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Physical Sciences Section

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SIMULTANEOUS DETERMINATION OF Cr (III) AND Cr (VI) IN NATURAL WATERS BY A SOLVENT EXTRACTION BASED ATOMIC ABSORPTION METHOD

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(Received February 4, 1990; revised December 6, 1990)

A new method for the simultaneous determination of Cr(III) and Cr(VI) is proposed employing 1,5-diphenylcarbazide (DPC) to form a colored complex with trace amounts of Cr(VI), followed by solvent extraction of the complex. Total chromium in natural waters is determined by the flame atomic absorption (AAS) method, while Cr(VI) is extracted as a DPC complex with cyclopentanol for colorimetric estimation. The residual Cr (III) in the aqueous phase is directly estimated by AAS and indirectly by colorimetric method after oxidation to Cr (VI) with aqueous ammonium peroxodisulphate. The two Cr (VI) results agree within ± 2-3%. The extraction equilibrium is quantitatively studied as a function of choice of solvent, pH of medium, equilibration time and concentration of the oxidizing agent. Under optimum extraction conditions, the lower detection limit achieved is 0.005 mg/l Cr (VI). The method is applied to 14 natural waters sampled from open reservoirs, wells and springs. The results show that Cr (VI) content of spring waters is in general greater than that of other waters.

Key words: Cr (III) and Cr (VI) determination, Cr content of water.

Introduction

aqueous phase of the sample is oxidized with ammonium

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COBALT (II), NICKEL (II), AND COPPER (II) CHELATES OF N-ISONICOTINAMIDO-SALICYLALDIMINE

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(Received November 25, 1989; revised December 20, 1990)

The 1:1 and 1:2 (metal to ligand) complexes of N-isonicotinamidosalicylaldimine with Co(II), Ni(II) and Cu(II) have been prepared. Stoichiometry and stability of the complexes have been tested in solution using electronic spectral and conductometric methods. Characterization of the complexes has been accomplished by elemental analysis, molar conductance, electronic and infrared spectral measurements. It is concluded that the chelate formation takes place through the C=N and C=O with 1:2 ratio and through the C=N and enol form with 1:1 complexes. The different bands observed in the electronic spectra of the complexes in DMF solutions have been assigned to the $\pi - \pi^*$, L $\rightarrow$ MCT and d-d electronic transitions.

Key words : Transition metals, Chelate formation, Complexation.

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ELECTROPHORETIC SEPARATION OF INORGANIC CATIONS IN BUFFER-ACETYLACETONE

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(Received July 7, 1990; revised November 19, 1990)

Electrophoretic separation of 21 inorganic ions using buffer-acetylacetone system at various pH values [1-8] have been investigated. The results successfully favour the separation/identification of these cations at pH-3 and field strength 10V/cm.

Key words: Electrophoretic separation, Inorganic cation, Buffer-acetylacetone.

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CURRENT VOLTAGE CHARACTERISTICS IN COPPER-POLY (VINYL-ALCOHOL) COMPOSITES

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(Received May 10, 1989; revised December 20, 1990)

Electrical conduction of pure poly (vinyl-alcohol) (PVA) and copper poly (vinyl- alcohol) composites (Cu-PVA) is studied as function of voltage and temperature. From log I - log V relations, it is found that we can not explain the conduction mechanism on the basis of space-charge limited current. The values of Schottky field lowering constant β_{SR} was calculated and compared with β_{exp} which was calculated from the slope of $\ln I\text{-}V^{1/2}$. It is found that at low temperature for pure sample the conduction may be due to a combination of electronic and ionic parts. But for other samples a quite large difference between $\beta_{P.F}$ and β_{exp} is observed. We conclude that, the $\ln I - V^{1/2}$ study of these composites samples dose not help us in knowing the exact case of the conduction mechanism of these samples.

Key words: Polymer, Poly (vinyl-alcohol), Electrical-conductivity.

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MOSSBAUER, ESR AND OPTICAL SPECTRA OF HUMITE MINERAL

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(Received June 8, 1989; revised November 10, 1990)

Mossbauer, ESR and optical spectra of humite were studied for the first time. From the supplementary measurements of Mossbauer and ESR data, the five absorption bands observed at 15240, 18350, 20745, 25575 and 28570 cm^{-1} are attributed to Fe^{3+} ion in a slightly distorted octahedral site. The crystal field parameters which give a good fit for the observed band positions are B = 690 cm^{-1}; C = 2769 cm^{-1} and Dq = 760 cm^{-1}. The two bands observed in the near infrared region are assigned to Fe^{2+} ion in a more distorted octahedral site.

