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Physical Sciences Section

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SYNTHESIS AND REACTIONS OF L-ASCORBIC ACID ANALOG 4' (4-ETHOXY-CARBONYL-5-METHYLFURAN-2-YL) - 2,3-DIOXOBUTYRO-1, 4-LACTONE

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(Received February 20, 1994)

A furanyl analog of dehydro-L-ascorbic acid (12) was synthesized starting from D-glucose via its condensation with ethyl acetoacetate followed by periodate oxidation. Acyloin condensation of the obtained aldehyde (2) with glyoxal in presence of potassium cyanide afforded the imide (3) with aqueous acetic acid gave (8) which when treated with aryl or acylhydrazines afforded the pyrazolin derivatives (9,10) whereas with o-phenylenediamine gave a quinoxaline derivative (11). Acylation of (3) gave monoacyl derivatives (7), while with aryl and acylhydrazines gave the corresponding hydrazones (5,6). On the other hand, treatment of (3) with nitrous acid gave the title compound (12). Reaction of (12) with aryl or acylhydrazines gave the corresponding bis (hydrazones) (13,14), rearrangement of (13) gave the pyrazoline (15). Reaction of (12) with o-phenylenediamine gave the quinoxaline derivative (16). Reaction of (16) with aryl or acylhydrazines gave monohydrazones (17,18).

Key words: Ascorbic acid analog, Tetronimide, Pyrazoline quinoxaline.

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**ION PAIRS AND SOLVENT-SOLUTE INTERACTION:
Conductance of Sodium Chloride in Methanol-H₂O and Glycerol-H₂O Mixtures
at Different Temperatures**

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(Received September 19, 1992; revised December 30, 1993)

The conductance of sodium chloride over the approximate range of concentration up to 0.02M has been measured in methanol-H₂O and glycerol-H₂O mixtures at 25, 30, 35, and 40°. For mixtures with the same dielectric constant, the association constant, K_A , is over an order of magnitude greater in the glycerol mixtures. This mainly is due to effect of hydrogen bond. Glycerol-H₂O is more hydrogen bonded solvent than methanol-H₂O. Also, K_A values increase as the proportion of methanol or glycerol increases in the mixture. The thermodynamic parameters ΔH° , ΔG° , and ΔS° were also calculated. It turned out that the entire process of ionic association in those systems are endothermic ones. The results are discussed on the basis of ion solvent interaction.

Key words: Conductance, Association, Thermodynamics.

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MIXED-LIGAND COMPLEXES OF ZIRCONIUM (IV) AND URANIUM (VI) WITH SALICYLALDEHYDE AND SOME HETEROCYCLIC AZOPYRAZOLONES

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(Received November 11, 1992, revised February 13, 1994)

Mixed-ligand complexes of Zr (IV) and U(VI) with salicylaldehyde (SA) and some heterocyclic azopyrazolones (HAP) have been studied spectrophotometrically. All formed chelates have ratio 1:1:1. The stoichiometry and the stability of the binary and mixed chelates have been evaluated. Elemental analysis, molar conductance and IR spectra have been used for identification of the solid mixed complexes.

Key words: Mixed ligands complex, Zr (IV), U(VI), Salicylaldehyde, Heterocyclic azopyrazolones.

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DETERMINATION OF THERMODYNAMIC PARAMETERS FOR THE DECOMPOSITION OF SOME METAL CHELATES OF SUBSTITUTED HYDRAZOPYRAZOLONES

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(Received April 1, 1993; revised November 18, 1993)

The relative thermodynamic parameters of a series of metal derivatives of hydrazopyrazolone dyes containing meta -OH, -COOH, and -OCH₃ groups have been determined by TGA, DTG and differential thermal analysis (DTA). The effects of substituent on the hydrazo-moiety of the ligand and on the stability of the complexes are discussed. The affinity of different ligands for complexation with metal ions Mⁿ⁺ [M=UO₂²⁺, Fe³⁺, Cu²⁺ and Hg²⁺] reaches its highest value with metahydroxyphenylhydrazopyrazolone. The relative order of thermal stability is : UO₂²⁺ > Fe³⁺ > Cu²⁺ > Hg²⁺. The data were correlated and the results were used to explain the stabilization of such chelates by dative π -bonding between Mⁿ⁺ and the ligand.

Key words: Thermodynamic parameters, Metal chelates, Hydrazopyrazolones.

