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Physical Sciences Section

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BEHAVIOUR OF ARSENIC AND ANTIMONY OXIDES AS GLASS REFINING AGENTS

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(Received September 4, 1986; revised April 4, 1987)

The refining action of arsenic and antimony oxide under commercial glass melting conditions has been investigated in Soda-lime-silica glasses. It has been shown experimentally by the bubble count method that arsenic oxide at 1450° is a better refining agent than antimony oxide. The investigations have further shown that the refining behaviour of both antimony oxide and arsenic oxide is enhanced considerably in the presence of the oxidising agent, sodium nitrate. The slopes of log N against concentration of the two refining agents also confirm the above statement.

Key words: Glass refining agents; Glass; Fining.

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CHARGE TRANSFER COMPLEX FORMATION BETWEEN SUBSTITUTED AROMATIC AND ALIPHATIC CARBONITRILES AND IODINE MONOCHLORIDE

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(Received December 22, 1986; revised February 17, 1987)

A study of molecular complexes of various aromatic and aliphatic carbonitriles was undertaken as a means of determining equilibrium constants. Such complex formation techniques have also been used as a means of comparing the mode of transmission of electronic effects of the substituents in aromatic alicyclic and open chain systems.

Key words: Aromatic and aliphatic carbonitrile, complex formation, charge transfer complexes.

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A NEW METHOD FOR THE DETERMINATION OF ISONIAZID (ISONICOTINIC ACID HYDRAZIDE) BY THE WEISZ RING-OVEN TECHNIQUE

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(Receive May 6, 1985; revised April 10, 1986)

A new method has been described for the determination of isonicotinic acid hydrazide (isoniazid) making use of its reaction with ceric sulphate to give a yellow coloured end-product. Interferences by aspirin, paracetamol and caffeine on this determination have also been studied using the Weisz ring-oven technique. It has been observed that isonicotinic acid hydrazide can be determined within the range of 250.0 ng to 30.00 μ g with a maximum error of -9.20 % for 250.0 ng of the substance. It can also be determined in the presence of paracetamol, aspirin and caffeine individually and collectively. The method is well suited to the routine analysis of isoniazid because of its accuracy, sensitivity, precision and convenience.

Key words: Isoniazid , Determination; Ring-oven.

QUALITATIVE STUDIES OF REACTIONS OF FURYL-SUBSTITUTED PYRAZINE AND QUINOXALINE LIGANDS TOWARDS SOME METAL IONS

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(Received January 30, 1985; revised January 29, 1987)

Five new reagents, 2, 3-bis (2'-furyl)-5-methyl-5, 6-dihydropyrazine (I) 2, 3-bis (2'-furyl)-5-methylpyrazine (III), 2, 3-bis (2'-furyl)-5, 6-dihydropyrazine (II), 2, 3-bis (2'-furyl)-5, 6-diphenylpyrazine (IV) and 2, 3-bis (2'-furyl)-quinoxaline (V) have been prepared. The reagents have been characterized using IR, U.V. and mass spectroscopic techniques. Iron (II) develops brown and iron (III), copper (I), copper (II), cobalt (II) and nickel (II) develop yellow colour or turbidity within 1-4 hr. at room temperature. The colour reactions have also been studied spectrophotometrically.

Key words: Furyl, Methye pyrazine; dihydropyrazine; diphenyl pyrazine; Quinoxaline; Reagents.

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POTENTIOMETRIC TITRATION METHOD FOR THE DETERMINATION OF URONIC ACID ANHYDRIDE CONTENT OF ACIDIC POLYSACCHARIDES

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(Received September 25, 1984; revised February 2, 1987)

Authentic samples of polysaccharides having uronic acid anhydride contents, ranging from approximately 10 to 98 per cent, as well as a sample of monomer, i.e. galacturonic acid, have been analysed by potentiometric titration method and the results are compared with other standard methods. It is concluded that this simple and rapid method works very satisfactorily.

Key words: Potentiometric titration, Determination of uronic acid.

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PHOTO-OXIDATION OF L(+) ASPARTIC ACID BY URANYL IONS

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(Received March 21, 1985; revised March 12, 1987)

The uranyl sensitized photodecomposition of L(+) aspartic acid has been carried out in acidic medium. Malonic acid has been characterised as the product of photo-oxidation of L(+) aspartic acid and a tentative mechanism for the photo-oxidation has been proposed.

Key words: Oxidation of amino acids, uranyl ions aldehyde formation by hydrolysis.

