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Physical Sciences Section

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WATER SOLUBLE *MESO*-TETRARYLPORPHYRIN DIACIDS

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Water soluble porphyrins are of considerable interest for structural and reactivity investigations. Only a few reports have been made for the synthesis and structural studies of *meso*-substituted porphyrin diacids. This report concerns the synthesis, ^{1}H NMR, IR, UV-visible spectra as well as mass spectra of three *meso*-substituted free-base porphyrins and their diacids.

Key words: Porphyrins; Synthesis and substituted acids.

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EXTRACTION STUDY OF EXTERNALLY-ADDED HYDROXAMIC ACID FROM UPWELLED SEA WATER

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(Received November 5, 1986; revised September 7, 1987)

A group of siderochromes, called hydroxamic acids, appear to be synthesized in sea water by phytoplankton. Externally-added hydroxamic acid was extracted successfully from upwelled sea water by liquid-liquid extraction using benzyl alcohol and acetophenone as an extracting solvent at pH 4. The same process gave positive results in the case of fresh water collected from a two years-old fish aquarium.

Key words: Organic acid in sea water.

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GEOCHEMICAL STUDY OF SOME THERMAL SPRINGS OF SIND, PAKISTAN

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(Received November 25, 1986; revised August 4, 1987)

The present investigation of waters of Teerath Lakhi and Karsaz thermal springs of Sind shows variations in physical and chemical characterstics. The geochemical behaviour of the chemical constituents of the waters has been described. Possible causes of the changes in chemical composition of waters have also been discussed with reference to the geology of the area.

Key words: Thermal springs; Geochemical behaviour; Chemical composition of waters.

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STABILITY TRENDS OF ASPIRIN TABLETS

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Hydrolytic degradation of aspirin in tablet form in Pakistan climate have been studied. The discrete data of degradation have been subjected to least square analysis.

Key words: Aspirin; Stability; Hydrolysis.

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COMPARISON OF METHODS OF AVAILABLE MICRONUTRIENTS (COPPER, ZINC AND MANGANESE) FROM SOIL

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(Received November 2, 1985; revised August 17, 1987)

Extraction efficiency of four solutions, DTPA (diethylene triamine pentaacetic acid), EDTA (ethylene diamine tetraacetic acid), HCl and NH_4OAC in respect of Cu, Zn, Mn was evaluated from three soils (clay, loamy sand and sandy clay loam) in a pot culture using rice as indicator crop. The results showed that for Zn and Cu extraction, the efficiency was in the order of HCl > EDTA > DTPA > NH_4OAC. The correlation co-efficient between plant Zn and Cu and soil Zn and Cu extracted with NH_4OAC remained the highest, i.e. 0.93 and 0.50 respectively. For Mn the order being HCl > NH_4OAC > DTPA > EDTA, however correlation co-efficient was not promising with any of the extractants.

Key words: Micronutrients, Extractants, Texture and availability.

Biological Sciences Section

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PROBLEMS AND PROSPECTS OF RICE X *KALLAR* GRASS HYBRIDIZATION

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(Received May 13, 1987; revised September 5, 1987)

Intergeneric hybrid of rice X *kallar* grass was successfully produced with two different cultivars of Basmati rice using the emasculation pollination procedure without growth hormone application. The hybrid seeds contained normal embryo and endosperm and upon harvesting germination was 100 %; embryo culture was thus not necessary. The hybridity was confirmed through mitotic analysis of root tips. Further studies are warranted on the non-availability of *kallar* grass pollen during daytime and on the observation that root development in the F_1 hybrid was poor.

Key words: Rice; Kallar grass; Hybridization.

