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Physical Sciences Section

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CONVERSION OF 2-METHYLCHROMONES TO PYRIMIDINE DERIVATIVES

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2-Methylchromones Ia-d were converted to 4-methyl-6-(substituted phenyl) -2-[1H]-thiopyrimidines IIa-d, via the condensation with thiourea. These thiopyrimidines were converted to other pyrimidine derivatives e.g. bis pyrimidinyl disulphides, oxopyrimidines, ethoxycarbonylmethylmercaptopyrimidines, ethoxycarbonylmethylmercaptopyrimidine acid hydrazides, triazolylpyrimidines, pyrimidin-2-ylmercaptoacetyl-thiosemicarbazides and dimethyl oxalacetate 2-carboxymethyl-mercaptopyrimidine acid hydrazides.

Key words: Methyl chromones, Thiopyrimidines, Pyrimidine derivatives.

MIXED LIGAND COMPLEXES INCLUDING COMPLEXES OF TETRA-AZAMACROCYCLES

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Several new mixed ligand complexes of zirconium (IV), uranium (VI), copper (II) and zinc (II) of compositions, $[\text{Zr}(\text{O})\text{Cl}_2\text{L}'\text{L}'']$ [L' =o-phenylenediamine, ethylenediamine, 1,6-diaminohexane and L'' =quinoline, pyridine pyridine N-oxide and aniline]; $[\text{Zr}(\text{O})\text{Cl}_2\text{L}'\text{L}'']$ [L' =aniline and L'' =pyridine N-oxide]; $[\text{Zr}(\text{O})[14] \text{ and } \text{N}_4\text{Cl}]\text{Cl}$; $[\text{U}(\text{O})_2 [14] \text{ and } \text{N}_4] (\text{NO}_3)_2$ and $[\text{ML}]\text{X}_2$ [$\text{M}=\text{Cu}(\text{II})$ and $\text{Zr}(\text{II})$, $\text{L}=\text{trans}-[14]$ - diene and $\text{X}=\text{Cl}^-$ and NO_3^-] have been synthesised and characterized. Conductivity measurements reveal that complex 1 is nonelectrolyte and copper (II) and zinc (II) complexes are 2:1 electrolytes in DMSO. But such measurements could not be carried out for other complexes due to their insolubility in almost all common organic solvents. Magnetic measurements, IR and electronic spectral data are consistent with octahedral geometry of zirconium (IV) and uranium (VI) complexes and four-coordinated square planar geometry of copper (II) and zinc (II) complexes.

Key words. Metal complexes, Tetraazamacrocycles, Mixed ligands.

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ACTIVATION OF FULLER'S EARTH OF D.G. KHAN WITH SULPHURIC ACID

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(Received December 26, 1995)

A huge deposit of fuller's earth essentially montmorillonitic has been identified in D.G. Khan. An investigation on its activation with sulphuric acid was made to make it suitable for cleansing and decolourising edible oils. However, special attention was paid to the comprehensive study of (i) concentration of acid (ii) time of activation and (iii) solid contents of the slurry, for activating the clay to a maximum possible degree so as to make it commercially acceptable.

Key words: Activation, Montmorillonite, Clay, Sulphuric acid.

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LIPID FRACTIONS AND FATTY ACID COMPOSITION OF *TRIANTHEMA* *PORTULACASTRUM* LINN

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(Received June 11, 1996)

Trianthema portulacastrum seed oil (12.5 %) has been examined for its physico-chemical characteristics and fatty acid composition. Thin layer chromatography of the oil into lipid classes resulted into polar lipids (4.8%) and neutral lipids (95.2 %). Fractionation of the neutral lipids provided hydrocarbons (0.3 %), wax esters (0.5 %), sterol esters (4.0 %), triglycerides (84.5%), free fatty acids (1.8 %), diglycerides (2.5 %) and monoglycerides (1.6 %). The fatty acids which ranged from C_8 to C_{20} have also been reported.

Key words: Fatty acids, *Trianthema portulacastrum*, lipids, seed oil.