INTERACTION IN AND BETWEEN SOME PROPERTIES OF POND BOTTOM AND ADJACENT LAND SOIL OF THREE BANGLADESH SOILS

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(Received September 9, 1986; revised March 31, 1987)

Most of the chemical properties of pond bottom soil were inversely correlated with exchangeable Na of adjacent land soil in case of Grey and NCDGF soil types. Again, the exchangeable Na of land soil had strongly ($p < 0.001$) inverse effect on the fluctuations of pH ($r = -0.744$), total N ($r = -0.696$), exchangeable K ($r = -0.757$), exchangeable Na ($r = -0.680$) and direct effect on the fluctuation of exchangeable Na ($r = 0.897$) in the case of NCDGF soil. The total N of land soil directly and inversely influenced the fluctuations of all chemical properties of pond bottom soil in the case of NCDGF, CDGF and CBF soil units respectively. In the case of intracorrelations in the chemical properties of pond bottom and adjacent land soil, only exchangeable Na had maximum inverse correlations with other chemical properties in three soil types.

Key words: Soil units; Pond bottom soil; Adjacent land soil.

INFRARED AND RAMAN STUDIES OF PEROXO BIS (2, 2'-BIPYRIDYLAMINE) COBALT (III)-PERCHLORATE

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(Received September 25, 1986)

Infrared and Raman spectra of the title compound are recorded. The ν (O-O), ν_s (Co-O) and ν_{as} (Co-O) are observed in both spectra around 890, 565 cm^{-1} respectively. This confirms the unique isosceles triangular structure of the peroxocobalt (III) unit, $\text{Co}(\text{O}_2)$, with local symmetry of C_{2v} . The calculated values of force constants for the O_2^{2-} and Co-O bonds based on a valence force field are 332 257 Nm^{-1} respectively.

Key words: Cobalt (III); Peroxi; Vibration.

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HOME COMPUTER IN MOLECULAR ORBITAL CALCULATIONS Part I. The Huckel Method

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(Received September 23, 1986; revised March 16, 1987)

Computer Programs in BASIC language for molecular orbital calculations have been developed for home computer (10 K memory). The M.O. Program can be used for research as well as teaching purposes. The programs are simple and tractable and can be used by nonprofessionals with ease. The program has been tested and found working with less than 15 seconds' time taken for allyl system.

Key words: Home computer; M.O. program Huckel Method; Basic program.

Biological Sciences Section

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THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XI. Chemical Investigations and Utilization Studies on Seed Oil of *Bombax malabaricum* (Simal)

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(Received May 21, 1986)

The chemical composition of the seed oil of *Bombax malabaricum* locally known as simal or simbal has been evaluated. The seeds yielded 17.2 % pale oil, composed of myristic (3.4 %), palmitic (4.7 %) palmitoleic (7.2 %), stearic (9.2 %), oleic (44.3 %), linoleic (25.6 %) and behenic acid (3.7 %) and unsaponifiable matter (1.78 %).

Key words: Fatty acids composition, Seed oil, *Bombax Malabaricum*.

THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XII. The Fatty Acids Composition of the Fixed Oils of *Ocimum sanctum* and *Salvia aegyptica* Seeds

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(Received 22nd February, 1987)

The physicochemical properties and chemical composition of the fixed oils of the seeds of *Ocimum sanctum* and *Salvia aegyptica* both belonging to N.O. Labiateae were investigated. The amount of the oil extracted from their seeds were 18.2 and 17.4 % respectively. The fatty acid composition of the seed oils of *Ocimum sanctum* and *Salvia aegyptica* were determined by GLC and it revealed the presence of capric (0.00, 1.34 %), lauric (2.84, 0.00 %), myristic (1.90, 0.00 %), palmitic (5.54, 9.42 %), stearic (3.12, 3.18 %), oleic (6.00, 0.00 %), linoleic (59.1, 84.53 %), linolenic (21.7, 0.00 %), and arachidic (0.00, 1.53 %) acids respectively.

Key words: Fatty acids; *Ocimum sanctum*; and *Salvia aegyptica*.

Short Communication

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STUDIES OF 'KALGA' SEED OIL

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COMPARISON OF DIRECT SEEDED AND TRANSPLANTED SUNFLOWER IN FEBRUARY AND MARCH

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(Received July 3, 1984; revised February 23, 1987)

To study the effects of transplanting one, two-and three-week old seedlings and direct seeding on dry, wet and moist seed beds during February and March on sunflower cultivar Sunbred 212, experiments were conducted at Agronomy farm and Malakandhar farm, NWFP Agriculture University, Peshawar during 1981-82.

Head dia. days to maturity and grain yield were significantly affected by the time of sowing. However, the sowing time did not affect the thousand grains weight. February sown crop produced larger heads and more yield than the March sown crop but took more days to mature. Thousand grains weight was about the same for the two dates. The effects of the stages of transplantation and direct seeding were significant in all the characters studied. Direct seeded crop gave more yield which decreased as the seedling age increased. Direct seeded crop gave more yield in March while the transplanted crop was better in the case of early planting. Methods of sowing did not affect significantly any of the characters.

Key words: Transplantation; Sunflower; Seedlings.