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ESTIMATION OF HERITABILITY AND GENETIC ADVANCE IN HYBRIDS OF RICE UNDER SALINE ENVIRONMENT

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(Received January 4, 1987)

Broad sense heritability and genetic advance of F_2 hybrids of five crosses of rice under saline environment was estimated. High heritability coupled with high genetic advance was observed for the F_2 hybrids of NR1 x C23-3-1 (plant height), NR1 x C23-3-1, Jhona 349 x NR 1 (number of productive tillers per plant), NR1 x C23-3-1, IR6 x Basmati 370 (number of grain per panicle) NR1 x C23-3-1, Jhona 349 x NR1, NR1 x IR6 (total florets per panicle), Jhona 349 x NR1, Jhona 349 x IR6 and IR6 x Basmati 370 (yield per plant). These attributes may be improved by utilizing a suitable selection scheme under saline environment.

Key words: Oryza sativa, heritability, genetic advance, saline environment.

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STUDIES ON THE ESSENTIAL OILS OF THE PAKISTANI SPECIES OF THE FAMILY UMBELLIFERAE

Part LIV. *Ferula jaeschkeana* Feeds and Stalk Oil

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(Received June 10, 1987)

The essential oil of *Ferula jaeschkeana* from the fresh mature seeds and stalks of Pakistani origin in 1.05 % yield has been characterised for the first time with respect to its physico-chemical properties and chemical composition. The oil contains α-pinene (8.32 %), $\triangle^3$ carene (1878 %), camphene (2.56 %), limonene (10.21 %), γ-terpinene (3.86 %), *p*-cymene (2.16 %), myrcene (1.21 %), cadrenene (1.06 %), geranyl acetate (7.45 %), terpinyl acetate (6.26 %), α-terpineol (5.23 %), geraneol (4.07 %), unidentified sesquiterpenes (7.44 %), unidentified acids (3.48 %) and a mixture of coumarins with tarry matter (14.56 %).

Key words: Umbellifereae, essential oil, *Ferula jaeschkeana.*

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CHARACTERIZATION OF MAZRI FIBRE

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(Received April 18, 1987)

Properties like twist on drying, moisture regain and retention for "Mazri", jute and sisal have been recorded. It has been observed that "mazri" twists in a clockwise direction, a property which is similar to the properties of jute and hemp. Moisture absorption, which is related to crystallinity, varies in the following order: Jute 41 % > sisal 38 % > "mazri" 36 %. Observations on moisture loss by wet fibres show a similar trend: jute 29 % > sisal 27.5 % > "mazri" 26 %. "Mazri" fibre has, therefore, been classified among cellulosic fibres of the jute and sisal category but with better orientation compared with the other two.

Key words: Fibres; Vegetative fibres; Ropes and fabrics.

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NUTRITIONAL REQUIREMENTS OF *PENICILLIUM FUNICULOSUM* FOR THE PRODUCTION OF DEXTRANASES : I EFFECT OF NITROGEN SOURCES

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(Received December 1, 1986; revised August 9, 1987)

Different nitrogen sources and media were employed to find out their effect on the biosynthesis of dextranases of the various inorganic nitrogen salts used. Ammonium nitrate gave maximum production of the enzyme yielding 88 units/ml. $(NH_4)_2SO_4$ KNO_3, $NaNO_3$, NH_4Cl and ammonium acetate resulted in 80, 74, 70, 61 and 46 units/ml respectively. In the case of organic nitrogen sources maximum formation was achieved after 72 hr. Peptone increased the yield of the enzyme to 90.2 units/ml. Yeast and beef extracts gave 78.3, 66 units/ml respectively. Urea and thiourea showed low dextranase production. Corn steep liquor gave the highest yield of the enzyme at 94 units/ml. Distillers soluble was poor in the synthesis of dextranase.

Key words: Dextranases, Nitrogen sources, *Penicillium funiculosum.*

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CLOSTERIUM IN PAKISTAN

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(Received July 10 , 1982; revised July 8, 1987)

Twenty four species of *Closterium* have been described and illustrated from Pakistan. An identification key has also been given.

Key words: Taxonomy, Closterium, Pakistan

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BLOOD AND TISSUE LEVELS OF CHLOROQUINE IN PROTEIN ENERGY MALNOURISHED RATS AFTER PROPHYLAXIC TREATMENT

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(Received January 9, 1985; revised July 22, 1987)

The tissue and blood levels of chloroquine were studied in the normal and protein energy malnourished (P.E.M) rats for a period of twelve weeks after the administration of a weekly dose of 10 mg/kg given intraperitoneally. It was found that the high perfused tissues (liver, kidney, spleen, lungs and heart) attained saturation in the P.E.M. rats whereas the level of chloroquine in the low perfused tissues (skeletal muscle, eye and skin) and the blood increased progressively.

