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Physical Sciences

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SYNTHESIS OF SOME NEW PYRIMIDINE DERIVATIVES INCORPORATED INTO OTHER HETEROCYCLES FOR BIOLOGICAL EVALUATION

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Chloroacetyl pyrimidine was synthesized and reacted with both aromatic amines and hydrazine hydrate. Hydrazide was reacted with β -dicarbonyl compounds and also with different acid anhydrides. 2-Amino-pyrimidine afforded new Schiff's bases which were cyclized with thioglycolic acid and thiolactic acid. Thiosemicarbazido derivatives were cyclized to give thiadiazole which gave Mannich bases. Some of the newly prepared compounds were biologically tested as antimicrobials.

Key words: Chloroacetyl, Pyrimidine, Thioglycolic acid, Thiolactic acid, Thiadiazole, Thiosemicarbazide.

AN OVERVIEW OF INCORPORATION OF DOLOMITE IN GLASS AND REFRACTORY

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Dolomite, $\text{CaCO}_3 \cdot \text{MgCO}_3$ is a mineral composed of calcium and magnesium carbonates in equimolecular proportions. It is a compound rather than a mixture of calcite (CaCO_3) and magnesite (MgCO_3), with a molecular weight of 184.4 and specific gravity 2.84. Its hardness is 3.5 - 4 on Moh's scale and crystal system is rhombohedral.

Key words: Dolomite, Composition of glass, Refractory.

BEHAVIOUR OF LAKHRA LIGNITE IN ATMOSPHERIC FLUIDIZED BED COMBUSTION (AFBC)

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(Received 2 May 2000, accepted 29 June 2001)

Results of studies carried out on the combustion of Lakhara lignite in Atmospheric Fluidized Bed Combustor (AFBC) are presented. Investigations cover some of the aspects of combustion including ash and environmental monitoring. It has been concluded that AFBC of lignitic coals is safe if sulphur content of coal is less than 4% as there is an optimum limit of addition of CaCO_3 as sorbent. It is important for the combustor designer to keep in mind about the burning rates, burn-out times and temperature of char particles which may create some problems during heating.

Key words: Lignitic coals, Combustion, Burning rates, Power generation.

ADSORPTION BEHAVIOUR OF CITRIC ACID FROM AQUEOUS SOLUTIONS ON ACTIVATED CHARCOAL

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Adsorption of citric acid at different concentrations on activated charcoal at 22° has been accomplished. It was found that at low concentrations, langmuir and Freundlich equations are well obeyed. The adsorption of citric acid from aqueous solution on the surface of charcoal is monolayer.

Key words: Adsorption, Citric acid, Langmuir constant, Freundlich constant, Monolayer

INFLUENCE OF BELA OPHIOLITE ON TRACE ELEMENT COMPOSITION OF JURASSIC AND CRETACEOUS CARBONATE ROCKS OF PHUARI AREA BALOCHISTAN

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Major and selected trace element analyses of carbonate rocks of Loralai formation and Parh limestone from Phuari area of Balochistan province were carried out. These carbonates are melanged with rocks of Bela Ophiolite. The distribution of various trace elements (Ni, Cr, Cu, Mn, Cd, Pb and Zn) in the carbonate rocks in the light of their plots was discussed with respect to primary dispersion, mobility and physicochemical environment. An attempt has also been made to evaluate the influence of magmatic bodies for impregnating trace elements into limestones. High Ni, Cr, Mn, Cu, Cd, Pb and Zn assemblage show similarity with tholeiitic Mid Oceanic Ridge Basalt (MORB). Petrographic studies were also made for description and classification of carbonates. Presence of dark glassy/amorphous igneous material in thin-sections emphasizes the influence of igneous bodies on carbonate rocks.

Key words: Trace element geochemistry, Bela Ophiolite, Jurassic-cretaceous carbonates, Phuari, Balochistan.

