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Physical Sciences

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CARBONACEOUS DEPOSITS ON NAPHTHA REFORMING CATALYSTS

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Carbonaceous deposits on naphtha reforming catalysts play a decisive role in limiting process performance. The deposits negatively affect catalyst activity, selectivity, and the production cycle of a semi regenerative reformer. The magnitude of negative effect of those deposits is directly proportional to their amount and complexity. Investigations on used reforming catalysts samples reveal that the amount and type (complexity of the chemical nature) of carbonaceous deposits are directly proportional to the catalyst life on stream and the severity of operating conditions. In addition, the combustibility behavior of carbonaceous deposits on the catalyst samples taken from different reformers are found to be different. Optimal carbon removal, for in situ catalyst regeneration, requires that specific conditions be developed, based on the results of well designed and properly performed investigations of the amount and type of carbonaceous deposits.

Key words: Carbonaceous, Naphtha, Reforming catalysts.

FREE RADICAL TERPOLYMERIZATION OF METHYL METH ACRYLATE N-BUTYL ACRYLATE AND 2-ETHYL HEXYLACRYLATE

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Free radical terpolymerization of methylmeth acrylate (MMA), n-butyl acrylate (BA) and 2-ethyl hexyl acrylate using methyl ethyl ketone as solvent was accomplished at 60 °C. It was observed that all the monomers participated in the reaction simultaneously and formed terpolymer in all monomeric ratios. The product, apart terpolymer also contained small quantity of homopolymers of the monomers used in the reaction. Terpolymers of 175000 - 590000 were obtained which were found to be viscous, highly tacky, soft at room temperature and soluble in most of the organic solvents. The refractive index of terpolymer samples was found to be 1.4945 - 1.4946. This terpolymer may be used in the modification of chlorinated rubber as the film forming agent on leather.

Key words: Free radical, Terpolymerization, Homopolymers

SPECTROPHOTOMETRIC DETERMINATION OF PALLADIUM (II)

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(Received 30 October 1997; accepted 2 August 1999)

Chlorpromazine tetrabromopalladium (II), promethazine tetrabromopalladium (II), chlorpromazine tetraiodo palladium (II) and promethazine tetraiodopalladium (II) were prepared and characterized by IR, VIS spectra and elemental analysis. A sensitive, inexpensive and rapid spectrophotometric method for the determination of palladium (II) has been elaborated. The method allows determination of palladium (II) in the range of 10-100 $\mu\text{g m}^{-1}$. It was checked by the determination of palladium (II) in Degussa's catalyst (E-207 R).

Key words: Palladium (II), Chlorpromazine palladium (II) complexes, Promethazine-Palladium (II) complexes, Spectrophotometry.

A SOLVENT-EXTRACTION STUDY OF THE THERMODYNAMICS OF *m*-IODOANILINE AND THE PROTON IONIZATION OF THE *m*-IODOANILINIUM ION

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(Received 14 February 1996; accepted 26 August 1999)

The distribution coefficients of *m*-iodoaniline between a petroleum ether fraction and aqueous sodium chloride solutions were determined at different temperatures. The activity coefficients of the amine in aqueous sodium chloride solutions, and the salting coefficients were determined at different temperatures. The results conformed with the Debye theory of salt effects. The proton ionization constant in terms of molalities (K_m), the thermodynamic proton ionization constant of the aminium ion (K_o), the basic dissociation constant of the amine (K_b)_m, the basic dissociation constant of the amine in pure water (K_b)_o, the standard free energy change ΔG° , the standard enthalpy change ΔH° , and the standard entropy change ΔS° were evaluated for the proton ionization of the *m*-iodoanilinium ion.

Key words. Thermodynamics, Proton ionization, *m*-Iodoanilinium ion.

POPULATION DYNAMICS OF *COILIA DUSSUMIERI* FROM THE KUTUBDIA CHANNEL OF BANGLADESH COASTAL WATER

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Elefan I and Elefan II were used to estimate the population parameters and length-frequency-based cohort analysis of *Coilia dussumieri*, collected from Kutubdia channel of Bangladesh coastal water. The Von Bertalanffy growth parameters L_{∞} and K for the species were 16.80 cm and 1.30 year^{-1} , respectively. The annual rate of M , F and Z were found to be 2.49, 2.30 and 4.79, respectively. The exploitation rate (E) was estimated as 0.48. This fish was recruited in the fishery during April-June and August-October. Peaks appeared in the months of May and September. $E_{\max}$ was found to be 0.602. From the analysis *Coilia dussumieri* showed below optimum fishing pressure (i.e. $E < 0.50$) in the coastal water of Bangladesh.

