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Physical Sciences Section

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SYNTHESIS AND REACTIONS OF A 4-METHYL-3-(3'-THIOXO)-1', 2', 4'-TRIAZOL-5'-YLCOUMARIN

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(Received February 25, 1992; revised July 14, 1992)

4-Methyl-3-(3-thioxo)-1',2',4'-triazol-5'-ylcoumarin (2) was prepared via condensation of ethyl 4-methylcoumarin-3-carboxylate (1) with thiosemicarbazide in boiling pyridine. Compound 2 reacts as a thione with nitrogen nucleophiles to yield the 4-methyl-3-(3'-hydrazinyl)-1',2',4'-triazol-5'-ylcoumarins (3a,b). Condensation of 3a with aromatic aldehydes gives the corresponding 4-methyl-3-(3'-arylidenehydrazonyl)-1',2',4'-triazol-5'-ylcoumarins (4a,b). Compound 2 reacts as a thiol with alkyl halides yielding 4-methyl-3-(1-alkyl-3-alkylthio)-1',2',4'-triazol-5'-ylcoumarins (5a,b). Treatment of 2 with acrylonitrile affords the corresponding 4-methyl-3'-[3'-(2'-cyanoethylthio)]-1',2',4'-triazol-5'-ylcoumarin (6). The antimicrobial activity of some new compounds has been screened.

Key words: Synthesis, Reaction, Coumarin.

RELEASE OF THEOPHYLLINE FROM FULLY SWOLLEN HYDROGELS BASED ON HYDROXYETHYL METHACRYLATE AND ACRYLAMIDE

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(Received December 27, 1989; revised July 21, 1992)

Release of uniformly dispersed theophylline in fully swollen hydrogels based on hydroxyethyl methacrylate and acrylamide was studied. The fractional drug release followed a direct time relationship instead of a $t^{0.5}$. The effect of monomers composition and different drug concentrations to control diffusivity of a drug from fully swollen cylindrical hydrogels was also investigated.

Key words: Release, Theophylline, Swollen hydrogels.

CHEMICAL INVESTIGATION OF WHITE SEEDED VARIETY OF *ABRUS PRECATORIUS* LINN.

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(Received April 26, 1992)

The fatty acids of the oil of the white seeded variety of *Abrus precatorius* Linn. have been identified by GLC. They are palmitic (15.8%), stearic (4.9%), oleic (46.4%), linolenic (0.5%), arachidic (19.2%) and Behenic acid (13.4%). Gallic acid and Abrine were isolated and the sugars and amino acids were characterised by chromatographic studies.

Key words: Fatty acids, *Abrus precatorius* Linn.

STUDIES ON THE ELECTROWINNING OF ZINC FROM ZINC SULPHATE ELECTROLYTE

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(Received September 2, 1991; revised June 22, 1992)

Studies have been reported on the electrowinning of metallic zinc from a zinc sulphate electrolyte. The electrolyte was prepared by roasting of zinc sulphide concentrate followed by leaching and purification of the resultant solution. This communication presents the results on the optimization of electrowinning parameters like current density, electrode spacing, acid concentration and addition agents. The purity of the metal obtained is 99.74%.

Key words: Electrowinning, Electrolyte, Hydrometallurgy.

STUDIES IN THE CHEMICAL CONSTITUENTS OF FLOWERS OF *MANGIFERA INDICA*
Part -II. Isolation and Characterization of Some Alkylgallates from
Blossoms of *Mangifera indica*

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(Received April 30, 1990; revised August 15, 1992)

Six new alkylgallates, methylgallate, *n*-propylgallate, *n*-pentylgallate, *n*-octylgallate, 4-phenyl-*n*-butylgallate, 6-phenyl- *n*-hexylgallate and dihydrogallic acid have been isolated from the blossoms of *Mangifera indica*. The identity of these compounds has been established by comparison with synthetic alkylgallates, mass spectrometry and thin layer chromatography.

Key words: *Mangifera indica*, Blossoms, Alkylgallates.

