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Physical Sciences Section

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TETRANORTRITERPENOIDS AND STEROIDAL GLYCOSIDES FROM THE SEEDS OF *AZADIRACHTA INDICA* A. JUSS

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(Received April 9, 1989; revised July 5, 1989)

The paper describes the isolation of two new tetranortriterpenoids limbocinin (1) and limbocidin (2) and two new glycosides (3) and (4) of stigmasterol which have been isolated from the neutral fraction of the seeds of *Azadirachta indica* A. Juss. Their structures have been elucidated through spectroscopic methods.

Key words: *Azadirachta indica* A. Juss, Meliaceae, Neem seed, Limonoids, Stigmasterol glycosides.

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FIRST TRANSITION SERIES – METAL COMPLEXES OF PHTHALIC HYDRAZIDE OR ITS ANION

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(Received November 23, 1988; revised June 7, 1989)

The reaction of phthalic hydrazide (H_2PH) with Cr(III), Mn(II), Fe(III) and Cu(II) salts yields corresponding mononuclear complexes of type $[Cr(HPH)_2(H_2O)_2] \cdot 2H_2O$ (I), $[Mn(HPH)_6] \cdot (H_2O)_2$ (II), $[Fe(HPH)_2(H_2O)_2]$ (III) and a binuclear complex of type $[Cu_2(HPH)_3(H_2O)_6] \cdot H_2O$ (IV). Infrared and electronic spectra and magnetic properties suggest octahedral structure for all the complexes. The ligand field parameters (wherever possible) have been calculated. The value in Cr(III) complex (I) indicates t_{2g} -type delocalization of metal t_{2g} electrons. The Dq values follow the usual order of metal M(II) and M(III) ions in the spectrochemical series. The magnitude of ν_{M-O} frequencies in metal (II) complexes shows an agreement with the Irving-Williams stability order for divalent metal ions.

Key words: First transition series, Metal complexes, Anion phthalic hydrazide.

INTRODUCTION

digestion of the sample in concentrated nitric acid using

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CYCLIC VOLTAMMETRIC STUDIES ON IODINE AND IODIDE ION

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(Received February 1, 1988; revised June 8, 1989)

Cyclic voltammetric studies on I_2 and I^- were carried out on a platinum electrode in dimethylformamide. The studies included a variation in concentration and scan rate. The analysis of the data (i.e. i vs. $v^{1/2}$ and i vs. conc.) showed diffusion controlled reaction. The analysis of cyclic voltammetric data $(E_p)_c - (E_p)_a$ and $E_p - E_p/2$ rules out single step multielectron reductions. It is proposed that the reaction undergoes a series of ECE type reactions.

Key words: Cyclic voltammetric, Iodine, Electrochemistry

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GAS HANDLING CAPACITY OF AN IMPELLER

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(Received August 1, 1988; revised June 5, 1989)

The criteria for gas handling capacity of an impeller is defined in this paper. Measurements are formed on different kinds of impellers including: radial, axial, tangential and mixed flow types. Different zones of gas dispersion are indentified with the help of Stroboscopic observations. Finally, results are expressed in terms of flow numbers as a function of changes in the flow pattern of the gas.

Key words: Flooding, Dispersion, Gas mixing.

INVESTIGATIONS ON BUILDING MATERIALS

Part I. Characterization of Surface Soil

Mirza Arshad Ali Beg, M. Hanif Qureshi, M. Yusaf, M. Ayub and M. Rafiq

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(Received December 13, 1988; revised June 20, 1989)

Soils around five towns viz Gujranwala, Gujrat, Wazirabad, Kamoki and Kasur have been analysed for their pH, moisture, electrolytes, total soluble salts content and for their grain size, plasticity index and plastic limit. They constitute the sediment load transported by the Indus and its tributaries and in this respect they are similar to the soils in other river basins. The irrigation practice is responsible for salinising the soil and as such quite a few samples from the study area were found to be alkaline, to contain high amount of total soluble salts and to have low plasticity index. They are therefore not suitable for agriculture or for making bricks. They can, however, be stabilized by using lime, portland cement or pozzolana. Samples in the remaining areas are good for agriculture and also for use as building material e.g. brick making and civil engineering construction.

Key words: Soils, Analysis, Building materials.

Biological Sciences Section

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BACTERICIDAL ACTIVITY OF PHOSPHONIUM COMPOUNDS

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(Received January 1, 1989; revised March 27, 1989)

Bactericidal activity of the seven phosphonium compounds was tested in vitro against 12 different strains of pathogenic bacteria. Of the series of compounds tested only 1-substituted 2-ethoxy-2-alkoxyvinyl triphenyl phosphonium tetrafluoroborate (I), carbomethoxy methyl triphenyl phosphonium bromide (II), carbomethoxy methylene triphenyl phosphoran (III) and methyl triphenyl phosphonium iodide (VI) exhibited complete inhibition of growth at 100 µg/ml. Partial inhibition was also noted by compound II, III and VI at lower concentrations. About 50-80% growth was inhibited at 80 µg/ml whereas about 40% inhibition was observed by compound II and VI at a concentration as low as 20 µg/ml. Minimum inhibitory concentrations varied from 40-100 µg/ml. Structure activity relationship has been discussed.