Key words: Population dynamics, *C. dussumieri*, Kutubdia channel, Bangladesh coast.

PRELIMINARY MEASUREMENTS OF FLUIDITY AND ACTIVATION PARAMETERS OF FLOW OF SOME NIGERIAN VEGETABLE OILS IN KEROSENE DILUENT

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The viscosities of cotton seed and walnut seed oils in kerosene diluent have been examined as a function of temperature. The decrease in viscosity values with increase in temperature has been explained in terms of thermal vibration resulting in the weakening of intermolecular forces of the oils. Plots of viscosity versus absolute temperature show curvature whereas the plots of logarithm of viscosity against inverse absolute temperature show linearity for all systems. The activation energy of viscous flow ΔE_v , the latent heat of vapourization L_v and the molar volume of the oil V_m , were evaluated from that plots: ΔE_v and L_v decrease with increase in the volume of kerosene, whilst V_m increases. The fluidity, which is a measure of the degree of entanglement of the oil molecules, is found to be proportional to the volume occupied by kerosene. It appears that the addition of kerosene uncoils the entangled and aggregated oil molecules.

Key words: Fluidity, Activation parameters, Vegetable oils.

VOLATILES OF *OCIMUM BASILICUM* (LOCAL) AT DIFFERENT PHASES OF PLANT GROWTH

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(Received 18 January 1997; accepted 6 October 1999)

The essential oil of *Ocimum basilicum* (Local) (0.27-0.29%) obtained by hydrodistillation of the plant at various phases was characterised by GC/MS. Among the 22 compounds identified Linalool (83.0-87.1%), 1:8 Cineole (3.2-4.7%) and Camphor (0.4-0.5%) predominated, while other constituents were either in small quantities or in traces.

Key words: *Ocimum basilicum*, Linalool, Monoterpenes.

Biological Sciences

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LIPID COMPONENTS FROM THE SEEDS OF *SAPINDUS MUKOROSI* L

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Seed lipids of *Sapindus mukorossi* L. were classified and fatty acid composition was determined. The fatty acid composition of the total lipids was C_{12:1} (0.3%), C_{14:0} (traces), C_{16:0} (4.6%), C_{18:0} (traces), C_{20:0} (3.5%), C_{18:1} (56.0%), C_{18:2} (5.8%), C_{18:3} (1.4%) and C_{20:1} (28.4%). The hydrocarbon fraction contained main components pentacosane C₂₅H₅₂ with 11.75% and hentriacontane C₃₁H₆₄ with 17.20%. Odd number *n*-alkanes were predominant (70.95%).

Key words: Lipids, Sapindaceae, Hydrocarbons, Hentriacontane (C₃₁H₆₄).

ADAPTABILITY OF SEMIDWARF SPRING WHEAT IN SINDH PROVINCE

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(Received 17 December 1997; accepted 4 August 1999)

The improvement of yield stability in spring wheat is a major plant breeding objective. The yield of ten spring wheat genotypes were determined for three seasons (1992-1994) at nine sites in Sindh province. The genotypes environments interaction was highly significant ($P \leq 0.01$). Heterogeneity between regression for genotypes ($P \leq 0.05$) and deviation from regression ($P \leq 0.01$) were significant. Genotype SI88123 had the highest mean yield over environment and was generally adapted to all the environments. WRS-01, SI88155 and SI88231 had lower mean yield over environments.

Key words: Wheat genotypes, Environmental factors, Yield, *Triticum aestivum* L.

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Key words: Wheat genotypes, Environmental factors, Yield, *Triticum aestivum* L.

STUDIES OF LIPASE AND PHOSPHOLIPASE ENZYMES OBTAINED FROM THE MEAL OF CITRULLUS VULGARIS OF THE CUCURBITACEAE FAMILY

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(Received 5 October 1995; accepted 18 August 1999)

The lipase and phospholipase extracted from the meal of mature seeds of *Citrullus vulgaris* showed optimum activity at 40°C and pH 7 in aqueous media. *N*-heptane was found to be the most satisfactory solvent media to maximize activities of lipase and phospholipase. The activity of lipase extracted from germinated seeds increased with the stage of seeds development but was found to be reverse for the phospholipase activity.

