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KINETICS OF SOLVENT EXTRACTION OF ZIRCONIUM (IV) FROM CHLORIDE MEDIUM BY D2EPHA IN KEROSENE USING THE LEWIS CELL TECHNIQUE: A COMPARISON WITH SINGLE DROP TECHNIQUE

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SYNTHESIS OF 5, 7-DIHYDROXY-6, 8-DI-C-PRENYL-4-O-PRENYL-FLAVANONE

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(Received April 18, 2003; accepted July 30, 2004)

The prenylated flavanone (**9**) has been synthesized from phloroacetophenone (**1**). All the new products have been characterized by the spectral data and microanalysis.

Key words: Synthesis, Chalcone, Flavanone

EFFECT OF pH AND CONCENTRATION ON THE REMOVAL OF MAGNESIUM FROM MAGNESIUM CHLORIDE SOLUTION BY BENTONITE

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(Received July 10, 2002; accepted August 2, 2004)

By virtue of their well-known cation exchange capacities of clays, particularly bentonites are important minerals to be used as adsorbent of various undesirable ions drained out as industrial waste. One of such pollutant is magnesium containing waste. The removal of magnesium from magnesium containing solutions is found to be dependent both on pH of the solution and the concentration of magnesium ions present in the solution. Using magnesium chloride solution of 50 mg/lit and 100 mg/lit concentration and bentonite (North West Frontier Province), it was found that adsorption equilibrium established within 6 h .

Key word: Bentonite, Adsorption, Freundlick equation

TRAFFIC NOISE IN LAHORE CITY, PART I: ROAD TRAFFIC NOISE

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(Received March 19, 2004; accepted August 9, 2004)

Traffic noise survey was conducted at 15 sites in the different residential and commercial areas of Lahore city and at each survey site, noise data were collected from 0900 to 1700 h. The data collected have been analyzed for the recorded range, L_{A99} , L_{A90} , L_{A50} , L_{A10} and L_{A1} and approximate values of L_{Aeq8h} were evaluated for each survey site. The results are discussed with reference to some criteria for community annoyance and ways and means to limit high-level traffic noise are suggested.

Key words: Environmental pollution, Noise pollution, Traffic noise, Lahore city.

PHYTOCHEMICAL ANALYSIS AND LAXATIVE ACTIVITY OF THE LEAF EXTRACTS OF *EUPHORBIA HETEROPHYLLA* LINN (EUPHORBIACEAE)

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(Received July 26, 2003; accepted August 23, 2004)

A hot aqueous decoction of the leaves of *Euphorbia heterophylla* Linn (Euphorbiaceae) 1.24 kg gave on cooling and defatting with dichloromethane, an aqueous solution which on successively extracting with n-butanol and ethylacetate gave 25.89g and 1.31g of residue, respectively on removal of solvent. The semi-solid extract from the ethylacetate fraction on hydrolysis with dilute tetraoxosulphate (VI) acid gave a yellow powder which on acetylation gave colourless needle clusters identified as quercetin tetracetate. The butanolic fraction had laxative action and contained saponins, phenols, terpenes and diterpenes identified as phorbols but no anthraquinones. The residual aqueous solution contained mainly sugars identified as xylose, maltose, galactose, lactose and lactulose, which are bulkforming laxatives. The purgative action was found to be a joint action of both the phorbols in the butanol fraction and the bulk forming laxative sugars in the residual aqueous fraction.

Key words: *Euphorbia heterophylla*, Laxative activity, Tetraoxosulphate (VI).

ULTRASONIC STUDIES ON SOME AQUEOUS SOLUTIONS OF CARBOHYDRATES AT THREE DIFFERENT TEMPERATURES

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Density, viscosity and ultrasonic velocity measurements have been performed by ultrasonic interferometer technique in some aqueous solutions of three carbohydrates (sucrose, D-glucose and β -D lactose) as a function of molality with different concentration of the order 0.1 to 0.5 mole/kg. At three different temperatures, via 303.15K, 313.15K and 323.15K and at atmospheric pressure, ultrasonic velocity, partial molar volumes, partial molar isentropic compressibility have been calculated and plotted against concentration. The velocity results confirm the conclusions that were originally derived from viscosity data by Einstein that the sugar molecules have a 'salvation envelope' attached with a layer of water molecules which decreases with thickness as the temperature of the solution rises. It has been observed that in such solutions it is quite legitimate to look for the dispersion caused by viscosity of the solutions. The apparent molar volume occupied by solute molecules remains constant at one particular temperature, irrespective of the change in concentration of sucrose in water. The compressibility increases slowly as a function of concentration at constant temperature. The data revealed that the compressibility of these different solutions is related with three dimensional hydrogen bond water structure. It is governed by the stereochemistry of carbohydrate. By these studies an overview of the hydration characteristics and the effect of relative position of hydroxyl group within a carbohydrate molecule is given. By increasing the carbohydrate concentration in water the ultrasonic velocity increases, while there is no effect on compressibility of moles. For monomer the apparent molal compressibility depends on the hydration of the mole. The results agree with the previously obtained kinematics data of literature values.

