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Physical Sciences Section

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SURFACE TENSION MEASUREMENT ON DROPPING MERCURY ELECTRODE USING THIOL - COLLECTORS AND THEIR MIXTURES

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The adsorption of potassium ethyl xanthate (KEX), dithiocarbamate (DTC) and their binary mixtures on a dropping mercury electrode (d.m.e.) has been studied using electrocapillary method. The electrocapillary curves determined as a function of potential in 0.1M borate buffer with the addition of KEX and DTC indicate a reduction in surface tension. Synergistic behaviour was also studied by comparing the decrease in surface tension of individual collectors with that of their mixtures at different molar ratios and potentials of - 500, -600 and -700 mv.

Key words: Surface tension, Mercury, Thiol - collectros.

MASS SPECTRAL STUDIES OF NEWER INDOLES

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(Received April 23, 1992; revised March 24, 1993)

The fragmentation pattern of 2- substituted -3'- (substituted indol-3-yl- methylene)imino]chalcones (Ia-Ie), 1-Acetyl-(5-substituted phenyl)-3-[*m*-(2-substituted indol-3-yl-methylene)imino]- phenyl-3-pyrazolines (IIa-IIe) and 1-Acetyl-3-[*m*-(5-methyl-2-phenylindol-3-yl-4-oxo-1-thiazolidinyl)]-5-(substituted-phenyl)-3- pyrazolines (IIIa-IIIe) have been studied. The structure of the major fragment ions and pathway resulting to their formation have been postulated by the recognition of the appropriate meta-stable peaks.

Keywords: Mass spectra, Fragmentation, Indoles.

STUDIES OF THE EFFECT OF ANIONS ON THE ANTIBACTERIAL ACTIVITY OF NICKEL (II), COBALT (II) AND COPPER (II) COMPLEXES WITH AMPICILLIN

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A number of cobalt (II), copper (II) and nickel (II) complexes with different counter anions such as sulphate, chloride, nitrate and acetate of the antibacterial drug ampicillin have been synthesised and characterised on the basis of molar conductance, magnetic moment, elemental analysis, infrared and electronic spectral data. In order to understand the possible role of anions on the antibacterial activity of ampicillin and their metal complexes, the synthesised metal complexes have been subjected for screening against bacterial species *Escherichia coli*, *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The role of the counter anions have been found to be significant in increasing the antibacterial activity of ampicillin and their metal complexes.

Key words: Anions, Antibacterial activity, Metal complexes, Ampicillin.

WATER QUALITY OF SHALLOW WELLS LOCATED CLOSE TO DUMP SITES IN AKURE, NIGERIA

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(Received January 23, 1992; revised March 14, 1993)

The quality of waters from eight wells located within 100 meters of dump sites in Akure, the capital of Ondo State, Nigeria was investigated. Several physico-chemical parameters that include temperature, pH, conductivity, total dissolved solute, total suspended solid, total alkalinity, total hardness; The concentration of phenols and the anions: Cl^- , NO_3^- , SO_4^{2-} and PO_4^{3-} ; and those of the following metals: Na, K, Ca, Mg, Fe, Mn, Co, Ni, Cr, Cd, Hg, Cu and Pb were determined using standard analytical methods. Bacteriological studies involving total plate count and the MPN index were also carried out. Large variations among wells were observed for most of the parameters. They also showed seasonal variation. Although microbial counts were relatively high for some of the water samples, the presence of *Escherichia coli* was not detected. Compared with WHO recommended standards the overall data suggest that most of the wells are polluted and their waters require some treatment to make them suitable for domestic use. The need for scientific methods of municipal waste disposal and for improved construction of wells are advocated.

Key words: Water quality, Shallow wells, Dump site.

THE EFFECT OF pH AND *P*-FORMALDEHYDE CONCENTRATION ON TANNIN - FORMALDEHYDE REACTION

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Tannins are composed of a mixture of different polyphenols. They have been used as partial substituent of phenol in preparation of phenolformaldehyde resin. Their reaction with formaldehyde is acid as well as base catalysed. In present study tannins from *Pinus roxburghii* were used to study the effect of pH and *p*-formaldehyde concentration on their potential to react with formaldehyde. The shear strength of adhesive prepared at different pH has also been measured. Maximum shear strength was obtained at pH 9.0. It is concluded from this study that the reaction in basic medium (pH>8) is more effective than that in acid condition and the concentration of the *p*-formaldehyde should be kept between 5-10% w/w.

Key words: Tannin-formaldehyde, Gelation time, Shear strength.

Short Communication

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**Chemical Constituents and Amino Acid
Pattern of Shrimp (*Penaeus merguensis*)
from Karachi Coastal Waters**

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Biological Sciences Section

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FACTORS CONTRIBUTING TO COCOON YIELD IN *BOMBYX MORI* L. IN BANGLADESH

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(Received September 23, 1992; revised February 13, 1993)

Effect of four different temperature ranges viz. $23 \pm 1^{\circ}$, $26 \pm 1^{\circ}$, $28 \pm 1^{\circ}$ and $30 \pm 1^{\circ}$ on rearing and their relative contribution different cocoon yielding factors of mulberry silkworm were observed under laboratory conditions at $78 \pm 1\%$ relative humidity. Increase of temperature range beyond $23 \pm 1^{\circ}$ had adverse effect on larval and cocoon characteristics including larval disease and mortality. For commercial rearing of indigenous races temperature range $26 \pm 1^{\circ}$ was considered for better performance. Cocoon-shell ratio was the most important factor of cocoon yield of mulberry silkworm with highest coefficient of correlation (0.848, $P < 0.01$) followed by maximum direct effect (0.687) and maximum contribution (71.93%) followed by cocoon weight, larval disease and larval weight.