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CHEMICAL COMPOSITION OF THE *CUPRESSUS SEMPERVIRENS* L. FRUITS AT DIFFERENT STAGES OF MATURITY

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(Received October 17, 1996)

The essential oil of *Cupressus sempervirens* L. obtained by hydro-distillation of fruits at two stages was analysed by GC & GC-MS. The main components of the fruits at two stages range from α -pinene (44.59 - 54.62%), sabinene (7.86-2.86%), D³-carene (15.45-21.83%), α -terpinene (5.25-3.90%), 4-terpineol (6.58-0.04%) and cedrol (1.02-1.35%) respectively.

Key words: *Cupressus sempervirens* L., Cupressaceae, Monoterpenes, Sesquiterpenes, GC/MS.

Short Communication

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**Complexes of Zr(IV) and U(VI) with
Trans- [14]-diene**

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(Received April 3, 1995)

Some new complexes of zirconium (IV) and uranium

Biological Sciences Section

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ELIMINATION OF NATURALLY OCCURRING AFLATOXINS IN COTTONSEED MEAL

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(Received December 21, 1994)

Ammoniation appears to be one of the most extensively studied and applied chemical methods. The present study was aimed at determining optimum time period required at pilot plant scale to detoxify aflatoxins in cottonseed meal by ammoniation under steam pressure and elevated temperature. The detoxification was achieved upto 97% with one percent ammonia at $99 \pm 1^\circ\text{C}$ under 0.7 ± 0.035 bar steam pressure. The quality and texture of starting material was not significantly altered. This study was also aimed to develop a feasible process for detoxification of aflatoxins in cottonseed meal on commercial scale in Pakistan.

Key words: Aflatoxins, Detoxification, Ammonia, Cottonseed meal.

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LIPID STUDIES OF *ANNONA SQUAMOSA*

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(Received 12 June 1995)

The air dried seeds of *Annona squamosa* contain moisture 10.0%, oil 23.0% minerals 1.89% and proteins 24.05%. The fatty acid composition of light yellow coloured oil is C16:0 (13.51%), C18:0 (10.40%), C18:1 (46.96%), C18:2 (25.89%), C18:3 (1.39%) and an unknown acid 1.95%. The unsaponifiable is determined as sterols (25.1%), alcohols (54.1%) and hydrocarbons (20.8%). The hydrocarbons (C11- C31) and alcohols (C16-C18) have been separated, identified and characterized by the application of thin layer and gas liquid chromatography.

Key words: *Annona squamosa*, Fatty acids, Hydrocarbons.

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MONITORING THE QUALITY OF SUNFLOWER SEED BEFORE AND DURING STORAGE

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(Received June 12, 1995)

Storage life of sunflower seed can be increased by monitoring the quality of seed before and during the storage period. Cold test, accelerated and modified accelerated aging test, in which several germination tests were made over time were evaluated. Modified accelerated aging test was found to be a more reliable method of seed quality evaluation. Seed lots having P_{50} viability period (period when germination drops to 50%) of 3.5 and above could be stored safely upto one year in conducive environmental conditions.

Key words: Accelerated aging, Viability, Seed vigor, Storage.

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EFFECT OF PRE-PLANT INCORPORATED AND POST-EMERGENCE HERBICIDES ON GROWTH AND YIELD OF SUNFLOWER (*Helianthus annuus* L.)

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(Received September 13, 1995)

A field experiment was conducted to study the effect of pre-plant incorporated and post-emergence herbicides on the growth and yield of sunflower cv. Hysun-33, sown in single rows 70 cm apart. Treatments in the experiment were control (weedy check), gramoxone (paraquat) @ 3 lit ha⁻¹ as directed post-emergence, Dual 500 E.C. (metolachlor) @ 3 lit ha⁻¹ as pre-plant incorporated, Sonalon (ethalfluralin) @ 3.75 lit and 5 lit ha⁻¹ pre-plant incorporated. The results revealed that ethalfluralin was the most effective herbicide in controlling weeds and improving sunflower yield of seed oil contents significantly.

Key words: Sunflower, Yield, Herbicides.

