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SYNTHESIS OF SUBSTITUTED PYRROLO [3,2-b] [1,4] THIAZINE 1,1-DIOXIDES

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Primary amines were reacted with acetyl methyl carbinol to give the corresponding α -alkylamino-ketones (I) which were condensed with sulphonyldiacetonitrile to give the corresponding 1-substituted 2-amino-3-cyanomethylsulphonyl-4,5-dimethylpyrroles (II). The substituted 2-aminopyrroles (II) were condensed with triethylorthoformate followed by base treatment to yield the 5-substituted 2-cyano-6,7-dimethylpyrrolo [3,2-b] [1, 4] thiazine-1, 1-dioxides (IV). Alkylation of obtained compounds (IV) was accomplished by forming sodium salts with sodium hydride in THF, followed by the addition of ethyl iodide to yield the targeting compounds (V).

Key words: Condensed, Alkylation, Targeting compound.

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CONFORMATIONAL STUDIES ON THE STRUCTURE OF 19-PROPYL THEVINOL HYDROBROMIDE

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(Received March 20, 1986; revised April 7, 1988)

In order to assess the nature of drug-receptor interaction in case of opioid series 19-propyl thevinol hydrobromide is selected. Potential energy calculations are carried out by computer on the basis of coordinates obtained from X-ray diffraction studies. Potential energy calculations based on non-bonded interactions showed that there are only specific allowed conformations to enable the molecule to conform itself according to the requirement of receptor. As a result of this study, it is speculated that design of new analgetics and mapping of receptor would become more feasible.

Key words: Conformational studies, Drug receptor interaction, Propyl thevinol hydrobromide.

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DERIVATIVE INFRARED SPECTRA OF REINECKATES OF N-ORGANIC BASES

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(Received December 6, 1987; revised February 25, 1988)

Derivative infrared spectra in CN stretching range ($1800-2200\text{ cm}^{-1}$) for twenty two reineckates of N-organic bases ($\text{HL}[\text{Cr}(\text{NH}_3)_2(\text{NCS})_4]$, where HL are protonated N-organic bases are studied and interpretation is made on the basis of crystal structure of ammonium and pyridinium reineckates. It is concluded from this work that the number of CN stretching bands correspond to the number of thiocyanate groups with different mode of behaviour in the crystal lattice.

Key words: Infrared spectra, Reineckates.

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GRAPHITE PASTE CYCLIC VOLTAMETRIC STUDIES OF SOME URANYL COMPOUNDS

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(Received July 22, 1987)

Results of graphite paste cyclic voltametry on some uranyl compounds like uranyl nitrate (I), uranyl zinc acetate [2] and uranyl nickel acetate [3] in aqueous KCl, HCl, and CH_3COOH system are reported. The over all electrochemical behaviour of these compounds was found to be a two step process involving an irreversible chemical reaction preceding with aquasi-reversible charge transfer process, in KCl and HCl system, while in CH_3COOH system the reduction step was found to be an irreversible electron transfer followed by an irreversible regeneration of starting material. The species generated electrochemically (during CV) were stable with respect to time in some of these cases.

Key words: Carbon paste, Graphite electrode, Uranyl compounds, Cyclic voltametry.

STUDIES ON INDIGENOUS FULLER'S EARTH

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(Received December 21, 1985; revised April 21, 1988)

Fuller's earth deposits discovered recently at Nooriabad (Distt. Dadu) can be activated by leaching the earth with 25 to 45 % sulphuric acid. The process of activation with 30 % sulphuric acid reduces the iron content from 12.7 % to 10.8 %, raises the silica-alumina ratio to 1:5.06, yields a product having improved colour and easy filterability. Activity of clay has been determined against crude soyabean oil and it has been found that product achieves maximum activity at a concentration of 5 % as compared with 7-8 % for other products.

Key words: Indigenous fuller's earth, Activation, Soyabean oil.

MINERALOGY AND CHEMISTRY OF BLOATING SLATE IN ATTOCK-CHERAT RANGE, NORTHERN PAKISTAN

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(Received January 21, 1988, revised April 21, 1988)

Mineralogy by XRD and Derivatography of twenty slate channel samples collected from Attock-Cherat Range is presented. The minerals identified in the rock are quartz, illite, chlorite, feldspar, pyrite, calcite and hematite. A composition diagram of chemical analyses is presented to show that all the samples studied are well within the area of bloating. Commercial use is also suggested.