Short Communication

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FORMATION OF SOME TRANSITION METAL COMPLEXES OF G-D OXIME IN SOLID STATE AND IN SOLUTION

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Short Communication

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IODINE DISTRIBUTION IN SOME NIGERIAN FISHES

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Biological Sciences

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INDUCTION ELICITATION OF CONTACT SENSITIVITY IN MICE DUE TO PROHAPTEN

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The prohaptenic status of abietic acid, methylabietate, 3-methylcholanthrene (3-Mc), 3-pentadecylphenol (3-PDP), and 5-pentadecylresorcinol (5-PDR), was confirmed by partition coefficient studies and conjugation reactions with amino acids. The sensitizing effects observed on mouse skin showed activation of prohaptens into haptens during the induction and elicitation of the contact sensitization reactions.

Key words: Prohaptens, Partition coefficient, Amino acid conjugation, Contact sensitization.

EFFECT OF NITROGEN, COPPER AND MAGNESIUM FERTILIZATION ON YIELD AND NUTRITION OF RICE

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From a field experiment in Cu and Mg deficient soil conducted in Muda Irrigation Scheme, Kedah, Malaysia, rice yield was found to increase significantly with the additional application of 40 kg N ha⁻¹ over farmers' practice (80 kg N ha⁻¹). Application of Cu and Mg in the land either singly or in combination increased rice yields and agronomic efficiency significantly. Highest yields for both the parameters were obtained when Cu and Mg were applied in combination. To get increased rice yield farmers could therefore, be suggested to apply Cu and Mg in combination and higher dose of N over the present rate in the fields, deficient in these two elements.

Key words: Nitrogen, Copper, Magnesium, Rice.

THE INORGANIC PHOSPHATE CONTENTS IN THE MUSCLES OF SOME TELEOSTS OF DIFFERENT FEEDING HABITS IN THE RED SEA

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The inorganic phosphate (Pi) contents of the muscles of some economically important Red Sea teleosts were determined. The fish species included were of different feeding habits: carnivorous, omnivorous and herbivorous. Herbivore group showed the highest level of inorganic phosphate followed by omnivore and carnivore. The variations of the total content of inorganic phosphate existed in the muscle of fish of the same feeding habit do exist.

Key words: Teleost fish, Inorganic phosphate, Muscle, Red sea, Feeding habit.

Introduction

The major building blocks of living animals are covalent molecules, polymers proteins, polysaccharides and nucleic acids. Living matter has a huge demand for phosphorus. DNA and RNA are nucleosides joined by phosphodiester bridges, and the high energy phosphate bond of ATP is one of the major energy currencies of living organisms. Cell membranes are composed mainly of phospholipids, and the inorganic constituents of bone are primarily a calcium phosphate salt. A variety of enzymatic activities are controlled by cellular kinases and phosphatases. The metabolism of many substrates depends on the phosphorus as a cofactor and as a principal reservoir for metabolic energy in the form of ATP, creation phosphate and phosphoenolpyruvate (Shil *et al* 1984). Inorganic phosphate could serve as a protection factor in lipid peroxidation in certain fish (Han and Liston 1989). It also played an important role in light-induced activation of H⁺ pumps in the plasma membrane and tonoplast of *Chara corallina* (Takeshige *et al* 1992). It could be a pollution parameters in coastal water (Gupta 1997), an indicator of ovarian maturation (vitellogenesis) Srivastav and Srivastav 1998), a buffer component in the control of the intracellular pH in white muscle during anaerobic burst swimming (Ogata *et al* 1998), and on vitamin D level in feshwater fish (Srivastav *et al* 1997). In general, food sources high in protein (meat, milk, eggs and cereals) are also high in phosphorus. The relative contribution of the major food groups to the total phosphorus intake is about 60% from milk, meat, poultry, fish and eggs, 20% from cereals and legumes and 10% from fruits and fruit juices, whereas other beverages such as coffee and tea and soft drinks provide 3% (Knochel 1977). Chronic phosphorus deficiency in animals results in the loss of appetite, development of stiff joints, fragile bones and a marked increase in susceptibility to

infection (Block *et al* 1985). This study was conducted to evaluate the total content of inorganic phosphate in the muscle of fish living in the red sea in relation to their feeding habits

Materials and Methods

Ascorbic acid, EDTA (ethylenediamine tetra acetic acid, disodium salt, 2H₂O), molybdic acid, dihydrogen potassium phosphate and hydrochloric acid were obtained from Sigma Chemical Co., St. Louis, MO, USA. All other chemicals were reagent grade.