Key words: Temperature, Larval and cocoon characteristics, Correlation matrix, *Bombyx mori*.

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OSMOTIC ADJUSTMENT IN WHEAT- A RESPONSE TO WATER STRESS

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(Received June 27, 1991; revised April 6, 1993)

Growth, water relations and accumulation of two potentially involved solutes in osmotic adjustment were studied in four cultivars of wheat. Biomass and grain yield component data indicated two major groups (i) drought resistant and (ii) drought susceptible. Water potential (WP), solute potential (SP) and turgor potential (TP) were reduced under drought conditions, but the effect was much less in resistant cultivars. The relative water contents (RWC) of resistant cultivars were much higher than non-resistant under drought conditions, indicating osmotic adjustment in these cultivars. Accumulation of proline and betain was many fold greater in resistant than susceptible cultivars.

Key words: Wheat, Osmotic adjustment, Water stress.

MACROBENTHIC FAUNA OF AN AQUACULTURE POND OF CHAKARIA SUNDERBAN, BANGLADESH

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(Received October 4, 1989; revised April 15, 1993)

The macrobenthic fauna along with limnological factors of a traditional aquaculture pond were investigated for a year (June, 1982 to May, 1983) at Chakaria Sunderban. The higher density of macrobenthos during the dry season (Nov. - Apr.) coincided with a higher salinity regime (13.05-35.42‰). The population peak of (24 923.32 specimens/m² and biomass, 163.33 g/m²) occurred in Jan. Animals occurred in lower densities during the rainy season (May- Oct.) and the lowest was in June (1111.65 specimens/m²), 917 g/m². The macrobenthos were identified under 10 taxonomic groups, their temporal and spatial distribution have been recorded. The macrobenthic community of the pond was dominated by Tanaidacea, Amphipoda and Polychaeta errantia, all of which occurred throughout the period of investigation.

Key words: Macrobenthos, Limnological factors, Aquaculture pond.

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REDESCRIPTION OF *CAPPAEA* ELLENRIEDER (PENTATOMIDAE: PENTATOMINAE: CARPOCORINI)

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(Received September 18, 1991 revised April 12, 1993)

Cappaea Ellenrieder with type species *Cappaea taprobanensis* (Dallas) is redescribed with emphasis on metathoracic scent gland complex, male and female genitalia. It is compared with related genera and its relationships within Carpororini Stål are also briefly discussed.

Key words: Revision, Tolumnia, Sub-continent.

Technology Section

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A RAPID ASSAY PROCEDURE FOR THE DETERMINATION OF THIAMINE IN PHARMACEUTICAL PRODUCTS

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(Received October 13, 1992; revised March 15, 1993)

A fast and simple method of determining thiamine (vitamin B₁) in neat solution and in pharmaceutical products has been developed using titrimetric procedure. The method makes use of the reaction in which thiamine is oxidized [1] by potassium ferricyanide in thiochrome in an alkaline medium. In the present investigation the ferrocyanide ion produced in equivalent amount has been titrated in presence of the remaining excess potassium ferricyanide with zinc sulphate in an acid medium. The determination is interference free from the other vitamins, e.g., B₂, B₆ and B₁₂. Detection as low as 0.01 mg ml⁻¹ has been obtained. The time required for analysis is short, being about 5 mins for a single determination.

Key words : Thiamine, Assay, Pharmaceutical products.

UTILIZATION OF MARBLE POWDER AND THE CLAY (GACCI MUTTI) AS THIN LAYER CHROMATOGRAPHY ADSORBENT

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(Received August 20, 1991; revised April 11, 1993)

Mixed marble powder and clay (Gacci Mutti) (19:1) was found satisfactory for separation of selected types of organic compounds. This was used as such without any treatment. Water was selected as the slurry liquid, about 10 ml water was sufficient for 20g mixed marble powder and Gacci Mutti. Ink pigments were separated by using solvent system, (i) ethanol, ammonia and water (8:1:1), (ii) n-butanol, ethanol, ammonia (2N) and water (6:2:2:1). The separated ink spots on Marble powder and Gacci Mutti were clear, bright and consistent as compared with that on silica gel. 2,4-dinitrophenylhydrazones were separated in solvent system, (i) petrol fraction boiling range 40 - 120° and ether (39:10), (ii) petrol fraction boiling range 40 - 60° and ether (15:4:5). Due to inertness petrol fraction boiling range 40 - 60° is selected as separating solvent for 2,4-dinitrophenylhydrazones. The separation of amino acids were carried out by using the solvent system: ethanol, ammonia and water (8:1:1). The separated spots on silica gel faded rapidly on exposure to light while on marble powder and Gacci Mutti these were compact and unchanged for several months.

Key words: T.L.C adsorbent, Petrol distillate organic compound.

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STUDIES ON THE QUALITY AND STORAGE STABILITY OF MIXED FRUIT SQUASHES

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(Received February 28, 1991; revised April 6, 1993)

Quality of pure (guava, citrus, mango) and mixed (guava-citrus, guava-mango, citrus-mango with mixing levels of 25,50 and 75%) fruit squashes was studied during storage at room conditions (22- 36°, 45-76% RH). High initial content and maximum retention of ascorbic acid during storage was found in citrus-mango combinations followed by guava-citrus and guava-mango combination. Cloud loss during storage was observed in citrus- guava squashes but there was no such problem in pure and mixed mango squashes. In general pure squashes were preferred over the mixed ones and the highest score was given to pure mango squash. Taste scores were positively correlated ($r = 0.689$) with total soluble solids/acid ratio of different drinks. All squashes were acceptable after the storage of 3-4 months and these were given more than 60% overall acceptability scores.

Key words: Guava, Citrus and mango squashes, Ascorbic acid.