Key words: Mineralogy, Bloating slate, Attock-Cherat range, Pakistan.

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STUDIES ON CEMENTITIOUS MATERIALS

Part II. Natural and Artificial Hydraulic Limes

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(Received June 1, 1986; revised March 29, 1988)

Hydraulic lime can be produced by calcining limestones available from the quarries abandoned by cement factories as well as by firing a mix of limestone and clay. The effect of substituting the two categories, viz. natural and artificial hydraulic limes, into standard cement has been studied by comparing the compressive strength of mortars prepared from cement as well as the mixes. It has been found that the two types of hydraulic limes may substitute 30 % and 50 % of Portland cement respectively in masonry mortars.

Key words: Cementitious materials; Natural hydraulic lime; Hydraulic lime.

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5-(1-PHENYL-2, 2-DICYANOETHYL) BARBITURIC ACID (PDCEB) AS CHELATING LIGAND: COMPLEXES WITH IRON(III) AND DIOXOURANIUM (VI)

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(Received March 19, 1987; revised October 20, 1987)

The new coordination complexes of iron(III) and dioxouranium(VI) with a ligand derived from benzalmalononitrile and barbituric acid has been synthesized and characterized by, elemental analysis, electronic absorption spectra, infrared spectra, and potentiometric equilibrium measurements. The ligand behaves as monoprotic bidentate NO donor forming complexes of the type $\text{FeL}_3 \cdot \text{H}_2\text{O}$ and $\text{UO}_2\text{L}_2 \cdot \text{H}_2\text{O}$ (where HL=ligand). The use of PDCEB as analytical reagent for determination of U(VI) and Fe(III) ions spectrophotometrically and as metallochrom indicator in the complexometric titration of Fe(III) ion is discussed. IR spectra reveals the existence of PDCEB in the closed tautomeric form.

Key words: Barbituric acid, Chelating ligand, Iron.

Biological Sciences Section

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INFLUENCE OF VARIETY ON THE QUALITY OF CANNED CAULIFLOWER

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(Received December 1, 1987; revised April 6, 1988)

Five varieties of cauliflower are grown locally namely Mid-Early, Matra, Gachi, Faisalabad and Swat Local were studied for their chemical composition and suitability for canning. Data on chemical composition has been presented. The cutout examination of canned cauliflower varieties showed that the varieties Matra and Faisalabad had good colour texture and taste. These varieties were rated superior to canned products from other varieties in overall quality besides meeting the requirements of Army Supply Corps. (ASC) specifications for drained weight and disintegration. Ascorbic acid losses in canned cauliflower were 52.2 to 66.9% during 6 months storage and 66.3 to 80.1% during 12 months storage at room temperature (13-35^o). Maximum retention of ascorbic acid during processing and storage was observed in Matra and Faisalabad varieties while maximum loss of ascorbic acid was recorded in Swat local, Gachi and Mid-early varieties. On overall basis cultivars Matra and Faisalabad were found suitable for canning.

Key words: Cauliflower varieties, canning.

EVALUATION OF REFERENCE CROPS IN THE STUDY OF NITROGEN FIXATION BY COMMON BEANS

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(Received June 14, 1987; revised March 31, 1988)

Nitrogen fixed by a legume crop can be measured by ^{15}N methodology using a nonfixing reference crop. Significantly different estimates of nitrogen fixed can be obtained with different reference crops. In order to evaluate a suitable reference crop for the determination of symbiotically fixed nitrogen by common beans (*Phaseolus vulgaris*), a glasshouse experiment was conducted at Seibersdorf, Austria on the soils from two sites — Seibersdorf and Au. Three reference crops viz. buckwheat (*Fagopyrum esculentum*), uninoculated common beans and sorghum (*Sorghum vulgare*) were used with test crop i.e. inoculated common beans. Results showed that there was no significant difference in estimates of nitrogen fixation in respect to buckwheat and sorghum. Both of these crops had the same percent nitrogen derived from fertilizer and total N content within the limits of significance. Estimates of N_2 fixation in respect to uninoculated common beans were smaller and this reference had the same total N content as the inoculated test crop. Its % Ndff was much lower than the other two reference crops showing some substitution from atmosphere.

Key words: Isotope dilution technique, N_2 fixation, Reference crop.

