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Physical Sciences Section

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VIBRATIONAL SPECTRA OF SOME SUBSTITUTED TRIVINYLSILANES

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The preparation of trivinylethoxysilane (I), trivinylchlorosilane (II) and trivinyl (2-chloroethoxy) silane (III) and the assignments of various group frequencies of their vibrational spectra are reported. It has been suggested that twisting (γ_{as}) CH_2 mode of vibration can be used to differentiate ethoxy group from 2-chloroethoxy group in technical silicon products.

Key words: Vibrational, Spectra, Trivinylsilane.

MECHANISM OF N-VINYLCARBAZOLE POLYMERIZATION CATALYZED BY MERCURIC CHLORIDE IN CHLOROBENZENE SOLUTION

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The polymerization of N-Vinylcarbazole initiated by mercuric chloride in chlorobenzene solution were done under high vacuum conditions ($\approx 10^{-4}$ torr) at 25°C , and the rates of reactions were followed dilatometrically. All the polymerization reactions gave first order plots after a short acceleration period. The rate of polymerization was found to be proportional to $C_0^m m_0^2$, $C_0 m$ and $C_0^3 m_0 m$ depending on the initial monomer, m_0 and catalyst, C_0 concentration. The polymerization of N-Vinylcarbazole initiated by mercuric chloride in chlorobenzene solution was believed to be stepwise reaction. The molecular weights of all the polymers, determined at complete conversion, were independent of C_0 and increased with the increase in m_0 . Therefore, it was concluded that the chain breaking reactions with monomer were predominant reactions in this polymerization system. It was believed that a charge transfer complex between N-Vinylcarbazole and mercuric chloride was formed, which under favourable conditions dissociated into radical-ions. The radical-cation carrying N-Vinylcarbazole thus formed, successively reacted with another molecule of N-Vinylcarbazole to dissociate radical and cation ends for propagation. Therefore, it was suggested that the polymerization of N-Vinylcarbazole initiated by mercuric chloride in chlorobenzene solution was of radical-cationic in nature.

Key words: Polymerization of N-Vinylcarbazole, Mechanism of N-Vinylcarbazole polymerization.

STUDIES ON DEHYDRO-L-ASCORBIC ACID 2-ARYLHYDRAZONE 3-OXIMES: CONVERSION INTO SUBSTITUTED TRIAZOLES AND ISOXAZOLINES⁺

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(Received July 27, 1988)

The 2-*o*-bromo and 2-*o*-chlorophenyltriazoles of dehydro-L-ascorbic acid (*L-threo*-2,3-hexodiolosono-1,4-lactone) were prepared through dehydrative cyclization of the corresponding 2-arylhydrazone 3-oximes. Upon treatment with liquid ammonia, the triazole ³ afforded the triazole carboxamides ⁴, characterized as the tri- and tetra-acetates. Reaction of 2 with bromine in water, caused its cyclization to the triazole ⁷. Controlled reaction of ² with alkali followed by neutralization, gave the isoxazolines ⁸. Reaction of ² with HBr-HOAc, gave the bromodeoxy derivatives ¹⁰, these were converted into the corresponding triazoles ¹¹ on treatment with acetic anhydride-pyridine.

Key words: Ascorbic acid, Hydrazones.

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SOLVENT EFFECT ON THE KINETICS OF BASE-CATALYSED CYCLIZATION OF 1,5-DIANILINO-2,4-DIPHENYLPENT-1,4-DIENE-3-ONE

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(Received April 6, 1988; revised October 6, 1988)

The kinetics of the base-catalysed cyclization of 1,5-dianilino-2,4-diphenylpent-1,4-diene-3-one to substituted 4-pyridone and aniline has been studied in aqueous dioxan mixtures in the temperature range 25-40°. The wt % of dioxan ranged from 45.73 to 72.59. The concentration of the KOH catalyst was fixed at 0.03 M. The reaction rate showed an increase with increasing dioxan content. The activation energy increased in the same direction. The results were discussed in the light of the thermodynamic parameters of activation. $\Delta G^\ddagger$ increased slightly as the water content increased while $\Delta S^\ddagger$ acquired a more negative value. Changes in $\Delta H^\ddagger$ and $\Delta S^\ddagger$ were attributed to specific solvation effects. The effect of dielectric constant on the reaction rate was discussed.

Key words: Solvent effect, Base catalysed, Heterocyclization.

LIPID COMPOSITION OF *FERULA JAESCHKEANA* – PRESENCE OF AN ODD FATTY ACID

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Ferula jaeschkeana seed oil (8.15%) was examined for its fatty acid composition. The oil was fractionated by TLC into lipid classes; neutral lipids (83.23%) and polar lipids (16.77%). Further fractionation of the neutral lipids resulted into hydrocarbons (4.46%), waxesters (3.90%), triglycerides (36.30%), free fatty acids (11.17%), 1:3-diglycerides (10.10%), 1:2-diglycerides (7.80%), monoglycerides (5.10%) and unidentified fraction (4.40%). Fatty acid composition of the whole oil and its fractions were determined by GC and presence of an odd fatty acid, margaric acid, $C_{17:0}$ was identified.

