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Activation Parameters of Butane and Decane Sulfonic Acids (Na-salt) in Pure and Mixed Solvents at Different Temperatures by Viscosity Measurements

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The viscosities of the various solutions of 1-Butane Sulfonic Acid (Na-Salt) and 1-Decane Sulfonic Acid (Na-Salt) in pure and mixed solvents have been measured at four temperatures 298, 303, 308 and 313 K. The measured data have been used to calculate viscosity coefficients of Jones-Dole equation. These coefficients have been found to be dependent on temperature and solvent composition. The positive values of B coefficients for butane and decane sulfonic acids (Na-salt) in pure and mixed solvents led to the conclusion that ion-solvent interaction is not so strong. Activation parameters such as energy of activation (E_η*), free energy change of activation (ΔG^*) and entropy change of activation (ΔS^*) have been evaluated at different temperatures in pure and mixed solvents.

Key words: Viscosity, Jones-Doles parameters, Activation parameters, Ion-ion and ion-solvent interactions.

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THERMODYNAMIC STUDY OF STRONG ELECTROLYTE IN MIXED SOLVENT SYSTEM FROM CONDUCTANCE AND VISCOSITY METHODS

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The viscosity and ionic conductivity of nickel chloride in 50% (v/v) methanol water mixture at different temperatures have been studied. The conductivity data have been analysed by various equations to evaluate molar conductivity at infinite dilution λ^{o}_{m}, Walden constant, equilibrium constant and dissociation constant at different temperatures. The viscosity data have been found to fit in the Jones-Dole equation and the additive character 'B' has been found to depend on the composition of solvent and temperature. Activation parameters have also been evaluated.

Key words: Viscosity, conductivity, Jones-Dole coefficients, Walden constant, Equilibrium constant.

Pak J Sci Ind Res 2000 43(1) 13 - 18

CHARACTERIZATION OF SPRING WATERS OF MURREE REGION

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Ten samples of water from springs located in different parts of Murree region of Pakistan were collected and evaluated for the drinking quality. The chemical analysis showed that all samples are of the same type and are fit for drinking, domestic or industrial purposes as these fall within the WHO permissible limits of drinking water. Two samples were better than others due to low hardness and alkalinity whereas one sample had the highest hardness and alkalinity.

Key words: Spring water, Murree region, Chemical composition.

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ENZYMIC DEGRADATION OF HIGH MOLECULAR WEIGHT CULTURE FILTRATE ELICITOR (POLYSACCHARIDE) OF *COLLETOTRICHUM LINDEMUTHIANUM**

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Attempts were made to establish enzymatic procedure which may selectively degrade polysaccharide obtained from culture filtrate of *Colletotrichum lindemuthianum* to produce elicitor active fragments.

Key words: Elicitor, *Colletotrichum lindemuthianum*, Enzymic degradation.

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FATTY ACID AND LIPID COMPOSITION OF *SESAMUM INDICUM* DC

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Sesamum indicum DC (sesame) seeds contained moisture 4.7% and lipids 53.9%. The lipids were fractionated into neutral lipids (96.3%) and polar lipids (3.7%) by thin layer chromatography. The neutral lipids identified were hydrocarbons (0.3%), sterol esters (0.7%), triacylglycerols (80.6%), free fatty acids (2.1%), 1,3-diacylglycerols (3.5%), 1,2-diacylglycerols (4.7%), sterols (1.9%) and monoacylglycerols (2.5%). The polar lipids were phosphatidylethanolamines (0.6%), phosphatidylcholines (1.3%), lysophosphatidylethanolamines (0.4%), lysophosphatidylcholines (0.5%) and phosphatidlinositols (0.9%). The fatty acids range of all the esterified lipids was ($C_{12:0}$-$C_{20:0}$) showing higher percentages of saturated fatty acids except in triacylglycerols. The major fatty acids were palmitic, stearic, oleic and linoleic acids.

Key words: *Sesamum indicum* DC, Lipids, Fatty acids, Triacylglycerols.