Fish species. Twelve economically teleosts (bony fish) species collected from Red sea were used in this study. Fresh fish of same size obtained from the fish market in jeddah were analyzed for Pi content.

Carnivorous fish. (i) Hamoor (*Epinephelus malabaricus*). (ii) Thouaina (*Epinephelus tauvina*). (iii) Louati (*Variola louti*). (iv) Baiad (*Alepes djeddaba*). (v) Garba (*Synodus variegatus*).

Omnivorous fish. (i) Hafar (*Crenidens crenidens*). (ii) Rabaag (*Mylio bifasciatus*). (iii) Macaroon (*Athernomorus lacunosus*). (iv) Sardin. (*Herklotsich.thys quadrlmaculatus*) (v) Bagah (*Rastrelliger kanagurta*).

Herbivorous fish. (i) Harid (*Scarus harid*). (ii) Sigan (*Siganus rivulatus*)

Sample preparation. Fish muscles were feleted, cleaned from skin and scales, and cut into small pieces. Samples were kept in the freezer (-80°C). Two grams of each sample were digested in 6 N HCl in semi-closed bioling water bath for 5 hr.

Determination of inorganic phosphate. The method of Fiske and subbarow was used (Fiske and subbarow 1925). Inorganic phosphate could reacted with ammonium

HEAVY METAL CONCENTRATION IN MARINE SEDIMENTS AND VEGETATION (*CALTHA PALUSTRVIS*) FROM RIVER RAMOS IN BAYELSA AND DELTA STATES OF NIGERIA

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(Received 7 June 2000; accepted 10 May 2001)

Heavy metals concentration in marine sediments and vegetation from River Ramos have been studied. Metals such as arsenic, mercury, cadmium, lead, chromium, nickel, iron, copper and zinc were analysed using atomic absorption spectrometer (AAS). The levels of these metals were determined from top and bottom river sediments, side and middle vegetation. The analytical results revealed that arsenic levels were high in all the samples. Secondly, the highest concentration of metals were found on the top sediment (68.00mg/kg dry weight) and vegetation (64.90mg/kg dry weight). Other metals such as mercury, chromium, nickel and iron were found to have high levels. The high levels of the above mentioned heavy metals are the cause of pollution, the concentration due to other metals such as cadmium, lead, copper and zinc was low. The high accumulation of heavy metals in the matrices are due to activities of oil companies and geochemistry of rocks.

Key words: Sediments, Vegetation, Heavy metals, *Caltha palustris*, Oil spillage, Oil companies.

WHEAT YIELD AND PHOSPHORUS USE EFFICIENCY AS INFLUENCED BY METHOD OF PHOSPHORUS AND ZINC APPLICATION

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Phosphatic fertilizers are recommended to be applied as broadcast and incorporated into the soil before sowing. More recently application of fertilizer with irrigation water as solution, termed "Fertigation", has been found equally effective for wheat production. Fertilizer zinc whose requirement is small and is commonly deficient in soils, was tried as fertigation in order to determine its effect on yield and P use efficiency by wheat. Single superphosphate fertilizer was applied at 22 and 44 kg P ha⁻¹ either alone or with 10 kg Zn ha⁻¹. The method of application employed was broadcast at sowing and fertigation at first irrigation. It was found that rate of P application increased wheat grain yield over control and P applied @ 44 kg ha⁻¹ by fertigation proved significantly better than broadcast application. Addition of Zn as broadcast or as fertigation showed no difference in yield compared to P alone. Application of Zn by fertigation, however, improved agronomic and P fertilizer efficiency compared to its broadcast application at sowing.