Key words: Umbelliferae, *Ferula jaeschkeana*, lipid compositions, Margaric acid ($C_{17:0}$)

SOME PROPERTIES OF FLASH EVAPORATED GALLIUM ARSENIDE THIN FILMS

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(Received August 19, 1985; revised September 22, 1987)

Thin films of gallium arsenide were deposited upon glass substrates by the flash evaporation technique at temperatures ranging from room temperature to 350° . The electrical and optical properties of the films depended strongly on substrate temperature. It was observed that the films deposited at about 250° had minimum resistivity. The thermoelectric power was measured as a function of temperature and all the films so far tested were found to be p-type. The optical band gap for the samples deposited at room temperature was 0.92 eV but that of the samples deposited at 250° was 1.33 eV.

Key words: Gallium arsenide, Thin films.

Biological Sciences Section

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REACTION OF THE TWO COMMERCIAL VARIETIES OF BANANA (*MUSA SAPIENTUM*) TO ROOT-KNOT NEMATODE *MELOIDOGYNE INCOGNITA*

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(Received May 30, 1988; revised September 26, 1988)

Two commercial varieties of banana viz. Cavendish Dwarf and William Hybrid were tested for their reaction to root-knot nematode *Meloidogyne incognita*. A test conducted in earthen pots indicates that both varieties are equally quite susceptible to *M. incognita* as they showed galling indices of 3.5 and 3.7 respectively without any statistically significant difference.

Key words: *Meloidogyne incognita*, Banana, Host reaction.

PTEROPODS, SPECIES COMPOSITION AND RELATIVE ABUNDANCE IN NORTHERN ARABIAN SEA

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(Received April 14, 1988; revised October 9, 1988)

A series of surface plankton sampling was done along thirteen transects in the northern Arabian sea bordering Pakistan during January to June 1977. Ten species were collected in the survey. *C. acicula* was found most dominant in frequency of occurrence (number of stations.) as well as in abundance i.e. (number of specimen) encountered. *S. subula* was second ranking in abundance and *L. inflata* was second in occurrence, these three species together constituted 74% of all thecosomes collected.

Key words : Pteropods, Northern Arabian sea, Relative abundance

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BIO-EFFICACY OF FOUR STRAINS OF *BACILLUS THURINGIENSIS* BERLINER AGAINST HAIRY CATERPILLAR *DIACRISIA OBLIQUA* WIK

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(Received October 7, 1986; revised September 22, 1988)

Three commercial preparations of bactospeine (bactospeine WP 16000 IU Ak/mg serotype H-3a3b, bactospeine FC 8500(IU Ak/mg) serotype H-3a3b and bactospeine FC 7500 IU Ak/mg serotype H-7) and a USDA standard strain HD-1-S-1980 (16000 IU/mg) were evaluated in different concentrations against field collected 3rd instar larvae of hairy caterpillar (*Diacrisia obliqua* Wlk.). The HD-1-S-1980 was found to be significantly more effective than to bactospeine preparations against the test insect after three and four days of exposure.

Key words: Bacillus thuringiensis; Bactospeine; Diacrisia obliqua.

EFFECT OF APPLIED P AND Zn FERTILIZERS ON WHEAT AND THEIR RESIDUAL EFFECT ON THE GROWTH AND COMPOSITION OF MAIZE

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(Received February 23, 1988; revised October 5, 1988)

The effect of applied P and Zn fertilizers on wheat and their residual effect on the growth and composition of maize was studied under pot culture conditions. P application increased the dry matter yield of wheat tops and roots but Zn application increased top growth only. Application of P decreased Zn concentration in tops but not in roots. The critical Zn concentration in 62 days old wheat tops appeared to be 10 $\mu\text{g/g}$.

Residual P and Zn was most effective at P_{100} Zn_3 mg/kg level of application for the growth of maize plant. P x Zn interaction was positive in producing dry matter yield of leaf, stem or roots. Higher level of residual P affected the distribution of Zn in different plant parts.

Soil P content showed significant correlation with plant growth of both wheat and maize while soil Zn content had no such relationship. The ratio of P to Zn in soil showed no correlation with crop yield, Zn concentration or Zn uptake and appeared to be less reliable parameter to predict p-Zn disorder in the plant.

Key words: Phosphorus, Zinc, Wheat, Maize.