SALT TOLERANCE OF RICE VARIETIES AND MUTANT STRAINS

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(Received January 22, 1987; revised April 17, 1988)

A pot experiment was conducted to evaluate salt tolerance of two varieties of rice (*Oryza-sativa*) Basmati-370 and IR6 and their four mutants evolved through mutation. Soil salinity levels were produced in 5 kg soil in pots by applying mixture of salts, containing 8 parts of Na_2SO_4 , 6 parts of NaCl , 2 parts of CaCl_2 , 2 parts of MgSO_4 and 1 part of NaHCO_3 , at 0, 0.25, 0.50, 0.75 and 1.00% of soil (w/w), resulting in the following five levels, control (0.45), 2.85, 5.75, 7.85 and 11.40 ds/m EC of saturation extract. Under non-saline (control) conditions the grain and straw yields for varieties and mutants varied significantly. The most tolerant mutant strain (IR6-18) tolerated twice as much salinity as the most sensitive mutant strain (Bas-EF-29-2), and 50 per cent reduction in grain yield occurred in two mutant strains at EC 4.45 and 2.25 ds/m, respectively.

Key words: Salt tolerance, Rice varieties, Rice mutant strains.

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EFFECT OF POST EMERGENCE WEEDICIDES ON THE YIELD AND YIELD COMPONENT OF COTTON *GOSSYPIMUM HIRSUTUM*. L.

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(Received February 14, 1988; revised April 6, 1988)

The study was done to see the effect of post emergence weedicides on the yield and yield components of cotton, variety TH-1100. Eight treatments vize, TOK-E-25, (1.5 gallon per acre), Karmex + MS M.A (2 lbs +5 pint per acre), Gasagard (2 lbs per acre), Gesgard (3 lbs per acre), Gramoxone (1 pint per acre), Gramoxone (2 pint per acre), Hand weeding and check, (Untreated) were tested.

Hand weeding produced maximum yield and yield components, followed by Gramoxone (2 pint/acre) recorded maximum mortality percent, seed cotton yield 2.607 M.t/ha, supported by maximum, plant height, number of branches/plant, number of open bolls/plant seed cotton yield/plant, respectively.

Key words: Cotton crop; Weed control; Herbicides; Yield; Pakistan.

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EFFECT OF DIFFERENT COMPOSTS ON THE FRUITING AND TUBER FORMATION OF WINGED BEAN-(*PSOPHOCARPUS TETRAGONOLOBUS* (L.) DC.)

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(Received October 16, 1987; revised May 4, 1988)

Five different manures were tried on winged bean to increase yield, particularly on fruit and tuber production.

Garbage compost prepared employing Beltsville Aerated Rapid Composting (BARC) technique was most efficient among all methods. Encouraging results were achieved on garbage composted by Chinese method and slurry obtained from cowdung, whereas "garbage compost" from windrow method (Indian method) and cowdung manure were less effective with regard to enhancing yield of winged bean tubers and fruits.

Increase in yield of fruits and tubers mostly depends on appropriate NPK and C/N values. It appears that NPK ratio of "garbage compost" prepared from BARC method was near the required ratio for winged bean cultivation.

Key words: *Psophocarpus tetragonolobus*, Composts, and NPK values.

ALLELOPATHIC POTENTIAL OF HARMAL

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(Received May 31, 1987; revised April 7, 1988)

Harmal (*Peganum harmala* L.) is a weed and wasteland species in Pakistan. Aqueous extracts from shoots, soil collected beneath harmal, substance volatilizing from shoots and added shoot litter, besides being auto-toxic, significantly reduced the germination and radicle growth of *Pennisetum americanum*, *Brassica campestris*, *Lactuca sativa* and *Trifolium resupinatum* in various experiments. Paper chromatography indicated the presence of caffeic, ferulic, *p*-coumaric and *p*-OH-benzoic acids in shoot extracts.

The toxicity depended upon the test species used, soaking duration and physiological process involved. It is suggested that harmal is strongly allelopathic.

Key words: *Peganum harmala*, Weed, Allelopathy.