EVALUATION OF ATTRACTICIDE FOR THE CONTROL OF PINK BOLLWORM*

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(Received November 26, 1986; revised May 3, 1987)

The efficacy of attracticides comprising gossyplure adjuvants and cypermethrin was evaluated in comparison with a conventional insecticide (fenvalerate) for the control of pink bollworm, *Pectinophora gossypiella*, Saunders (Lepidoptera: Gelechiidae). The results revealed that attracticide treatment was only comparable with conventional insecticide treatment in terms of the effectiveness of larval control. However when the male moth population was monitored using delta traps baited with gossyplure in the treated plots, a reduction of 80 % in attracticide treatment over insecticidal treatment was observed.

Key words: Pink bollworm; Attracticide; Insecticide.

HYDROCARBON BIODEGRADATION: BIOCHEMICAL CHARACTERIZATION OF BACTERIA ISOLATED FROM LOCAL SOILS

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(Received January 18, 1987)

Fifty-six bacterial isolates were separated and purified from fourteen soil samples collected from ecologically different environments in Lahore. Thirty-seven of these were gram-negative and nineteen gram-positive. The growth pattern of the gram-negative organisms were examined using different hydrocarbons as energy source. Six of these isolates efficiently utilized chicken fat as the sole source of energy. Those isolates which exhibited oxidase-positive response were characterized as *Pseudomonas aeruginosa* and *P. strutzeti*. The remaining oxidase-negative isolates were characterized as *Enterobacter sakazaki* and *E. cloacae*. When chicken fat was replaced with kerosene oil as the carbon source, the Ps22 and PS 37 isolates produced emulsification.

Key words: Bacterial isolates, Local soils, Biodegradations.

EFFECT OF RATIO OF APPLIED N AND P ON THE YIELD OF WHEAT IN TWO SOIL SERIES

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(Received November 11, 1985; revised March 31, 1987)

A field experiment was conducted with four promising mutants of wheat to study the influence of three N: P ratios at each of the three levels of applied N in the Shahdara and Sultanpur series.

The results obtained showed that nitrogen and phosphorus fertilizers applied at the rates of 120 kg N and 90 kg P_2O_5 per ha. at the N: P ratio of 1: 0.75 statistically produced the same yield as the higher rates of application in the same ratio. The yield from other ratios including the previously adopted ratio of 1: 0.5 (120 kg N: 60 kg P) was lower. The increased P requirements are mainly due to depletion of the element from soil as a result of intensive cultivation and to introduction of high yielding varieties having high nutritional requirements. The sultanpur series produced about 50 % more yield per kg of the nutrient applied than the Shahdara series.

Key words: Promising mutants, N and P on the yield of wheat, Nutritional requirements.

ISOLATION AND PARTIAL PURIFICATION OF A RESTRICTION ENDONUCLEASE FROM *PSEUDOMONAS OVALIS*

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(Received February 2, 1987; revised February 26, 1987)

A restriction endonuclease, P_{ov}I, has been isolated and partially purified from *Pseudomonas ovalis* by high speed centrifugation and fractionation on a column of Biogel followed by dialysis and ion exchange chromatography on a phosphocellulose column. The presence of the restriction endonuclease was detected by a simple assay procedure using agarose slab gel electrophoresis.

Key words: Restriction Endonucleas; Enzymes; *Pseudomonas ovalis*.

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ISOLATION AND SPECTROSCOPIC STUDIES OF MONO-PALMITIC, DI-OLEIC TRIGLYCERIDE FROM SEEDS OF *MORINGA OLEIFERA* LAM

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(Received January 15, 1987; revised April 15, 1987)

Mono-palmitic, di-oleic triglyceride has been isolated from the benzene extract of semi-dried seeds of *Moringa oleifera* Lam and its tentative structure has been elucidated through spectral data.

Key words: Mono-palmitic di-oleic tryglyceride, *Moringa oleifera*; Triglyceride; Seed oil.

HETEROSIS IN CHICKPEA

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(Received January 18, 1987; revised April 15, 1987)

Heterosis was studied in 4 crosses of F1 and F2 generations for plant height, primary and secondary branches per plant, pods per plant and yield per plant in chickpea (*Cicer arietinum* L.). Crosses, PK 51814 X CM 72 and C 141 X ILC 72 showed very high positive heterosis for primary branches per plant and pods per plant, over mid, female and male parents. Heterotic vigour in F2 was less than in F1. Hybrid vigour in primary branches per plant and pods per plant seems to influence heterosis in yield.

Key words: *Cicer arietinum* L., Hybrids, Heterosis, Mid parent.

Technology Section

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AN EXPERIMENTAL RESEARCH OF THE HARNESS LEATHER PROCESSING

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(Received January 18, 1987; revised March 10, 1987)

Some of the techniques for the production of curried leather for harness are described. The methods used are drum and pit tanning using crude mimosa and babul bark extract.

Key words: Curried leather; Tanning; Harness leather.