HUMAN EXPOSURE TO POLLUTANTS

Part-I. Blood Lead and Cadmium Levels in a Sample of Population of Karachi

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(Received February 25, 1993; revised December 30, 1993)

A study was carried out to see the blood lead and cadmium levels in fifty employees working at PCSIR Laboratories Complex, Karachi. These employees belonged to various socio-economic groups and had their residences in different areas of Karachi. Sixty two percent staff had blood lead level between 100-200 $\mu\text{g/L}$. The highest blood lead level (>400 $\mu\text{g/L}$) was found in volunteers working as garage staff. No significant difference was found between the blood lead levels of volunteers belonging to different socio-economic and age groups. Only 8% of the staff had blood lead levels below 100 $\mu\text{g/L}$. Lead in the dust collected from the residences of the volunteers was also estimated for lead and correlated with blood lead levels. Blood cadmium levels were also estimated. These were found to be higher in smokers and tobacco chewers. A definite correlation was observed between blood cadmium levels and smoking habits.

Key words: Blood lead, Blood cadmium, Household dust.

PETROGRAPHIC AND GEOCHEMICAL STUDIES OF SOME PHOSPHORITE DEPOSITS OF HAZARA, PAKISTAN

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(Received March 28, 1993; revised December 19, 1993)

Samples from Kakul mine and trenches of several phosphorite deposits were studied. These phosphorites occur in gradational contact with siltstone, dolomite and chert belonging to Abbottabad Cambrian System. Thinly bedded phosphorites occur mostly as pellets and microspherule, while the intraclasts and pseudo-oolites are rare. Fluorapatite is abundant in all the samples, while quartz, calcite, dolomite, feldspar, illite and hematite occur in minor phases. These phosphorites are primary marine sediments formed mostly by direct precipitation. Recrystallization is due to intense diagenesis, whereas ferruginization suggests weathering of phosphatic horizons in Hazara.

Key words: Petrography, Geochemistry, Phosphorite.

Short Communication

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**Mixed Ligand Complexes of Co(II), Ni(II)
and Hg(II) Diphenates with Amine Bases**

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Biological Sciences Section

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SEEDLING EMERGENCE OF GROUNDNUT AS INFLUENCED BY CULTIVAR, SOWING DEPTH AND SEED SIZE IN A DRYING SOIL

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(Received March 30, 1993; revised January 25, 1994)

A growth chamber experiment was carried out to determine the influence of cultivar, sowing depth and seed size on the emergence of groundnut in a drying soil. Seeds of four cultivars (Kadiri-3, Kadiri 71-1, Gangapuri and TMV-2) classified into three size grades were sown at four depths (2, 4, 6 and 8 cm) in soil at field capacity and no water was added subsequently. Result indicated that there were considerable differences among cultivars for rate and fractional emergence. Gangapuri showed the greatest fractional emergence, while, TMV-2 had the fastest rate of emergence than all other cultivars. Sowing depth had a significant influence on the rate and fractional emergence and as expected, seedling emergence decreased with increased depth of sowing. In general, the rate and fractional emergence of small seeds were better than those of large seeds at all sowing depths.

Key words: Groundnut cultivar, Fractional emergence, Rate of emergence.

A COMPARATIVE STUDY OF DIFFERENT METHODS FOR OBTAINING AN INDEX OF NITROGEN AVAILABILITY IN UPLAND SOILS

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(Received August 22, 1992 ; revised February 12, 1994)

A study on 50 soils with wide range of properties was conducted to find out a simple, rapid and reliable method of obtaining an index of soil N availability. Three chemical methods; mineral plus mineralizable N determination by modified alkaline permanganate method, mineral N as $(\text{NH}_4 + \text{NO}_3)$ and NO_3 -N estimation by 2 N KCl were found promising as the soil N values obtained by these methods showed high correlation with mineral N of incubation test ($r = 0.92, 0.88$ and 0.85 , respectively) and N uptake by wheat plants ($r = 0.90, 0.87$ and 0.85 , respectively). The relationship between yield response of wheat plants to applied N in pots and soil available N determined by the three methods was also studied.

Key words: Alkaline KMnO_4 extraction, Incubation, N uptake, Soil N availability.