Key words: Optical absorption, Humite mineral crystal field parameters.

Biological Sciences Section

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CHARACTERISTICS AND COMPOSITION OF THE FRUIT OF *AVICENNIA MARINA*

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(Received December 10, 1989; revised November 11, 1990)

The fruit of *Avicennia marina* was investigated for its proximate chemical composition. The crude protein, fat, total carbohydrates, moisture, crude fibre, ash and gross energy content were estimated. The fruit was found to contain significant level of Na, Ca, Mg, K and P. The chromatographic analysis of ethyl alcohol water extract showed that it contains essential amino acids like arginine, methionine, phenylalanine, leucine, valine and sugars as arabinose, galaclose, glucose, maltose, mannose and lactose.

Key words: *Avicennia marina*, Fruit, Proximate chemical composition.

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PHYSICOCHEMICAL CHARACTERISTICS AND NUTRIENT COMPOSITION OF BANGLADESHI BANANAS

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(Received February 15, 1990; revised November 25, 1990)

Qualitative characteristics, biochemical and mineral status of fruits of four banana varieties were studied. Significant variation in most of the characters was found among the varieties. Minimum moisture content (68.87%) and maximum TSS (28.93%) were found in pulp of Ganasundari while it was reverse in Chinichampa. Ganasundari synthesized maximum total sugar (26.36%) and Japkathali highest vitamin C (9.99 mg/100g). Champa have shown to contain maximum amount of protein (4.9% DW basis), ash (0.87%), K (1153.0 mg), Na (50.13 mg), Ca (51.93 mg), Mg (206.65 mg) and P (109.0 mg) in even dried 100 gm pulp.

Key words : Fruit characteristics, Biochemical status, Banana varieties.

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STUDIES ON SEED-BORNE FUNGI, BACTERIA AND NEMATODE OF RICE IN THE PUNJAB

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(Received August 29, 1990; revised December 30, 1990)

One hundred and seventy paddy seed samples were collected from Punjab paddy growing area, and tested for fungal, bacterial and nematode seed-borne pathogens by using standard methods. Seven seed-borne fungi were recorded. *Trichoconis padwickii* was recorded in 57 seed samples with maximum percent seed infection of 84.5. The infection of *Fusarium moniliforme, F semitectum, Drechslera oryzae* and *Curvularia lunata* was 21.0% on variety B-6129, 14.5% on IRRI-6 and 21.5% on KS-282 and B-385 respectively. Other seed-borne fungi such as *F. graminearum* and *Nigrospora oryzae* were recorded at infection of 1.0%.

Forty four seed samples were assayed for identification of bacterial pathogens using seedling symptom method. The seed infection of *Xanthomonas oryzae* and *Pseudomonas avenae* was 11.0% in variety IRRI-6 at Lahore and 8.5% in variety B-385 from Sahiwal area. All the seed samples were also assayed for rice with tip nematode *(Aphelenchoides basseyi).* Out of 170 seed samples tested, 13 were found infected with white tip nematode. It was observed that percent seed infection with fungi, bacteria and nematode varied from cultivar to cultivar and locality to locality.

Key words: Seed-borne pathogen, Blotter paper method, Abnormality, Rice seed samples (Paddy).

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EFFECT OF GAMMA RAYS ON THE CANOPY STRUCTURE OF PEARL MILLET (*Pennisetum americanum* L.) Leeke

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(Received March 18, 1989; revised November 15, 1990)

The magnitude and direction of change induced through mutagenesis in the decisive components of canopy structures of four contemporary varieties of pearl millet (*Pennisetum americanum* L. Leeke, *viz*. Awn selected, ex-Bornu, Japan Bajra and B-18 were treated with different doses (0,5,10,15,20,25,30 and 35 kR) of gamma rays and were investigated. Their differences amongst varieties were significant (P = 0.05) whereas differences amongst different doses of gamma rays were highly significant (P=0.01). The effects on the components of canopy structure i.e. leaf size, number of leaves on plants and number of spikes were studied. The rate of reduction in leaf length was highest in Japan Bajra followed by B-18, ex-Bornu and Awn-selected at 15 kR (29.50) with control. In variety ex-Bornu at 5 kR (12.75) at 20 kR (14.05) compared with control (9.50) and variety B-18 at 15 kR (18.25) at 25 kR (12.50) at 30 kR (18.75) and 35 kR (22.25) compared with control (9.75). The implications of results are discussed with reference to the developmental allometry of pearl millet and feasibility of construction of new ideotypes for increasing productivity in selected macrodiameters.