Key words: Phosphonium compounds, Bactericidal activity, Antibacterial activity.

LARVICIDAL ACTIVITY OF β -EXOTOXIN AND BEAUVERICIN AGAINST TWO DIPTEROUS SPECIES

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(Received February 15, 1989; revised June 27, 1989)

The toxicity of crude β -exotoxin, extracted from *Bacillus thuringiensis* bacterial culture, was tested against larvae of *Musca domestica*. Its LD_{50} was 0.04 % when tested against 3rd instar larvae for 5 hrs. Commercial pure β -exotoxin and beauvericin were treated against larvae and pupae of *Aedes aegypti* and *M. domestica*. β -exotoxin was toxic to 1st and 4th instar larvae and pupae of *A. aegypti*, after exposure of 3, 7, 12 days respectively at doses from 0. 325 μ g/ml. water (ppm). Its LC_{50} was 0.52 μ g, 2.1 μ g and 12 μ g respectively. Treatment with *M. domestica*, its LD_{50} was 38 μ g/g diet when tested against 3rd instar larvae. Beauvericin was less toxic as compared to β -exotoxin, its relative toxicity was 5-10 fold.

Key words: β -exotoxin, Beauvericin, *Aedes aegypti*, *Musca domestica*.

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STUDIES ON THE MUD-BIN STORAGE OF WHEAT

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(Received April 22, 1989; revised July 6, 1989)

Modification of mud bin structures by treating them with coaltar, synthetic enamel, calcium oxide or addition of activated clay resulted in reduction in losses of wheat due to insects during storage at pilot and at farm level. Amongst various treatments applied, calcium oxide coating proved to be the most effective in reducing the losses due to insect infestation.

Key words :Wheat, Mud-bin, Insects infestation

INTRODUCTION

There are about 100 mud bins in the country which are used for storage of wheat.

EFFECT OF DIFFERENT PLANTING DATES ON THE GROWTH AND YIELD OF COTTON (*G. HIRSUTUM* L.) CULTIVARS

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(Received May 30, 1988; revised June 6, 1989)

A field experiment to assess the effect of different planting dates on the growth and yield of Cotton (*G. hirsutum* L.) Cultivars was conducted at (A.R.I.), Tando Jam during summer 1986. Four planting dates (1st April, 15th April, 1st May and 15th May) and six cultivars i.e., Qalandri, TH-1100, TH-1174, TH-199/80, TH-3/83 and Rehmani were studied. Early planted (1st or 15th April) cotton recorded significantly higher seed cotton yield 2.30 and 2.62 m.t/ha, than the cotton planted on 1st and 15th May.

The newly evolved cultivar gave significantly higher seed cotton yield of 2.59 m.t/ha as compared to Rehmani, TH-1100 and TH-1174 cultivars.

Key words: Planting dates, Cultivars, Yield, Yield characters.

EVALUATION OF PERFORMANCE OF SUNFLOWER THRESHER

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(Received February 14, 1989; revised May 29, 1989)

Threshing is a key operation in the mechanised raising of the sunflower, a crop well-suited to bridging the edible oil gap in Pakistan. Three threshers of the peg, rasp bar and rubber bar type were studied, with various combinations of drum type, drum speed and concave clearance. Based on statistical and graphical analysis of the results, the highest yield and realised on a peg-type cylinder unit with a concave clearance of 4.4 cm, with only moderate grain breakage and fair clearing efficiency.

Key words: Mechanisation, Evaluation, Oilseed threshing.

INTRODUCTION

Machine operation. In determining output the ti

PRELIMINARY STUDIES ON THE INTORUDCTION OF GUAYULE IN PAKISTAN

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(Received January 14, 1989; revised June 7, 1989)

Five accessions of guayule from USA namely N565, N576, 11605, 11619 and 12229 were studied at National Agricultural Research Centre, Islamabad for growth parameters i.e. plant height, number of primary branches per plant, main stem diameter and plant periphery. The plants reached a height of upto 98.8 cm, main stem diameter of upto 4.61 cm and 300 cm in periphery in three years. The differences in growth parameters except plant height among five accessions of guayule were significant.

Key words: Adaptability, Guayule, Rubber, Sodium hypochlorite.