RELATIVE EFFICIENCY OF CONVENTIONAL AND SLOW RELEASE NITROGEN FERTILIZERS FOR RICE GROWN ON A UDIC HAPLUSTALF

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(Received March 24, 1988; revised October 10, 1988)

Low recovery of fertilizer N during this era of energy crisis is a serious setback to fertilizer management in flooded paddy rice. This resulted into nitrification retardants and slow release N sources. Pakistan is producing 80% of its N fertilizers in the form of urea which is vulnerable to N losses through several pathways under anaerobic conditions prevailing in rice field. Nitrogen fertilizers, Sulphur coated urea (SCU) which releases N slowly, urea super granule (USG) which facilitate deep placement of N and a nitrification retardant, N serve, were compared with split application of prilled urea for rice (IRRI-6) on a silty clay loam (Gujranwala series) under farmer's conditions. Urea applied in three splits produced maximum paddy yield followed by SCU, USG and urea N-serve. Agronomic efficiency and N recovery also followed the same trend.

Application of prilled urea in three equal splits at the time of sowing, tillering and panicle initiation can be practiced for maximum rice production and higher N fertilizer use efficiency.

Key words: Flooded rice, N efficiency, Slow release.

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INFLUENCE OF NITROGEN FERTILIZATION ON GRAIN PROTEIN CONTENT AND NPK CONTENT OF STRAW IN LATE SOWN WHEAT (*Triticum aestivum* L.)

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(Received July 5, 1988; revised October 6, 1988)

A field experiment was conducted to investigate the effect of nitrogen fertilization on grain protein and content of straw of NPK by late sown wheat cultivar. From the observations it was noticed that increase in level of nitrogen, increased the grain protein content. Grain protein content was significantly correlated with amount of nitrogen applied. From the NPK content of straw it was observed that nitrogen fertilization caused increase in nitrogen decrease in content of phosphorus and again increase in content potassium in late sown wheat.

Key words: Nitrogen fertilization, Grain protein, Uptake.

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ANURANS (AMPHIBIA) OF NORTHERN PAKISTAN WITH SPECIAL REFERENCE TO THEIR DISTRIBUTION

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(Received September 7, 1987; revised April 21, 1988)

The present study is based on the collection of anurans made from 33 different localities of northern Pakistan including Federal Capital area, Islamabad. More than 200 specimens belonging to 3 genera and 10 species are described with special reference to distribution. Moreover, a species of *Bufo* and of *Rana*, may be new, are also included.

Key words: Amphibia, Anura, Northern Pakistan.

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CONDITION INDEX OF THE BLUE SWIM CRAB, *PORTUNUS PELAGICUS* L. FROM THE KARACHI COAST

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(Received May 5, 1988, revised October 1, 1988)

The present work reports the edibility or condition index of the crab, (*Portunus pelagicus* L.). Condition index is an approximation of the quantity of edible meat present in the whole animal. Values of condition index were relatively high in both male and female crabs. Condition index in male crabs remained high throughout the year and did not fluctuate as widely as it did in the females. Data also indicate an approximate size of the harvested crab and the seasons when the meat could be taken as maximum.

Key words: Condition index, Crab, Edible, Standard size class, Carapace length.

Technology Section

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DETERMINATION OF SEXAVALENT CHROMIUM FROM THE EFFLUENTS OF VARIOUS ELECTROPLATING INDUSTRIES

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(Received January 20, 1987; revised September 20, 1988)

Sexavalent chromium has been determined from the effluents of some electroplating industries in and around Lahore. It has been found that the amount of this toxic ion in waste waters is quite high. Since this ion is carcinogenic it must be removed from water at all costs. Methods of its removal have also been discussed briefly.

Key words: Sexavalent chromium, Effluents, Electroplating industries.

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STUDIES ON ECONOMIC POTENTIALS OF NEPHELINE SYENITE OF KOGA (SWAT) FOR MAKING COLOURLESS GLASS

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(Received May 22, 1988; revised September 17, 1988)

Six samples of Nepheline syenite collected from Koga area (Swat, NWF) have been investigated to find their suitability for the manufacture of colourless glass. This work involves geology, microscopic study, crushing grinding, grading, chemical analysis, magnet treatment and glass melting. The iron content in the raw samples varied in the range 0.87 to 2.7 % rendering them unsuitable for colourless glass making. After magnetic separation, Fe_2O_3 is reduced (0.06 %) to a level which is acceptable for colourless glass making. Two glass compositions containing Al_2O_3 1.5 % and 4.0 % suitable for container and fiber glass have been melted to produce colourless glass. The results are satisfactory.

Key words: Nepheline, Glass raw material, Nepheline for glass making.

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PREPARATION AND NUTRITIONAL EVALUATION OF HIGH PROTEIN BREAD AND BISCUITS CONTAINING SOYFLOUR

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(Received October 8, 1985)

Trypsin inhibitor free soy flour was incorporated in bread and biscuits and their nutritional values determined which showed that bread and biscuits containing soy flour were better in all respects than those made out of wheat flour alone.

Key words: Soyflour containing bread.

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SAPONIFICATION CATALYSTS

Part I. Organic Catalytic Activity of Carvacrol and Chlorophenol

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(Received October 25, 1987; revised October 5, 1988)

A simple and rapid method for saponification has been studied, using carvacrol and *p*-chlorophenol as catalysts under ambient conditions.

Key words: Saponification, Catalytic activity, Carvacrol, Chlorophenol.