In the normal rats, none of the tissues got to saturation; the tissue and blood levels increased with time. The brain did not show any defined pattern in both normal and the P.E.M. rats. It was therefore suggested that prolonged administration of chloroquine would lead to accummulation of the drug in these diseased states.

Key words: Blood and tissue level; Chloroquine; Malnourished rats; Prophylaxic treatment.

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OESTROGEN POTENTIATING ACTIVITY OF PHENYL 2-(2-HYDROXYL INDEN-3-YL) PROPIONLACTONE, A COMPOUND WITH DEAROMATIZATION CHARACTER

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(Received February 23, 1986; revised July 1, 1987)

The synthesis of phenyl 2-(2-hydroxyl inden-3-yl) propionlactone (3) has been described. An explanation of its NMR spectrum has been postulated, where the aromatic nature of one of its phenyl group could have transitionally been lost. This compound resembles stilboestrol in its molecular dimension and potentiates its activity. However it exhibits no oestrogenic activity. It also gives some protection against leptazol convulsions.

Key words: Oral contraceptives; Oestrogen therapy; Fertility control.

INTRODUCTION

could be screened for oestrogenic activity.

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VARIATIONS IN THE MALE AND FEMALE REPRODUCTIVE ORGANS IN DIFFERENT FORMS AND HOST RACES OF *PYRRHOCORIS APTERUS* L.

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(Received January 26, 1986; revised August 10, 1987)

The anatomy of the male and female reproductive organs of *Pyrrhocoris apterus* (Linn.) has been detailed. Differences in the structures of the long-and short-winged forms collected on two different host plants, *Althaea rosae* (L.) Cav. and *Foeniculum vulgare* Miller, are also given in tabular form. No significant difference was observed due to difference in the host plant.

Key words: Variations, reproductive structures, forms and host races, *Pyrrhocoris apterus* L.

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EFFECT OF ELEVATED TEMPERATURE OF STORAGE ON THE BACTERIOLOGICAL QUALITY OF TROPICAL SHRIMP (*PENAEUS MERGUIENSIS*)

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(Received June 4, 1987; revised August 24, 1987)

Changes occurring in bacterial populations and in generic composition of bacterial flora of shrimp (*Penaeus merguiensis*) during storage in ice (0^{o}), 10^{o} and 22-30^{o} (room temperature) were studied.

The total bacterial population increased from an initial count ranging from $5.5x10^{5}$ to $4.7x10^{7}$ CFU/g to 10^{9} CFU/g after 16 days of storage in ice (0^{o}), > 10 CFU/g after 12 days at 10^{o} and to > 10^{10} CFU/g after 24 hr. at room temperature (22 -30^{o}).

At the end of the storage period the dominant organisms in shrimp during ice storage (0^{o}) were *Alteromonas, Moraxella, Pseudomonas* Groups II and III and *Micrococcus*. Genus *Micrococcus* dominated at 10^{o} storage together with the flora found at 0^{o} storage. At room temperature (22 -30^{o}) the mesophilic flora composed of *Vibrio, Pseudomonas* Group III, *Bacillus* and *Micrococcus* was dominant.

Key words: Storage; Tropical shrimp; Bacteriological quality.