Key words: Gamma rays, Canopy structure, *Pennisetum americanum*.

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CHANGES IN MICHAELIS PARAMETERS OF HUMAN ERYTHROCYTE ACETYLCHOLINESTERASE IN HEPATITIS AND MALARIA

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(Received October 13, 1986; revised November 25, 1990)

Michaelis-Menten parameters aK_m and aV_m of the erythrocyte acetylcholinesterase (AChE; EC 3.1.1.7) were assessed in adult humans whether normal (n = 80) or with clinically diagnosed viral hepatitis (n = 69) or malaria (n = 76). Huge elevations in the parameters were observed in the patients. Time courses of the parameters were characteristically different from the normal levels. The observations indicated that the parameters of the enzyme can provide with valuable diagnostic evidence of the diseases.

Key words : Kinetic studies, Acetylcholinesterase, Human erythrocyte.

Short Communication

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A Morphological Feature Characterizing the Chinese Lac Insect, *Kerris chinensis*

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(Received September 19, 1990)

As prolongation of upper spiracle there is chitinzation

Technology Section

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COMPARATIVE ASSESSMENT OF COMMERCIALLY AVAILABLE MATERIALS FOR USE AS SEPARATORS IN Ni-Cd BATTERIES

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(Received November 23, 1989; revised December 20,1990)

Measurements of various properties, considered to be relevant for assessing the performance of a separator material have been undertaken for different commercially available materials having potentials for use as battery separators. These studies have been carried out in order to assess the relative merits of these commercially available materials for their use as separator materials for Ni-Cd batteries.

Key words: Ni-Cd batteries, Separator evaluation, Alkaline battery separator.

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CHARACTERISTICS OF PAKISTANI TUFTED CARPETS AND FLOOR COVERING

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(Received October 31, 1989; revised December 9, 1990)

The objective of the present study is to investigate and assess the quality of the Pakistani tufted carpets. Carpets manufacturing was the first branch of textile industry to recognise the tufting technology. This study deals with the important physical characteristics of the tufted carpets and floor covering. The relationship between physical properties of carpet and floor covering has been determined for the quality evaluation. The primary backing plays key role in tufted carpet manufacturing. The construction and the type of yarns used for primary backing has also been investigated regarding its physical characteristics and its relationship with the carpet quality.

Key words: Quality, Tufted carpets.

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DEHYDRATION STUDIES ON THE PRESERVATION OF TEMPEH

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(Received December 31, 1988; revised December 12, 1990)

Tempeh was prepared from Soybean cultivated in Pakistan by fermentation with *Rhizopus oligosporus* NRRL-2710 slices of different sizes were prepared and the samples were steamed for 3,5,7,5 and 10 min, and dehydrated to 4, 6-4.8% final moisture content. Steaming for 5 min. from both the sides showed better results, Protein content and rehydration ratio gradually decreased during 120 days storage of the dehydrated tempeh but the product remained acceptable for 4 months and rehydrated to almost original size, taste and texture.

Key words: Dehydrated soy product.

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FASTNESS PROPERTIES OF INDIGO-DYED COTTON FABRIC

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(Received March 11, 1990; revised November 3, 1990)

Natural indigo vat dye (CI vat blue 1) was extracted from the plant species, *Lonchocarpus cyanescence* and applied to pure white (bleached) cotton fabric intended as wearing apparel, by dyeing using alkali concentrate from cocoa pods *(Theobroma cacao)* as solubilising agent. The fastness properties of the dyed fabric to light, washing, ironing and rubbing were then assessed using standard Gray scales. The dyed fabric was found to show very good fastness to these agencies.

Key words: Fastness properties, Dyestuffs, Fabric.