GROWTH, FOOD CONVERSION AND PROTEIN UTILIZATION OF MAJOR CARP *CIRRHINA MRIGALA* FRY FED ARTIFICIAL DIETS

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(Received February 21, 1988; revised April 24, 1988)

Growth, feed efficiency, protein efficiency ratio and food quotient of the fry of major carp *Cirrhina mrigala*, supplied three compounded diets were studied. Diet 'A' comprised linseed oil cake, wheat bran, sugarcane roughage, hyacinth meal, blood meal and egg shell; diet 'B' included all three ingredients except hyacinth meal, and diet 'C' contained only linseed oil cake, sugarcane roughage and blood meal. Proportions of different components were altered resulting in varied percentages of protein (45.5-50.7), fat (0.95-1.35), (carbohydrate (40.1-43.3), inorganic matter (5.6-10.2) and the energy value (363.9-384.3 Kcal/100 g). Instantaneous growth rate, feed efficiency and protein efficiency ratio increased but food quotient declined with intake of dietary protein and the non-protein energy. Quality of energy entering the body appreciably influenced these nutritional parameters. Protein sparing action of carbohydrate and fat components of the diet was clearly evident. Mineral supplementation of feeds exceeding 5.5 % was found unnecessary.

Key words: Food conversion, Growth, *Cirrhina mrigala*.

Technology Section

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A SIMPLE POROUS CERAMIC CUP SOIL WATER SAMPLER

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A simple soil water sampler fabricated from porous ceramic cup was tested in soil columns under laboratory conditions. This device proved useful for collecting water samples from saturated soil. A water sample was forced out of the cup with a hand operated squeeze bulb. The porous cup showed no measurable adsorption of Cl^- . The device described here could be used in monitoring changes in soil water composition during leaching and reclamation of saline soils without disturbing the soil after installing it in the field.

Key words: Porous ceramic cup, Water sampler, Leaching, Reclamation.

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EGG POWDER BY FOAM-MAT DRYING

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Egg powder has been prepared using the foam-mat technique. Various aspects in the production of egg foam and subsequent drying have been studied. It was found that a $\frac{1}{4}$ " thick layer of foam having density between 0.20 to 0.26 gm/ml had low spreading and drainage problems and yielded good quality product when subjected to dehydration. Of the several drying temperatures used, 70°C was found to be the optimum. Egg powder prepared under the above conditions had fine quality as revealed by the solubility and organoleptic tests.

Key words: Egg; Dehydration; Food foam.

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SEPARATION OF NATURAL COUMARINS IN DIFFERENT SOLVENT SYSTEMS BY THIN LAYER CHROMATOGRAPHY ON SILICA GEL.

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(Received September 24, 1987)

Separation of thirty natural coumarins was done by TLC on silica gel G in eight different eluting solvent systems. The coumarins showed higher R_f values in solvent systems: chloroform-methanol (97:3) and butanol-acetic acid-water (40:12.5:29.5) and appeared equally good in separating these derivatives. No structural relationship between the R_f values and the coumarins was observed.

Key words: Natural coumarins, Separation, Structural effect.

COLOUR INDEX, F.F.A. AND FATTY ACID COMPOSITION OF FRESH, SHELF STORED AND UNDERGROUND STORED *B. CAMPESTRIS* SEED OIL

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Colour index (Lovibond) free fatty acid (F.F.A.) and fatty acid composition of the fresh and stored, [underground (4 feet deep) and on the shelf for (2 years)] rape-seed oil (*B. campestris*) has been studied. Discernible changes in the colour index and F.F.A. were observed but the fatty acid composition remained essentially the same.

Key words: *Brassica campestris*; Folk lore myth.

BIOCHEMICAL COMPOSITION OF DATES AND DATE SYRUP

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(Received December 11, 1987; revised April 6, 1988)

Nutritional quality characteristics of six date cultivars were determined. The results indicate that Bodaywala dates contained highest average weight (8.9g) per date and the Jhajri date stone contained highest average weight (1.0g) per stone. Dona was the sweetest with 83% total soluble solids. The maximum pulp (91%) and date stone (24%) was recorded for Bodaywala and Waniwala respectively. Data on the yield of date syrup (72° Brix) revealed that Basra was the best in quality. Other quality parameters studied were moisture, crude protein, crude fat, carbohydrates, crude fibre and ash. Date-syrups were analysed for mineral elements (calcium, phosphorous, sodium, potassium, copper, iron, manganese and zinc). Glucose and fructose contents of the syrups were also determined.

Key words: Date cultivars, Date syrups, Mineral elements and sugars.