 2.5, mg l⁻¹ of Zn and 25 mg l⁻¹ N, the growth generally increased.

Key words: Growth, Zinc, Nitrogen, Temperature, Wheat.

A HOLISTIC APPROACH TO THE CONSERVATION OF THE INDUS RIVER DOLPHIN (*PLATANISTA MINOR*) (OWEN, 1853)

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The Indus River Dolphin is one of the world's most endangered cetaceans with a total population of just a few hundred individuals. Ecological interest in the species was aroused in the 1970's and intermittent but largely uncoordinated monitoring of numbers has continued ever since. Barrages cutting the river into biologically upstream isolated segments combined with the pressures associated with a growing population in a Third World country pollution such as over-fishing and illiteracy, combine to put the species under threat. The establishment of a Dolphin Reserve between the Guddu and Sukkur barrages in Sindh has made a positive contribution to dolphin conservation but a more holistic approach is advocated here. Accepting that little can be done to change the nature of the barrages, approaches reducing the pollution load of the river water, particularly in low flows, by natural filtration are advocated.

Key words: River dolphin, *Platanista minor*, Indus, Barrages, Pollution, Wetland filtration.

EFFECT OF LEAF EXTRACT ON STYLET BEARING NEMATODES AND ON GROWTH PARAMETERS OF TWO WHEAT VARIETIES

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Leaf extracts from *Azadirachta indica*, *Nicotiana tabacum* and *Eucalyptus citriodora* were tested for their nematicidal effect on *Helicotylenchus indicus*, *Bitylenchus goffarti* and *Pratylenchus thornei* and on growth and yield of Pavon-76 and Mehran wheat varieties in microplots. All the amendments significantly reduced the population of the nematodes. Average weight of shoot, root and yield were increased by *A. indica* treatment. *Nicotiana tabacum* increased the yield in variety Pavon-76.

Key words: Leaf extracts, Nematode, Wheat.

Technology

Pak J Sci Ind Res 2002 **45** (1) 63-68

IMPROVEMENT IN BENEFICIATION OF LOW GRADE FLUORITE ORE FROM KALAT MARAN RANGE

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This paper describes a bench scale investigation on the preparation of metallurgical and chemical grade fluorspar concentrate from a low-grade fluorite ore from Kalat Maran Range. A combination of chemical treatment and flotation techniques has been applied to fluorite ore. The ore initially containing 36.5% calcium fluoride has been processed and beneficiated to produce calcium fluoride concentrate containing 98.7% calcium fluoride with 99.8% recovery.

Key words: Metallurgical grade, Fluorite concentrate, Chemical grade fluorite concentrate, Chemical treatment, Flotation parameters.