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EFFECTS OF SOAKING AND COOKING ON PHYSICAL CHARACTERISTICS, TANNIN CONTENTS AND PROTEIN DIGESTIBILITY OF KIDNEY BEANS (*PHASEOLUS VULGARIS* L.)

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(Received October 5, 1995)

This study reports the effects of soaking and cooking methods on some physical characteristics, tannin contents and in vitro protein digestibility of kidney beans. Soaking of kidney beans in sodium bicarbonate solution gave rise to lower hydration capacity, hydration index, swelling capacity and cooking time than soaking in simple water or neutral sodium chloride solution. Tannin contents of red kidney beans were reduced by soaking at 30° and 100°C for different periods. However, soaking in sodium bicarbonate solution with or without sodium chloride was more efficient in reducing tannin contents. Maximum improvement in protein digestibility was also observed by soaking kidney beans in mild alkaline solutions. Tannin contents were further reduced alongwith improvement in protein digestibility as a result of cooking.

Key words: Kidney beans, Soaking, Cooking, Tannin, In vitro protein digestibility.

OESOPHAGOSTOMIASIS IN BLACK BENGAL GOATS IN BANGLADESH

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(Received November 11, 1995)

Examination of the intestinal tracts (both small and large) of 208 apparently healthy slaughtered Black Bengal goats from different parts of Bangladesh revealed *Oesophagostomum columbianum* infection in 185 (88.94%) cases. In the presence of the parasites, nodular lesions were detected in the wall of the intestines of 166 (79.81%) goats. The mean worm burden (28.66) and the number of nodules (30.88) varied independently. Both worm burden and nodule formation were found to be very much age dependent ($p < 0.01$), higher in goats above 18 months old, but without any seasonal variations ($p > 0.05$). Sex of the animals had significant bearing on nodule formation, more in male than in female goats ($p < 0.05$). The mucous membrane of the intestines were inflamed, discoloured and covered with mucus. Slightly yellow to green coloured nodules of various sizes were seen on the outer surface of the intestines. There was destruction and desquamation of the villar epithelium due to invasion of parasites. In many cases larval worms were present inside the nodules and destruction of the muscularis mucosa and submucosa was noted. At places, the nodules contained central caseous mass surrounded by chronic inflammatory cells, mostly lymphocytes and macrophages.

Key words: Oesophagostomiasis, Black Bengal goats, Bangladesh.

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LEAD INDUCED STIMULATION IN THE ACTIVITIES OF PEROXIDASE AND IAA OXIDASE AND THEIR INFLUENCE ON THE GROWTH IN MUNGBEAN

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(Received November 21, 1995)

Foliar application of lead applied in four different concentrations (1, 4, 7 and 10 mM) and the control (0) at five growth stages (28, 35, 42, 49 and 56 DAS) of mungbean resulted in increased activities of both peroxidase and IAA oxidase. Highest stimulation in peroxidase activity was recorded at 56 days after sowing (DAS) by 10 mM dose while IAA oxidase showed maximum activity at 35 DAS under same dose. Lead also caused growth inhibition of plants by decreasing plant height, dry weight of leaf, stem and five entire plants. The effect was pronounced towards higher concentrations of lead.

Key words: Peroxidase, IAA oxidase, Lead nitrate, Mungbean.

Technology Section

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DYES FROM PLANT BIOMASS

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(Received September 9, 1995)

Series of dyes based on sulphur chromophores was manufactured by the baking process involving rice husk from the plant *Oryza sativa* and wood shavings of the plant *Entandrophragma angolense* at 230°C/125 mmHg in a pressure vessel for 3 hrs in presence of aqueous sodium sulphide. Following m-toluene extraction and crystallisation, two dyes were obtained, both of which showed remarkable ultra-violet /visible absorption maxima at λ_{max} of 420nm indicating that they both are of one single colour shade. The dyes gave brilliant yellow colouration of average-good fastness ratings to light and alkaline wash on a bleached and mercerised cotton fabric.

Key words. Dyes, Sulphur chromophores, Plant biomass.

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