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EFFECT OF CARBON AND NITROGEN SOURCES ON ACETONE AND BUTANOL PRODUCTION BY A LOCAL STRAIN OF *CLOSTRIDIUM ACETOBUTYLICUM*

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The role of carbon and nitrogen sources on the production of acetone and butanol by a local strain of *C. acetobutylcium* was investigated. Molasses was found to be superior as compared with the other tested mono di and polysaccharides. The highest solvent yield (17.37 g l^{-1}) was obtained with a culture medium containing 140 g l^{-1} molasses. $(NH_4)_2SO_4$ proved to be the best inorganic nitrogen source whereby a total yield of 17.7 g l^{-1} solvents were obtained at 2 g l^{-1} salt level. Among the different organic nitrogen soures tested, rice bran and corn bran mixture (5 g l^{-1} each) proved to be the best, where by 18.56 g l^{-1} of total solvents were obtained.

Key words: Molasses, Polysaccharides, *Clostridium acetobutylicum*.

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SCREENING OF FRESH ANIMAL MILK FOR LEAD CONTAMINATION

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(Received 7 September 1998, accepted 16 August 1999)

Fresh milk samples of buffalo, goat and cow from different urban and rural locations falling within and outside the proximity of the highways of Punjab and NWFP were analysed for lead using the atomic absorption method. The possibility of anthropogenic contamination of lead in the milk samples was explored. Lead concentration of varying levels was found in the milk of animals habitating near highway locations in both the provinces. In general, maximum lead level was found in the goat milk, while the minimum in buffalo milk. The average concentration were 0.082, 0.098 and 0.173 mg l^{-1} for near highway and 0.062, 0.044 and 0.142 mg l^{-1} for off-highway animals in the milks of buffalo, cow and goat, respectively. The provincewise comparison showed more contamination of lead in the milk of animals from NWFP. Compared with international standards, the local milk was found unsafe in terms of lead content.

Key words: Lead in milk, Animal milk analysis, Milk contamination.

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PYRAZOLE AROYL HYDRAZONES AS LIGANDS: COMPLEXES OF 1,3-DIPHENYLPYRAZOLE -4-CARBOXALDEHYDE 2-CHLOROBENZOYLHYDRAZONE WITH Fe(III), Co(II), Ni(II), Cu(II), Zn (II), Cd(II), Hg(II), Sn(II), Bi(III) AND Pb(II)

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The complex formation process of 1,3-diphenylpyrazole -4-carboxaldehyde -2-chlorobenzoyl-hydrazone with different transition and non transition metals were investigated and complexes have been characterized through their metal analysis and by applying spectrophotometric techniques. Job's continuous variation method has been used to calculate the stability constant and stoichiometry of the complexes. The mode of complexation has been studied with the help of infra-red technique. A proposed structure of the complexes involving co-ordination through nitrogen and oxygen of the hydrazone moiety with different metals has been represented.

Key words: Pyrazole, Carboxaldehyde, Chlorobenzoyl hydrazone, Metal complexes, Spectrophotometric techniques.

Biological Sciences

Pak J Sci Ind Res 2000 43 (1)42-45

EFFECTS OF ENTOMOPATHOGENS ON ALBINO MICE

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(Received 30 June 1998, accepted 30 September 1999)

The safety of three species of entomogenous fungi *Tolypocladium cylindrosporum* (Gams), *Verticilium lacanii* (Zimm.) Viegas and *Paecilomyces fumosa-roseus* (Wize.) Brown & Smith was tested on laboratory mice. Acute oral dosages of 4.9 x 10^8 spores/mouse for *T. cylindrosporum*, 5.54 x 10^8 spores/mouse for *V. lacanii* and 4.5 x 10^8 spores/mouse for *P. fumosa-roseus* were administered for two weeks experimental period. No recoveries of the target organisms were recorded from any of the tested animals and there were no significant differences in terms of body weight, food and water consumption and blood counts. No histopathological changes were observed in liver and kidney on microscopic examination.

Key words: Murine safety, Entomogenous fungi, Albino mice.

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POSSIBLE MECHANISM OF ANTIHYPERGLYCEMIC EFFECT OF *AZADIRACHTA INDICA* LEAF EXTRACT: PART V

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Effect of *Azadirachta indica* leaf extract on adrenoreceptor blocking agents (propranolol and phentolamine) on serotonin inhibition in glucose mediated insulin release in rat pancreas was studied *in vitro* to elucidate the possible mechanism of antihyperglycemic effect of *A. indica* leaf extract. *A indica* leaf extract and phentolamine block significantly ($P<0.05$) the inhibitory effect of serotonin on insulin secretion mediated by glucose.