Short Communication

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**Lipid Fraction and Fatty Acid Composition of
Chenopodium album Seed Oil**

M. RIAZ, M. RASHID AND F. M. CHAUDHARY

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(Received November 8, 1989; revised August 8, 1992)

Chenopodium album seed oil (76%) has been examined

Short Communication

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**Lipid Components from the Roots of
Myrsine africana L.**

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(Received March 18, 1990; revised August 2, 1992)

Myrsine africana L. (Family: Myrsinaceae) a small ex-

Biological Sciences Section

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GENOTOXICITY TESTING OF SOME DYES IN THE DIPLOID YEAST *SACCHAROMYCES CEREVISIAE*

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(Received September 27, 1989; revised July 29, 1992)

Ten synthetic colours were tested for the induction of mitotic gene conversion, mitotic crossing over and reverse mutation in the diploid strains D4 and D7 of *Saccharomyces cerevisiae*: Methyl Red, Orange G, Eriochrome Black T, Congo red, Rose Bengal, Fosin Y, Orange G, Phloxine B, Violet Acid 5B, Rouge S and Auramine O. All except rouge S and auramine O, failed to induce detectable genetic damage in yeast without metabolic activation. Auramine O and Rouge S induced significantly higher frequencies of mitotic recombinants and revertants in log-phase as well as in stationary-phase cells of the diploid yeast strains D4 and D7.

Key words: Mutagenicity, Recombinogenicity, Food colours.

INFLUENCE OF PHOSPHORUS FERTILIZATION ON CROP GROWTH, SEED COTTON YIELD AND FIBRE QUALITY

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(Received January 15, 1992)

Field experiments on phosphorus fertilization of cotton cultivar B-557 (*Gossypium hirsutum* L.) were conducted at Multan for three seasons. The treatments consisted of 0, 50, 100, 150 and 200 kg P_2O_5 ha⁻¹ and were arranged in randomized complete block design. Cotton crop showed a significant response to phosphorus fertilization and application rate of 50 kg P_2O_5 ha⁻¹ seemed sufficient to obtain good yield. Phosphorus uptake ranged between 16.77–24.37 kg ha⁻¹ in different fertilizer treatments. Fibre quality was not affected by fertilizer treatments.

Key words: Phosphorus fertilization, Crop growth, Yield, Cotton.

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EFFECT OF NUMBER OF PLANTS PER DIBBLE ON YIELD AND SOME ECONOMIC CHARACTERS OF TWO UPLAND COTTON CULTIVARS

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(Received; March 2, 1992)

Two cotton cultivars having different plant morphology were evaluated for seed cotton yield and some economic characters keeping 1, 2 and 3 plants per dibble at a standard plant configuration of 75x30 cms. The results showed that the cultivars do not differ significantly from each other in yield of seed cotton, boll weight ginning out turn and staple length except number of bolls per plant. In spite of difference in plant shape, CIM-85 and MNH-93 produced maximum yield of seed cotton at two plants and one plant per dibble respectively. The increase in number of plants per dibble showed statistically significant negative effect on bolls per plant, boll weight and lint percentage. However, the staple length was not affected by different number of plants per dibble. The varieties and number of plants per dibble interaction effects remained significant only for seed cotton yield.

Key words. Upland cotton, Cultivars, Plants per dibble, Fibre quality.

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THE INFLUENCE OF NITROGEN AND ZINC ON THE YIELD OF JUTE CV. 0-4

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(Received January 26, 1992; revised August 1, 1992)

An experiment in 1989 examined the influence of nitrogen and zinc rates on the yield and yield components of jute cv. 0-4. Nitrogen from 0- 67.5 kg/ha in increments of 22.5 kg progressively increased both fibre and stick yields. Significant difference in yield was first observed at the 45 kg N/ha level compared to the control, which persisted up to the highest rate. This influence on yield was attributable to significant increases in both plant height and stem diameter of individual plants. Nitrogen did not influence the bark thickness, bark-stick ratio and harvest index. Zinc rate did not produce any significant effect on the yield and yield parameters. Strong correlations between yield and yield parameters except bark thickness were observed, but plant diameters were found to be the major determinants to final yield.

Key words: Influence, Nitrogen, Zinc, Jute.