HEAVY METAL CONTAMINATION OF COMMERCIALY PRODUCED BREADS

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(Received January 8, 1989; revised June 13, 1989)

Copper, zinc, manganese, cadmium and lead contents of ten brands of commercially produced breads were estimated by atomic absorption spectrophotometer. Heavy metal contents ranged from Cu 0.88 – 1.20; Zn 3.40–5.60; Mn 3.70–5.40; Cd 0.018–0.108; Pb 0.11–0.45 ppm. These amounts were below the maximum permissible limits.

Key words: Trace elements, Heavy metals, Breads.

INTRODUCTION

Short Communication

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PREPARATION AND NUTRITIONAL EVALUATION OF DISHES CONTAINING SOYBEAN FLOUR

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(Received December 1, 1988; revised July 9, 1989)

Short Communication

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EFFECT OF NAA ON THE FRUITY YIELD OF TOMATO (*LYCOPERSICON ESCULENTUM* M.)

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Technology Section

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GRAVITY CONCENTRATION OF MUSLIMBAGH (BALUCHISTAN) CHROMITE

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(Received April 1, 1989; revised June 6, 1989)

Muslimbagh chromite ore has been beneficiated by gravity mineral processing technique using Wilfley table and Humphreys spiral concentrator. Tests were carried out to optimize the process parameters like feed rate, water flow rate, stroke length, motor speed and the deck inclination. The effect of the grind size on the concentration behaviour of the ore was then studied by using Wilfley table and the Humphreys spiral concentrator under the predetermined optimized process variables. Better grades and recoveries have been obtained by using the Wilfley table. The regrinding and retabbling of the tailings have indicated the possibility of concentrating the ore at the coarser sizes. The ore, initially containing 35% Cr_2O_3 , has been upgraded to a concentrate containing 50.65% Cr_2O_3 recovery of 84.6%.

Key words: Chromite, Tabling, Spiraling, Regrinding.

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RECOVERY OF CHROMITE FINES BY FROTH FLOTATION

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(Received February 2, 1989)

Chromite fines generated during comminution of the low grade Landi-Raud chromite ore for the gravity processing, have been recovered by Froth flotation. A concentrate assaying 47% Cr_2O_3 with a recovery of 61% has been obtained by using a fatty acid anionic collector during the flotation process on a deslimed feed.

Key words: Flotation, Flocculation, Desliming, Scrubbing, Activation.

an indigenous low-grade chromite ore [18]. The test work

ROOFING SHEET BASED ON CEMENT GYPSUM AND AGRICULTURE/FOREST WASTE

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(Received October 7, 1986; revised June 27, 1989)

To replace cement fully or partially by gypsum plaster and to utilize agriculture/forest waste fibre for making low-cost fibre board, the board prepared from cement, gypsum plaster mixture (1:1) is comparable in all respects with the board prepared from cement alone. The fibre board, thus prepared can be used as roofing sheets, partition sheets for low-cost housing as these boards are tough, light weight and water resistant.

Key words: Gypsum, Cement, Vegetable fibre.

DETOXIFIED MUSTARD SEED MEAL IN BROILER RATIONS

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(Received February 7, 1989; revised May 18, 1989)

Animal and vegetable protein in broiler rations was replaced with low phytate, detoxified mustard seed meal (DMSM). The standard ration containing blood, fish and sesame meals as source of animal and vegetable protein showed an average weight gain of 1675 g. Replacement of sesame meal with low phytate-DMSM showed significant increase in weight gain (2225 g). Average weight gain of broilers increased to 2050 and 1860 g when 33% fish, 33% blood and 100% sesame meals or 33% fish and 66% blood meals was replaced by low phytate-DMSM. Higher replacement of animal protein with low phytate-DMSM adversely affected the growth and average weight gain decreased to 1615 g.

Key words: Glucosinolates, Phytic acid, Nutritive value

A STUDY ON THE RETARDATION OF THE CORROSION OF Al-Mn ALLOY IN HYDROCHLORIC ACID SOLUTION

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(Received February 4, 1989, revised May 29, 1989)

The effect of KSCN, NaCN, NaN_3 , $(\text{CH}_3)_2\text{SO}$ and CH_3NH_2 on the corrosion of Al-Mn alloy in 3.0 N hydrochloric has been investigated using Mylius thermometric technique. It has been found that KSCN, NaCN, $(\text{CH}_3)_2\text{SO}$ and CH_3NH_2 act as inhibitors while NaN_3 acts as accelerator at all concentrations used. KSCN has higher inhibition effect, while CH_3NH_2 is the lowest one. The extent of inhibition of the studied compounds was found in agreement with the difference in charge, electronic structure and the basicity of the sulphur, oxygen and nitrogen sites involved.

Key words: Corrosion, Inhibitors, Thermometric method, Al-Mn alloy.