Key words: *A. indica*, Antihyperglycemic activity, Adrenergic blocking agents.

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ANTIPYRETIC AND ANALGESIC ACTIVITY IN CRUDE ETHANOLIC EXTRACT OF *CALENDULA OFFICINALIS* LINN

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Crude extract of *Calendula officinalis* Linn. exhibited significant antipyretic (74.95% inhibition) and analgesic (27.42% inhibition) effects at a dose of 300 mg kg^{-1} 40 mg kg^{-1} respectively as compared to standard i.e. acetyl salicylic acid which exhibited 50.5% and 11.3% respectively. The extract not only reversed the induced hyperthermia but also affect the normothermia in rats. A dose of 20 mg kg^{-1} crude extract was found to be equipotent in its analgesic action to 40 mg kg^{-1} of acetyl salicylic acid. The extract was found to be non-toxic and showed a wide margin of safety through oral route.

Key words: *Calendula officinalis*; Antipyretic; Analgesic activity.

Pak J Sci Ind Res 2000 **43** *(1) 55-59*

SOME ASPECTS OF POPULATION DYNAMICS OF *EXOPALAEMON STYLIFERUS* FROM BANGLADESH COAST

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Elefan I and Elefan II were used to estimate population parameters in *Exopalaemon styliferus* from length-frequency data collected from Kutubdia channel of Bangladesh Coast. The L_∞ and K were 11.21 cm and 2.20 per year respectively. The annual rate of natural mortality, fishing and total mortality were 3.94, 4.57 and 8.57, respectively. The rate of exploitation (E) was 0.54. The mean length at first capture (Lc) was estimated as 6.276 cm. The shrimp was recruited in the fishery during March-May and July-October. Peak recruitment took place during April and September. Emax was found 0.859. This study shows some over fishing of *Exopalaemon styliferus* (E> 0.50) in the Kutubdia Channel of Bangladesh coastal water. The length-weight relationship ($W=0.00359TL^{3.184}$) was studied. The asymptotic weight was calculated as 7.889g.

Key words. Population dynamics, *Exopalaemon styliferus*, Kutubdia Channel, Bangladesh coast.

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Technology

PREPARATION OF HYDROGELS BASED ON PVA-ACRYLIC ACID USING N,N-METHYLENEBISACRYLAMIDE AS CROSSLINKING AGENT

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A transparent hydrogel based on PVA-acrylic acid using N,N-methylenebisacrylamide as crosslinking agent was prepared. Effects of deionised water, distilled water, tap water, aqueous solution of NaCl and NaOH were examined. Degree of swelling was maximum in deionized water, in aqueous NaCl it became minimum whereas it increased in alkaline medium. Increment in degree of swelling was due to the formation of carboxyl anions ($-COO^-$) in the polymer network leading to the development of strong electrostatic forces. Dry hydrogel was white polymeric material insoluble in most of the organic solvents. Decomposition started after 170°C. The refractive index of hydrogel was 1.332-1.345.

Key words: Transparent hydrogel, Degree of swelling, Crosslink density

Review Article

Pak J Sci Ind Res 2000 43 (1) 65 -72

Analysis of Prohibited Amine in Azo Dyes used in Textile and Leather Garments

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The dyes based on specific 20 arylamines have been used on industrial scale due to their desirable colouring properties. These dyes release these amines under different environmental and physiological conditions and have been established to be potentially carcinogenic in nature. Therefore, trace level determination of these prohibited amines is of great practical importance. The present review embodies details of various methods used for their determination. These methods spelt out procedures and techniques for the quantitative determination of these amines under chromatogenic spot test, spectrophotometric method, chromatographic method, potentiometric titration and polarographic estimation. Various reagents and colour reactions are described for spot tests and spectrophotometric determinations. The techniques such as column chromatography, thinlayer chromatography, gas chromatography, gas liquid chromatography, high performance liquid chromatography and optical densitometry have also been reported. Various columns and solvent systems are described for the separation of a mixture of amines. The potential and limitations of various methods have also been discussed in the light of our practical experience.

Key words: Prohibited arylamine, Diazotization, Coupling and chromatography.