Introduction

during the period from May - August 1989. The site belongs

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EFFECT OF DIFFERENT INTERVALS OF IRRIGATION ON GROWTH AND YIELD OF GARLIC

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(Received June 15, 1991; revised April 12, 1992)

A study was conducted to evaluate the growth and yield of garlic with 7, 14 and 21 day intervals of irrigation and without any irrigation. The result of the study indicated that crops grown under irrigated conditions of any interval duration produced better performances regarding growth and yield of garlic over non-irrigated crops. The 7-day interval of irrigation significantly increased the vegetative growth of garlic while the 14-day interval of irrigation produced significant increases of yield and harvest index.

Key words: Garlic, Irrigation, Growth, Yield.

Short Communication

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**Nitrogen Supplying Capacity of Soils Having
Previous Cropping and Fertilization History**

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(Received February 15, 1990; revised June 17, 1992)

Short Communication

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Utilization of Carrot Residue in Poultry Feed

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Technology Section

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UTILIZATION OF CEMENT DUST IN BLENDED CEMENT

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(Received October 11, 1990; revised July 14, 1992)

Cement plants generate cement dust during the manufacture of portland cement. The present work aims to study the utilization of this waste product to prepare some blended cements. The results revealed that the substitution of portland cement clinker as well as slag with cement dust decrease the hydration and mechanical properties of portland and portland slag cements.

Key words: Cement dust, Granulated slag, Portland cement.

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EFFECT OF PROCESSING CONDITIONS ON THE NUTRITIVE VALUE OF SUNFLOWER MEAL

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(Received November 13, 1990; revised June 30, 1992)

The effect of processing conditions on the proximate composition of sunflower seed cake and meal was investigated. Maximum amount of oil was extracted when the seeds were crushed in a screw press (screw to cone distance 3 mm). The sunflower meal obtained after pre-pressing (screw to cone distance 12 mm) showed higher nutritional value (net protein utilization, true digestibility, protein efficiency ratio, biological value) because of lesser damage to the protein.

Key words: Screw pressing, Pre-pressing, Sunflower meal, Nutritive value.

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CHEMICAL BENEFICIATION OF NIGERIAN ILMENITE ORE

Part-I . Hydrochloric Acid Leaching

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(Received July 17, 1990; revised August 17, 1992)

Leaching of powdered ilmenite ore was carried out in hydrochloric acid solutions in order to upgrade it. The effects of acid concentration, treatment time, particle-size, solid- liquid ratio, temperature and stirring speed were considered. The following have been found as the optimum leaching conditions for the ilmenite containing TiO_2 43.2, FeO 22.6, Fe_2O_3 16.8%, plus other impurities: HCl concentration 30%, treatment time 8 hrs, ilmenite- HCl ratio 1:5, and temperature 90° . The particle size between 100-425 μm and the stirring speed did not significantly influence leaching. The TiO_2 content of the ilmenite ore was increased to about 78%, and ferric chloride was recovered as a by-product.

Key words: Beneficiation, Leaching, Ilmenite.

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SCIENTIFIC STUDY AND DEVELOPMENT OF MEAT-BARIAN, A TRADITIONAL FOOD PRODUCT

Part -IV. Comparison Chemical Constituents of Commercial and Laboratory Made Legume Product (Barian)

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(Received January 14, 1990; revised March 17, 1992)

Comparison of chemical analysis of the nutritionally important components in the laboratory made Mash/Mung dal barian containing 25% beef has been made with a variety and market samples collected from Lahore, Jhelum, Multan, Rawalpindi and Peshawar. Protein content did not differ in quantity although quality difference existed due to the use of animal protein in case of Laboratory samples. Other parameters like starch, fat, ash, calcium, iron have also been compared without any significant differences. Titre value and dehydration value were determined to evaluate quality of the scientifically prepared laboratory products. Extract water analysis after 1 and 4 hr. of soaking of Barian in the water has been determined to prove improved quality of the laboratory made products.

Key words: Pulse, Meat, Barian

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PREPARATION OF SODIUM SULPHATE FROM ROCK SALT AND AMMONIUM SULPHATE

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(Received July 25, 1991; revised August 22, 1992)

Investigations were carried out for the preparation of anhydrous sodium sulphate (salt cake) from rock salt (NaCl) and ammonium sulphate (commercial grade). Effect of temperature, time of reaction and varying proportion of the reactants were studied and parameters were established for the maximum recovery of sodium sulphate. The purity of the product (Na_2SO_4) has been found to be 98% with a recovery of 95%.

Key words: Preparation, Rock salt, Sodium sulphate.