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Physical Sciences Section

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A STUDY OF ELECTRICAL PROPERTIES OF POLY(VINYL-ALCOHOL) CONTAINING METALS

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(Received November 30, 1992; revised May 8, 1993)

Films ($\approx 350 \mu\text{m}$) of poly (vinyl -alcohol) composites, containing copper (Cu), aluminium (Al), and iron (Fe), metallic powder very fine, were prepared by casting method. No drastic change in the main transition temperature was observed by differential thermal analysis (DTA). The electrical resistivity, dielectric constant and dielectric loss ($\tan\delta$) were measured at temperature range from room temperature up to 260° . The values of activation energy which estimated from the resistivity curves tell us that the hopping conduction is the predominant for these samples at that temperature region. The result of the dielectric constant does not obeys Debye's theory, this behaviour attributed to space charge polarization due to lattice defect. The result of dielectric loss ($\tan\delta$) against temperature shows that there are two relaxation processes, α -relaxation at $T=T_g$ and β -relaxation at T below T_g and the addition of metals as a dopant reduce the glass transition temperature.

Key words: Poly(vinyl-alcohol), Metals, Differential thermal analysis.

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THE STUDY ON VISCOSITY OF CINNAMIC AND MANDELIC ACIDS IN PURE AND MIXED SOLVENTS

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The viscosity values, coefficient A and B for cinnamic acid solutions and mandelic acid solutions in various compositions of methanol and water have been determined at 298 K, 303 K, 308 K and 313 K. The positive values of coefficient B calculated by Jones-Dole equation show that there is an increase with the increase of methanol content at different temperatures. The energy of activation, free energy of activation and entropy of activation, of acid solutions in pure solvents and in 54% aqueous methanol have also been determined at 298 K, 303 K and 313 K.

Key words: Viscosity, Viscosity coefficient, Activation parameters.

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EFFECT OF A SYNTHETIC CHOCOLATE COLOURANT AND A FLAVOURANT ON SOME GLYCOLYTIC ENZYME SYSTEMS OF ALBINO RATS

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(Received April 29, 1992; revised April 29, 1993)

The effect of administering a synthetic chocolate colourant, a chocolate flavourant and a mixture of both for 28 days period on some glycolytic enzyme activities and of albino rats, their metabolite contents in some subcellular fraction of liver, brain and kidneys were studied. The activities of cytoplasmic and mitochondrial hexokinase and pyruvate kinase in liver, brain and kidneys increased by the synthetic food additives but the activity of lactate dehydrogenase was decreased. A significant decrease in pyruvate and lactate contents of the organ homogenates was seen. Administration of these food additives was accompanied by an increase in blood glucose level and decrease in liver glycogen content. Mixture of the two food additives produced more pronounced effects than the individual ones.

Key words: Synthetic chocolate colourant and a flavourant, Glycolytic enzyme.

PYROLYTIC PREPARATION OF AMORPHOUS SILICA FROM RICE HUSK

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(Received April 2, 1991; revised May 11, 1993)

Preparation of maximum amorphous silica from local rice husk was attempted under controlled heat treatment. A number of batches were pyroprocessed in an electric furnace at 450° - 600°, for 2 - 12 hrs. The resulting ash specimens were analysed chemically and those found with higher silica content studied through XRD. Minor conversion of amorphous rice husk silica to α -quartz phase was observed as a result of heat treatment. The thermal treatment of rice husk at 500° for 8 hrs., yielded the highest percentage of amorphous RHA silica.

Key words: Rice husk, Thermal treatment, Amorphous silica.

Short Communication

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**Synthesis of Some Diaroylhydrazines Bearing
A Pyrazine Nucleus**

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Biological Sciences Section

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TWO NEW SPECIES OF THE GENUS *PLAUTIA* STÅL (HETEROPTERA: PENTATOMIDAE) FROM THE MALAYAN SUBREGION

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(Received December 30, 1992; revised June 17, 1993)

Revision of the genus *Plautia* Stål from the Malayan subregion includes four species of which two are new to the science. The genus *Plautia* is redescribed with special reference to most reliable characters like metathoracic scent apparatus and male and female genitalia. A key to the species is also provided.

Key words: Malayan subregion, Heteroptera, Pentatomidae, *Plautia*.

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EFFECT OF FOLIAR APPLICATION OF LEAD ON THE GROWTH AND YIELD PARAMETERS OF WHEAT

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Foliar application of lead nitrate solution in four different concentrations resulted in decrease in various growth indices and yield parameters of wheat over the control. The rate of decrease was gradually higher with increasing concentrations of lead nitrate and the maximum effect was noticed under highest dose.

Key Words: Foliar spray, Lead nitrate, Wheat.