Key words: Carbohydrates, Concentration, Density, Viscosity, Isentropic compressibility, Ultrasonic velocity, Apparent molar volume.

Short Communication

Pak. J. Sci. Ind. Res. 2004 47(4) 356-357

PULSE VOLTAMMETRIC DETERMINATION OF pK_a OF PARA-CHLOROANILINE

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(Received July 10, 2002; accepted March 25, 2004)

Monochloroderivatives of aromatic amines are the degradation products of commonly used herbicides. The oxidation potential of monochloroanilines at a number of solid electrodes has been found to be dependent on the number of substituents in the ring system (Suatoni *et al* 1961). Voltammetric detection of these compounds and their separation in a mixture by liquid chromatography has been reported (Purnell and Warwick 1980; Hart *et al* 1981). Large amplitude pulse voltammetric experiments suggest that the oxidation reaction of 4-chloroaniline involves the elimination of the one electron as the initial oxidation reaction at the carbon paste anode. The experiments were performed by varying the values of rest potential, drop-time and sweep rate in large amplitude pulse voltammetry. The reasonably constant value of limiting current shows that 4-chloroaniline can be used as a standard for 1-electron oxidation for the investigation relating to the electrochemical studies of selected aromatic amines (Haque 2002). More recent work on these compounds relates to electrodegradation kinetics of *p*-chloroaniline at solid anodes (Casado *et al* 1994; Brillas *et al* 1995). The acidity and basicity of benzene and its derivatives including *p*-chloroaniline have been treated theoretically in terms of a new quantitative parameter (Feng *et al* 1995). Effect of potential on the adsorption of *p*-chloroaniline on silver electrodes has been studied using surface-enhanced Raman spectroscopy (Xu *et al* 1993). Haloaminobenzenes continue to be the focus of research (Freccero *et al* 2003). Recently their electrochemistry was reviewed (Haque 2003).

Biological Sciences

Pak. J. Sci. Ind. Res 2004 47(5) 358-369

COMPARATIVE ECOLOGICAL STUDY OF PHYTOPLANKTON. *PART II. BAKAR AND PHOOSNA LAKES - PAKISTAN*

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(Received February 02, 2003; accepted July 05, 2004)

A comparative ecological survey of phytoplankton part II of Lake Bakar, district Sanghar and Lake Phoosna, district Badin was carried out during August, 1993 to July, 1996. A total of 122 species belonging to 45 genera of 15 families of 5 orders of class Chlorophyceae were recorded. 11 species were common in both Lakes. 94 species were present in Lake Bakar and 17 in Lake Phoosna. The study showed that the aquatic environment of Lake Bakar is qualitatively much better as compared to Lake Phoosna.

Key words: Phytoplankton, Bakar lake, Phoosna lake.

ASSESSMENT OF DRINKING WATER QUALITY OF A COASTAL VILLAGE OF KARACHI

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(Received January 27, 2003; accepted July 28, 2004)

The drinking water quality of a coastal community in Rehri village, Karachi was assessed for human consumption by studying the chemical and microbiological parameters to determine the suitability of domestic drinking water usage. Water samples were collected at household levels from storage tanks and storage containers (earthen jars), main supply line and springs present in the vicinity. Samples collected from different sources indicated that bacterial counts were high for the storage tanks than the earthen jar containers. In storage tanks 71% samples were in high to very high health risk category whereas, in earthen jars 50% samples were in low health risk category. Water samples from two springs showed that samples of Chashma spring had high bacterial count (336 MPN index/100 ml) coupled with high concentration of NO₃ (29.681 mg/l) as compared to Rehri spring (41 MPN index/100 ml, 8.417 mg/l, bacterial count and nitrate concentrations, respectively). All samples collected at household level showed that bacterial contamination exceeded the maximum acceptable concentration. Other parameters (NO₃, NO₂, NH₃, PO₄, free Cl, Ca and Mg hardness) studied including trace elements (Fe, Cu, Cr) in the drinking water were below the WHO drinking water quality guidelines. Fecal coliform, *Escherichia coli* was also detected including important pathogens *Serratia* sp. and *Enterobacter* sp. which were isolated and indicated possible fecal contamination of drinking water at all levels.