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EFFECT OF HEAT PROCESSING ON NITROGEN SOLUBILITY AND DIGESTIBILITY OF PROTEIN IN SUNFLOWER MEAL

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(Received August 27, 1992; revised March 7, 1994)

Proximate composition of seven varieties of sunflower seed and meal and their nitrogen solubility profile in water (20.5-22.5%), 5% NaCl (49.6-52.8%), 70% C_2H_5OH (3.0-4.0%) and 0.2% NaOH (9.8-11.0%) was determined. *In vitro* digestibility of untreated and enzymic treated sunflower meal was found to be 34.5% and 83.5% respectively. The autoclaving of untreated meal at 1 kg/cm^2 for 5-60 mins., showed a gradual decrease *in vitro* protein digestibility from 34.5 to 12.0%. *In vitro* protein digestibility of enzymic treated meal increased from 83.5 to 87.2% after 15 mins. autoclaving. Further increase in autoclaving time to 60 mins showed a gradual decrease in the *In vitro* digestibility. Hence processing of sunflower meal at 1 kg/cm^2 for 15 mins. was found most suitable.

Key words: Autoclaving, Nitrogen solubility, Digestibility.

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STUDIES ON ANTIBACTERIAL ACTIVITY OF *NELUMBium SPECIOSUM*-WILD SEEDS EXTRACTS

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(Received December 5, 1992; revised March 24, 1994)

Seeds of *Nelumbium speciosum*-Wild were studied for their antibacterial activity against Gram + ve and Gram -ve bacteria *in vitro*. Ethanolic extract "C" was more active against Gram -ve bacteria than "A" and "B" (aqueous extracts), while extract "A" was more active than "B". Their actions were comparable to the action of Erythrocine, Ampiclox and Penbritin.

Key words: *Nelumbium speciosum*- seeds, Antibacterial activity.

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EFFECTS OF HEAT SHOCK ON LEAF CHLOROPHYLL FLUORESCENCE IN COTTON CULTIVARS

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(Received December 1, 1993; revised May 5, 1994)

Four cotton cultivars viz. Qalandari, MNH-93, Rehmani and S-12 were analysed for their leaf chlorophyll fluorescence properties, at normal growth temperature (30°) (control), and shocked at high temperature (45°) for different time periods. There were only small variations in the values of chlorophyll fluorescence at the control temperature. However, the photosystem of the leaves was irreversibly damaged as assessed by fluorescence properties when the leaves were shocked at 45° for 30 mins or longer. All the cultivars were equally sensitive to the treatment.

Key words: Chlorophyll fluorescence, Photosynthesis, Heat shock, Cotton cultivars.

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ELECTRICAL CONDUCTIVITY AS A MEASURE OF PLANTING SEED QUALITY IN COTTON

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(Received May 2, 1993 ; revised December 29, 1993)

Investigations were conducted to relate seed exudates conductance to standard germination so as to develop a quick and reliable test for measurement of cotton seed quality. Results showed that cotton cultivars differed significantly in germination percentage and electrical conductivity. Cultivars MNH-93 and CIM-109 had higher germination percentage and less exudate conductance compared to other cultivars. Seeds obtained from first pick were of poor quality than those of second pick. The exudate conductance was negatively correlated with germination ($r = -0.88^{**}$). The loss of membrane functional integrity seems responsible for lower germination. These data indicate that electrical conductivity test can provide estimates of seed quality.

Key words: Electrical conductivity, Measurement, Cotton seed quality.

Short Communication

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**Partial Purification and Antibacterial Studies
of Extracts from *Eugenia jambolana* Linn and
Vinca rosea Linn**

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Short Communication

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**Effect of Epichlorohydrin on the DNA and
RNA of Growing Wheat Seedlings**

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AND YASMEEN BADAR

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(Received December 31, 1991; revised February 22, 1994)

During the germination of *Triticum aestivum* (wheat)

Technology Section

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EFFECT OF DIFFERENT STORAGE TECHNIQUES ON THE RIPENING BEHAVIOUR OF TOMATOES (*LYCOPERSICUM ESCULENTUM* MILL) VARIETY ROMA

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(Received October 12, 1992; revised February 12, 1994)

Tomato (*Lycopersicum esculentum* Mill) variety Roma is a major crop growing in Pakistan. Due to its perishable nature, storage is a problem. Attempts were made to investigate the storage of tomatoes using different techniques during 1989-92. Results showed that the ripening of tomatoes variety Roma can be controlled for 40 days with percentage of fruit rotting 23.80 - 29.79 depending upon the treatments in coarse moistened saw dust or fine moistened saw dust with or without dipping in 0-4% CaCl_2 at ambient pressure for 5 min.

Key words: Post harvest technology, Tomatoes, Storage.