DIALLEL ANALYSIS FOR COMBINING ABILITY IN RICE

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(Received May 19, 1992; revised August 11, 1993)

A half diallel analysis of combining ability involving four rice varieties/lines (Basmati 370, Basmati 385, 4048 and Basmati 198) was studied for grain yield, plant height, number of tillers per plant, panicle length, number of spikelets per panicle, number of grain per panicle, percent filled spikelets, panicle weight and spikelet density. General (GCA) as well as specific combining ability (SCA) mean squares were significant for all traits except percent filled spikelets and panicle weight for which GCA mean squares were significant. The mean varietal performance was linearly related to their GCA values for grain yield and yield components. Basmati 385 was found good combiner for grain yield and some of its major components. Basmati 198 and 4048 were poor combiners for plant height. Basmati 370 was the good combiner for percent filled spikelets. Based on mean performance coupled with SCA effects of the crosses and varietal GCA effects, crosses viz. Basmati 370 x Basmati 385, Basmati 370 x Basmati 198, Basmati 385 x 4048 and 4048 x Basmati 198 could be recommended for pure line development using pedigree method.

Key words: Rice, Genetic, Combining ability, Diallel.

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SURVEY AND CONTROL OF PHYTOPARASITIC NEMATODES OF TURFGRASSES IN PAKISTAN

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(Received May 21, 1992; revised May 13, 1993)

A survey was conducted to evaluate the losses caused by nematodes associated with turfgrasses. For the eradication of phytoparasitic nematodes, an experiment was conducted in randomized complete block design, in the experimental field, Applied Biology and Marine Resources Research Centre, PCSIR Laboratories Complex, Karachi. The population of *Helicotylenchus multicinctus*, (Cobb, 1893) Golden, 1956, was significantly reduced in the plots treated with Tenekil followed by DBCP and Carbofuran. No phytotoxicity was observed. Sprigs treated with Tenekil grew vigorously as compared to control. The population was reduced below alarming level as compared to control.

Key words: Tenekil, DBCP carbofuran, *H. multicinctus*.

VARIATION IN JUICE QUALITY IN TOP BORER *SCIRPOPHAGA NIVELLA* (FABR.) INFESTED CANE

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(Received January 29, 1992; revised May 23, 1993)

Five sugarcane varieties two each from Barbados and Tando Jam and one from Lyallpur (BL-19, BL-4, Triton, PR-1000 and L-113) were planted in six replicated Randomized Complete Block Design during 1986-87 and 1987-88. TSS, sucrose, CCS, glucose and fibre content percentages were affected significantly by top borer infestation. Variety L-113 was significantly more susceptible to top borer, followed by BL-19 and BL-4 respectively. It was further estimated that top borer infested cane reduced 6.46% TSS, 5.05% sucrose, 6.63% CCS, 15.19% glucose but significantly increased the fibre content percent (8.72). It is suggested that sugarcane crop may be sprayed with suitable insecticide for obtaining better juice quality and quantity. Furthermore variety L-113 is recommended for commercial planting.

Key words: Sugarcane, Juice quality, Top borer, Infestation.

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IMPROVING DIGESTIBILITY OF BIOGAS PLANT WASTE

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(Received August 21, 1990; revised February 2, 1993)

Biogas plant waste (BPW) was treated with 1-5% (w/w) urea or aqueous ammonia and 20% added water for 30 days at ambient temperature in a confined system. Under these conditions, the *in vivo* dry mater digestibility of BPW increased from 30.13 to 42.25% and 45.12% on treatment with 4% urea or 3% aqueous ammonia respectively. 50.34 - 64.93% increase in non-proteinous nitrogen of BPW was also observed after both the treatments.

Key words: Biogas plant waste, Urea, Ammonia, Digestibility.

Short Communication

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Utilization of Biogas Effluent as Manure

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Technology Section

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THE STRENGTH EFFECT OF MINERAL ADMIXTURES ON SAND-LIME PRODUCTS

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(Received November 8, 1992; revised August 11, 1993)

Different mineral admixtures, e.g. china-clay, Na_2CO_3 , $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$, slate, fire-clay and Na_2SiO_3 have been incorporated in the hydrothermal reactions of sand-lime in order to know the strength effect on the products. The compressive strength and mineralogy of the various mixtures were determined after they had been autoclaved at a steam pressure of 0.1 MPa (100°) for 6, 12, 18, 24 and 48 hrs. It has been observed that the maximum compressive strengths are recorded when china-clay, slate, Na_2SiO_3 are used while Na_2CO_3 , $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ and fire-clay do not increase the strength markedly, though the later has a composition similar to that of china-clay.

Key words: Strength, Mineral admixtures, Sand-lime.

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EVALUATION OF ECONOMIC POTENTIAL OF INDUSTRIAL MINERALS OF PAKISTAN USING LORENZ MODEL

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Economic potential of industrial minerals and rocks of Pakistan have been evaluated by using Lorenz (1985) model. Based on the preconditions a list of priorities have been deduced. Top six industrial minerals have been discussed with reference to their reserves, production, present infrastructure, uses and export potential.

Key words: Lorenz model. Industrial mineral. Economic potential.