Key words: Coliforms, Coastal area, Drinking water, *Escherichia coli*, Nutrients, Trace metals.

SOME ECOLOGICAL STUDIES ON *LINUM USITATISSIMUM* LINN

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The application of fertilizers appeared to have no significant effect on the overall growth and productivity. Various salt types affected various parameters with a tendency of better growth in light textured soils. The plant grew better in full light condition with optimal soil moisture. The plants wilted to death under shady condition. Both the water stressed and waterlogged conditions reduced the growth performance but the waterlogged condition adversely affected the plants. Therefore, it is concluded the *L. usitatissimum* could be grown in semi-arid condition on marginal lands.

Key words: *Linum usitatissimum*, Soil moisture, Growth, Productivity.

SERA FROM NIGERIAN CHILDREN WITH GENITOURINARY SCHISTOSOMIASIS HAVING IMMUNE COMPLEXES AND HEAT LABILE LEUCOCYTE MIGRATION INHIBITORY FACTORS WITHOUT IMPAIRED CELLULAR IMMUNITY

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There was a significant increase in the rate of synthesis of both albumin and globulin as a result of good adaptive mechanism which prevent hypoproteinemia in children with genitourinary schistosomiasis from endemic areas in Edo and Delta States, South Eastern Nigeria. Single radial immunodiffusion method and the Mantoux test were used to evaluate serum acute phase proteins and delayed hypersensitivity skin assay. While the Nytrek filter method of World Health Organization was employed in the counting of *Schistosoma haematobium* ova and the serum inhibitory factor to leucocyte migration was determined in accordance with WHO specifications with modifications in the preparation of the two antigens and a mitogen - BCG, IMV and PPD. Results were interpreted statistically using spearman's coefficient of correlation and regression analysis. Complement factors present in circulating soluble immune complex and complement dependant cell mediated and killed schistosomula. C₄ decreased with increase in number of *S. haematobium* eggs while C₃ (C₃C) products increased with severity of infection. There was an acute phase response to tissue damage by all stages of schistosomes and inflammatory response of immune competent cells against schistosome antigens from eggs and worm organs, which resulted to increase in transferrin. It was suggested that the heat labile leucocyte migration inhibitory factors were present in the sera of *S. haematobium* infected children, and there was a reduced negative skin response to tuberculin antigen in the infected children. These facts establish the possession of adequate functioning of the cytotoxic CD8⁺ T lymphocytes in the infected children. The heat labile migration inhibitory factors are products of immune complexes which when activated by complements result to patchial haemorrhagic manifestations. Leucopenia, atypical lymphocytes and plasma cells were observed in the blood which are characteristics of children who have experienced previous attack of *S. haematobium* infection.

Key words: Genitourinary schistosomiasis, Immune-complex, Leucocyte-migration, Cellular immunity.

PRELIMINARY INVESTIGATION ON THE HERBICIDAL POTENTIALS OF THE EXTRACTS FROM MAIZE INFLORESCENCE ON SEEDS OF THREE TROPICAL COMPOSITAE WEEDS

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(Received August 19, 2002; accepted August 28, 2004)

The herbicidal potentials of extracts derived from maize inflorescence were collected at 48, 96, 144, 196 and 240 h after formation were examined on the weeds, Siam-weed (*Chromolaena odorata*), Node-weed (*Synedrella nodiflora*) and Tridax (*Tridax procumbens*). Two sets of aqueous extracts (A and B) were prepared. Treatment A involved the dispersion of the powdered extracts from the inflorescence in distilled water, while treatment B involved the addition of sodium chloride to the dispersed powder in distilled water. The extracts inhibited growth of the seeds of the weeds used when compared to the control. In both treatments 48 h extract tends to be the most effective. The effectiveness of the extracts decreases with an increase in the age of the inflorescence. Hence, more extract-treated seeds germinate with an increase in the age of the inflorescence. The addition of sodium chloride to the extracts tends to increase the potency of the extracts in delaying germination of weed seeds.

Key words: Herbicide, Inflorescence, Weeds.