Key words: Fertigation, Phosphorus, Wheat, Zinc.

EVALUATION OF HERBICIDES FOR POTATO SPROUT SUPPRESSION ACTIVITY

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(Received 9 December 1998, accepted 24 September 2001)

Herbicides including barban, embark, diuron, prometryne, simazine, atrazine, destmetryne, asulam, monuron and linuron are screened for potato sprout suppression activity. A potato sprout suppressant will be expected to inhibit growth of cress root, tomato shoot or potato tissue callus. It is observed that only embark shows pronounced inhibition of callus growth. Embark was found to be effective as a potato sprout suppressant at high application rate of 500mgkg⁻¹.

Key words: Sprout, Herbicide, Potato, Callus.

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Key words: Sprout, Herbicide, Potato, Callus.

WHEAT FLOUR PRESERVATION BY MEANS OF PACKAGING AND ITS STATISTICAL EVALUATION

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(Received 17 September 1998; accepted 27 December 2001)

The wheat flour (atta) stored in conventional packaging materials i.e. jute (gunny), cloth, woven polyethylene threads bags which were in contact with air deteriorated more quickly than the wheat flour stored in air tight polyethylene acetate bags containing free oxygen absorber (FOA). The colour, taste, texture, flavour, acidity, organoleptic evaluation, insect and bacterial count remained acceptable for two months in polyethylene-acetate coated impermeable bags containing FOA and insect infestation was zero. These changes were due to anaerobic fermentation of starch in wheat flour. The statistical presentation of the data has been carried out.

Key words: Wheat flour, Storage, Packing material, Polyethylene, Statistics.

Short Communication

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**INTENSITY OF PHYTONEMATODES IN
CITRUS ORCHARDS OF NORTH WEST
FRONTIER PROVINCE AND THEIR
CONTROL THROUGH INDIGENOUS
NEMATICIDES**

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Technology

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SPECTROSCOPIC STUDIES OF FLUORESCENT COMPLEXES OF TYROSINE-8-HYDROXYQUINOLINE AND TYROSINE-8-HYDROXYQUINALDINE IN AQUEOUS PHASE

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(Received 6 December 2000; accepted 12 April 2001)

A new method has been developed by preparing complexes involving condensation of tyrosine with 8-hydroxyquinoline (Oxine) and 8-hydroxyquinaldine (Quinaldine) respectively, producing fluorescent products. The products obtained have been investigated for identification and quantitative estimation using different spectroscopic techniques including fluorescence activity of newly synthesized products. 8-hydroxyquinaldine and 8-hydroxyquinoline (Oxine) condensed with tyrosine separately produced water-soluble fluorescent complexes. The complexes have been investigated for identification and quantitative estimation of amino acids. Identification of amino acids in nano mole or below than nano mole has become possible by present fluorometric activity of these complexes involving different excitation and emission wavelengths. The fluorometric activity of complexes has been observed to be 100 to 1000 times higher than assay method involving ninhydrin and amino acid analyzer.

The method adopted in our laboratory is rapid, versatile with good reproducibility and provides excellent results for adoption by analytical, agricultural and biomedical laboratories to estimate amino acids and metals in composite matrix.

Key words: Tyrosine, Fluorescent complexes, 8-Quinolinol, 8-Quinaldine.

APMP INTERCOMPARISON OF DC VOLTAGE STANDARD AT NPSL ISLAMABAD

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Inter-comparison of DC voltage standards has now become the most suitable and authenticated means for maintaining the international tractability of national standards all over the world. The results of an intercomparison on DC voltage standards carried out at National Physical & Standards Laboratory (NPSL) Islamabad are presented and discussed.

Key words: Metrology, Travelling standard, Traceability, Uncertainty.