Key words: *Citrullus vulgaris*, Lipase, Phospholipase.

WEED INFESTATIONS IN BORO RICE IN THE HAOR AGRO-ECOSYSTEM AS AFFECTED BY WEEDING REGIME AND UREA TOP DRESSING

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(Received 18 December 1993; accepted 11 September 1999)

Phytosociology of weeds was studied in boro (winter) rice in haor area in relation to weeding regime and urea top dressing through a weed survey. 16, 18 and 13 weed species were recorded in the fields receiving three different regimes of weeding. *Scirpus juncoides* was the most dominant species. A wide range of dissimilarity in weed infestation was observed in those fields. The fields receiving 15-20, 8-14 and 0-7 kg ha⁻¹ of urea as top dressing recorded 14, 21 and 17 weed species respectively. *Scirpus juncoides* was also the most dominant weed species. A wide range of dissimilarity and severe weed infestation was observed in the fields receiving urea as top dress.

Key words: Weed survey, Boro rice, Relative abundance, Hoar area.

PHENOTYPIC STABILITY IN *GOSSYPIUM HIRSUTUM* L. FOR YIELD, GINNING OUT TURN AND STAPLE LENGTH IN MULTAN COTTON ZONE

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(Received 14 February 1994; accepted 16 September 1999)

Seed cotton yield, ginning out turn percentage and fibre length data from six locations in Multan Zone were evaluated for stability. All these cultivars under study were stable for ginning out turn percentage in these environments. S-12, MNH93 and B557 were identified as the most stable for yield performance. Utilisation of MNH321 was recommended in hybridization to have better stability for ginning out turn percentage. S-12 was identified to be the most stable for staple length. In conclusion for better stability in yield of seed cotton, ginning out turn percentage and staple length, utilisation of MNH93, B557, MNH321 and S-12 in the breeding programmes are recommended.

Key words: *Gossypium hirsutum*, Yield, Ginning out turn, Staple length.

IMPROVEMENT IN THE NUTRITIVE VALUE OF RICE STRAW BY BIODEGRADATION WITH *PLEUROTUS* SPP

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(Received 2 January 1995 ; accepted 27 September 1999)

Biodegradation of rice straw with *Pleurotus* spp. enhanced its nutritive value. The protein contents increased from 1.7 to 9.40% and crude fibre, cellulose and lignin decreased from 32.6 to 17.4%, 35.0 to 18.2% and 10.9 to 8.5%, respectively. Reticulo-rumen digestibility of dry matter, cellulose, minerals and protein contents of rice straw, biodegraded by different *Pleurotus* spp., was enhanced from 37.0 to 46.8%, 49.9 to 61.0%, 20.1 to 29.3% and 31.4 to 43.9%, respectively over the non-degraded rice straw.

Key words: Rice straw, Biodegradation, *Pleurotus* spp.

NEGATIVE PURIFICATION OF THE PLASMA MEMBRANE ATPASE OF *RHODOTORULA GLUTINIS*

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The ATPase from the aerobic yeast *Rhodotorula glutinis* was purified by removing undesirable proteins. Four different reagents proved effective in removing about 50% of undesirable proteins (peripheral membrane and/or cytoplasmic proteins that might be trapped during membrane isolation). The plasma membrane suspensions were treated with KCl (2M), followed by lysophosphatidylcholine (0.001 %, wv⁻¹), then Triton (0.02%, wv⁻¹) and finally deoxycholate (4 mM). This resulted in removal of 50 % of the proteins while increasing the ATPase activity 20% above the control level, resulting in about 2.5-fold purification.

Key words: ATPase, *Rhodotorula glutinis*, Plasma membrane.

EFFECT OF DIFFERENT CONCENTRATION OF KCl ON CONTRACTION PERFORMANCE OF GASTROCNEMIUS MUSCLE OF *UROMASTIX HARDWICKII*

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(Received 9 October 1997; accepted 30 September 1999)

This paper deals with changes in muscular activity of gastrocnemius muscle of *Uromastix hardwickii* for reptilian buffer having different concentration of KCl. Contraction time, half relaxation time, peak duration time, maximum rate of rise of tension and isotonic tension have been selected as the parameters for evaluation of muscle contraction performance. These studies confirm that, maintenance of K ion to the normal value both in the extra and intra cellular fluid is necessary, because its decrease and increase from the normal value is dangerous for life.