EFFECT OF AQUEOUS EXTRACT OF *AVICINNIA MARINA* ON MYOCARDIAL CONTRACTION OF ISOLATED MAMMALIAN HEART

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(Received May 09, 2002; accepted September 02, 2004)

Aqueous extract of *Avicinnia marina* commonly known as mangrove showed a marked inhibitory action on isolated mammalian heart *in-vitro*. The degree of inhibition was found to be highly dose dependent. A dose of 100 mg/kg caused cardiac arrest for few seconds. The force and magnitude of cardiac contractions were regained to pre-injection level after 1.6-2 min. Pretreatment with atropine was found to have no effect on myocardial contractions. The amplitude of cardiac contractions was reduced slightly after the administration of adrenaline.

Key words : *Avicinnia marina*, Mangrove, Mammalian heart.

TOXICITY OF *CLERODENDRUM INERME* EXTRACT AND CYHALOTHRIN AGAINST *RHIZOPERTHA DOMINICA* PARC STRAIN AND THEIR EFFECT ON ACID PHOSPHATASE AND CHOLINESTERASE ACTIVITY

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(Received September 18, 2003; accepted September 02, 2004)

Toxicity of *Clerodendrum inerme* (dumdum leaves extract) and cyhalothrin (Pyrethroid) was tested against adult beetles of *Rhizopertha dominica*. Filter paper impregnation method was adopted for the determination of LC₅₀ dose. LC₅₀ dose of *C. inerme* and cyhalothrin was found to be 1460 µg/cm² and 0.00063 µg/cm², respectively. Biochemical estimation revealed that both the products inhibited the acid phosphatase and cholinesterase activity to some extent.

Key words: *Rhizopertha domimica*, Cyhalothrin, Acid phosphatase, Cholinesterase, *Clerodendrum inerme*.

INFLUENCE OF DIFFERENT TYPES OF MILK AND STABILIZERS ON SENSORY EVALUATION AND WHEY SEPARATION OF YOGHURT

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The influence of seven different stabilizers i.e. pectin, guar gum, carboxymethylcellulose (CMC), carrageenan, sodium alginate, corn starch and gelatin was studied at 0.4% levels in buffalo milk with 16.6% total solids, cow milk with 13.5% total solids and mixture (1:1) of both having 15.0% on syneresis, body/texture, flavor, acidity and color in yoghurt. Results showed that corn starch gave best results in controlling syneresis in yoghurt followed by gelatin, pectin, sodium alginate, carrageenan, guar gum and CMC in buffalo milk as compared to mixture and cow milk. Treatment (T₁₉) having 0.4% corn starch and 16.6% total solids got maximum scores in flavor, body/texture, acidity and appearance than all other six stabilizers. This sample had firm coagulum, less separating whey, good aroma, pleasant taste and rheologically superior to all other samples. Statistical analysis showed that the treatments, storage intervals and total solids had a significant effect ($P < 0.05$) on syneresis, body/texture, flavor, acidity and color of the yoghurt samples.

Key words: Yoghurt, Milk stabilizer, Syneresis.

Short Communication

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COMPARISON OF HYPER PRODUCER *ASPERGILLUS NIGER* CULTURES (IFS-5, IFS-6 AND IFS-17) FOR CITRIC ACID FERMENTATION IN SURFACE CULTURE

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Citric acid fermentation by *Aspergillus niger* is an aerobic process and the organism needs a fairly high and constant oxygen supply for its growth (Hang 1988; Haq *et al* 2000). Surface culture technique (SCT) is a conventional method of citric acid production. Most of the pilot plants are using this technique due to low energy consumption and manpower involved (Singh *et al* 1998). In SCT, the substrate remains stationary and organism form mycelial mat on the surface of medium. The relation between constitution of the fermentation medium and rate of citric acid production has been investigated (Elimer and Ewaryst 1995). Sucrose salt medium as synthetic fermentation medium while cane or beet molasses as natural fermentation medium have long been employed as usual routine basal media (Ali *et al* 2001). Clark *et al* (1965) obtained 80% conversion of available sugar, 8 days after incubation. Farouk *et al* (1977) pointed out that the age of culture also affect the yield of citric acid. Both of these authors used synthetic medium in their study on citric acid fermentation. The mutant strains have greater ability to produce citric acid. The present investigation deals with the time course study during citric acid production by surface culture technique using three different mutant cultures of *A. niger* (IFS-5, IFS-6 and IFS-17) and their comparison on kinetic basis.