Short Communication
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TAGETES MINUTA L. SYN. *T. GLANDULIFERA* FATTY ACID COMPOSITION OF THE SEED OIL

Mushtaq Ahmad, A. W. Sabir, Imran Waheed, Kamal-ud-Din and M.K. Bhatty

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Technology Section

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COMPARATIVE STUDIES ON THE EFFECTS OF RAPESEED, COTTONSEED, FISH AND COD-LIVER OIL IN THE PROCESSING OF CHAMOIS LEATHER

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(Received June 23, 1987; revised August 12, 1987)

Oil tanning is an essential factor for chamois leather. Oils from three indigenous sources such as fish, cottonseed and rapeseed, were used for the purpose, besides the commonly used cod-liver oil, after their physico-chemical analyses with respect to density and iodine value, acid value, saponification number. Indigenous fish oil gave satisfactory results which were compared with code liver oil tanned products. Shrinkage temperature in both cases was in the reasonable limits of variation (lower, 52-57°; higher 60-65°) under different conditions of processing. The period of tanning, elasticity, softness, velvety feel for fine nap, and water absorption capacity were almost the same under similar conditions. Cotton and rapeseed oil tanned products, although having higher Ts-range of 73-79°, proved inferior to fish oil tanned products.

Key words: Chamois leather.

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STUDIES ON THE PRODUCTION OF FUMARIC ACID AND FERROUS FUMARATE*

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(Received July 9 , 1987; revised September 8, 1987)

Optimisation of reaction conditions for hydrochloric acid catalysed isomerisation of maleic anhydride gave fumaric acid in 95% yield. Studies were also carried on the conversion of fumaric acid to the well known antianaemic agent, ferrous fumarate. A pilot plant for the batchwise production of fumaric acid and ferrous fumarate on 20 kg and 10 kg scale respectively is described. Quality control tests on ferrous fumarate show that it conforms to British Pharmacopoea Standards.

Key words: Pilot plant, Fumaric acid, Ferrous fumarate

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THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XIV. Fatty Acid Composition of the Seed Oil of *Citrus limon* Var.Eureka

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(Received August 27, 1987)

The seed oil of *Citrus limon* Var. Eureka belonging to N.O. Rutaceae was analysed for its physico-chemical properties and fatty acid composition by gas chromatography. The oil (28 %) from fresh seeds had palmitic acid (41.2 %) and oleic acid (33.5 %) as the main constituent acids. The other acids present were C12:0 (1.8 %), C14:0 (0.5 %), C16:1 (5.1%), unknown (3.1 %), C18:0 (7.2 %), C18:2(5.1 %) and C18:3 (1.0 %).

Key words: Citrus limon Var. Eureka; Rutaceae; Lemon seed oil; Saponifiable portion.

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SULPHUR MODIFIED ROSIN-MALEIC ADDUCTS

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The preparation and properties of sulphur-treated rosin - maleic adducts and their esters have been studied. It has been found that oxidation characteristics of sulphur - treated rosins are markedly imparted to such products. Comparison of the properties of these resins with corresponding resins based on unmodified rosin is presented in this paper.

Key words: Sulphur modified rosin, Maleic adducts, Oxidation resistance; Blocking

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AN OPERATIONAL AMPLIFIER-BASED LOW-COST CONDUCTOMETER

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(Received June 23, 1987; revised August 1, 1987)

Fabrication details are described for a low-cost conductometer of general utility. The circuit of the unit is based on IC operational amplifier (opamp) 741 in conjunction with a push-pull transistor couple operated in common base mode. A stable, ripple-free DC supply energises the circuit at ± 12 V and ± 15 V, 500-600 mA. Zero-cost carbon electrodes comprise the cell. Conductance measurements within the range 10^{-2}-10^{-6} mho can be made with an overall accuracy of ± 1 %.

Key words: Low-cost electroanalytical equipment; Opamp application; Conductometry.

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STUDIES ON THE BIOLOGICAL EVALUATION OF PROTEIN ISOLATE FROM DETOXIFIED MUSTARD SEED MEAL

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(Received December 29, 1986; revised August 26, 1987)

The quality of protein isolates prepared from untreated and detoxified mustard seed meals was evaluated as a substitute of casein in rat feed. The net protein utilization values of the diets containing untreated mustard seed meal, detoxified mustard seed meal and casein was 65.45 %, 69.94 % and 73.73 % and the protein efficiency ratio was 2.34, 2.47 and 2.52 respectively.

Key words: Mustard seeds, Detoxified, Protein-isolate