Key words: KCl, Gastrocnemius muscle, *Uromastix hardwickii*.

EFFECT OF DIFFERENT CONCENTRATION OF KCl ON CONTRACTION PERFORMANCE OF GASTROCNEMIUS MUSCLE OF *UROMASTIX HARDWICKII*

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(Received 9 October 1997; accepted 30 September 1999)

This paper deals with changes in muscular activity of gastrocnemius muscle of *Uromastix hardwickii* for reptilian buffer having different concentration of KCl. Contraction time, half relaxation time, peak duration time, maximum rate of rise of tension and isotonic tension have been selected as the parameters for evaluation of muscle contraction performance. These studies confirm that, maintenance of K ion to the normal value both in the extra and intra cellular fluid is necessary, because its decrease and increase from the normal value is dangerous for life.

Key words: KCl, Gastrocnemius muscle, *Uromastix hardwickii*.

Short Communication

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**INFLUENCE OF AQUEOUS LEAF EXTRACT
OF PURPLE NUTSEDGE (*CYPERUS
ROTUNDUS* L.) AND NaCl ON GERMINA-
TION AND SEEDLING GROWTH OF WHEAT
(*TRITICUM AESTIVUM* L.)**

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Short Communication

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**PHYSICO-CHEMICAL PROPERTIES OF
STARCHES FROM SOME NIGERIAN CUL-
TIVARS OF THREE-LEAVED YAM, *Di-
OSCOREA DUMETORUM* (KUNTH) PAX**

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Technology

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PRODUCTION OF CELLULOSE ACETATE FROM JUTE STICKS

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A method for the production of cellulose acetate from the jute sticks, *Corchorus capsularis*: late variety -1 (CVL - 1), Fulguni Tossa (0-9897), and BJC 718, was described. Alphacelluloses were isolated from the jute sticks by a standard method. The method of acetylation of the alphacelluloses was then standardised by using acetic anhydride (310% on the dry weight of the material, i.e. alphacellulose, on the weight of material, o.w.m.), glacial acetic acid (410% o.w.m.) and sulphuric acid under the specified conditions. The yields of cellulose acetate were found to be: CVL-1: 55.80%, 0-9897: 45.60% and BJC 718: 63.74% on the dry weight basis on the respective jute sticks. The yields were compared with the previous results and found to be greater in the present investigation. The degree of substitution (D.S) for each of the three acetates was found to be around two.

Key words : Jute sticks, Cellulose acetate, Acetylation, Yield.

FERTIGATION TECHNOLOGY FOR IMPROVED PHOSPHORUS USE EFFICIENCY IN WHEAT

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(Received 15 September 1997; accepted 1 July 1999)

The conventional method of broadcast and incorporation of P fertilizer was compared and evaluated with "fertigation" technology using the phosphatic source SSP and DAP at 22 and 44 kg P ha⁻¹ rate of application. Grain yield and total P uptake by Pak-81 wheat was found to be similar irrespective of source, but rate and method of application affected them differently. Applying P by fertigation resulted in improved P fertilizer efficiency as well as agronomic efficiency compared to its broadcast application at sowing. Application of half of P rate by fertigation produced grain yield and total P uptake equivalent to that obtained by full P rate applied by the conventional method indicating the possibility of substantial saving in P fertilizer input. Thus for optimum yield and increased efficiency, fertigation technology could be economically used for both P fertilizer sources.

Key words: Fertigation, P uptake, P application, Wheat.

HYDROMETALLURGICAL PROCESSING OF COPPER ORE

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A hydrometallurgical method has been proposed for the 99% extraction and recovery of copper from indigenous copper ore using 5% solutions of trioctylamine in benzene after acid leaching of the ore with 7.5M HCl. Various parameters, such as, the effect of temperature, acid concentration and digestion time have been optimised. The process developed has been made more cost effective by recycling used solvent.

Key words: Hydrometallurgy, Copper, Trioctylamine, Solvent extraction.