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EXPERIMENTAL AND THEORETICAL STUDIES OF SOLVENT EXTRACTION OF COPPER (II) WITH Di-(2-ETHYLHEXYL) PHOSPHORIC ACID

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The preferential extraction of copper from a multicomponent feed is achieved by using kerosene solution of di-(2-ethylhexyl) phosphoric acid. The extraction of metal has been found to be influenced by both distribution constant and dissociation constant of the metal species involved. The theoretical predictions were confirmed experimentally by employing multistage extraction unit.

Key words: Electrical neutrality, Dissociation constant, Separation factor.

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THE DEFECT STRUCTURE OF $(\text{Fe}_1 - x \text{Co}_x)_2$ RE COMPOUNDS (RE = Gd AND Tb)

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Constitutional investigations of Fe-RE, Co-RE and Fe-Co-RE systems revealed that it requires an "RE" content in excess of $(\text{Fe}_1 - x \text{Co}_x)_2$ RE composition in order to prepare these compounds free from the presence of phases. A comparison of experimental and theoretical densities (calculated from the volumes of the unit cells) showed that the number of vacant TM (TM=Fe, Co or Fe+Co) sites vary from 7.5% for $(\text{Fe}_{0.32}\text{Co}_{0.68})_2$ Gd to 2.5% in the binary Fe_2 Gd compound. Likewise, there are 7.1% such sites in $(\text{Fe}_{0.33}\text{Co}_{0.67})_2$ Tb and 3.8% in the binary Co_2 Tb compound. Thus, it was concluded that the defects in the lattices of these compounds, responsible for the deviation from ideal stoichiometric compositions are vacancies on Fe and Co sites in respective binary compounds and on Fe+Co sites in ternary compounds.

Key words: Lattice defects, $(\text{Fe,Co})_2$ RE Compounds.

REACTION OF Cu(II) COMPLEX OF PHTHALIC HYDRAZIDE WITH OXYGEN AND NITROGEN DONOR LIGANDS

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The reaction of Cu(II) complex of phthalic hydrazide of type $[\text{Cu}(\text{HPH})_3(\text{H}_2\text{O})_6]\text{H}_2\text{O}$ with acetylacetone (acac), monoethanolamine (MEA) ethylenediamine (en) and bipyridine (bipy) gives mononuclear complexes of types $[\text{Cu}(\text{HPH})_2(\text{acac})_2]\text{H}_2\text{O}$ (I), $[\text{Cu}(\text{HPH})_2(\text{MEA})_2]$ (II), $[\text{Cu}(\text{HPH})_2(\text{en})_2]2\text{H}_2\text{O}$ (III) and $[\text{Cu}(\text{HPH})(\text{bipy})_2(\text{H}_2\text{O})]\text{H}_2\text{O}$ (VI) respectively and with aniline (An) and *p*-phenylenediamine (*p*.Phda) it gives binuclear complexes of types $[\text{Cu}_2(\text{HPH})_2(\text{An})(\text{H}_2\text{O})]\text{H}_2\text{O}$ (IV) and $[\text{Cu}_2(\text{HPH})_2(\text{p}.Phda)(\text{H}_2\text{O})]$ (V) respectively. The complexes have been characterized on the basis of IR and electronic spectral and magnetic properties.

Ligand field parameters have been calculated. Analysis of electronic spectra, Dq Value and IR spectra strongly indicate the presence of CuN_2O_4 , CuN_2O_2 and CuNO_4 chromophores.

Key words: Cu (II) Complex, Phthalic hydrazide, Oxygen or nitrogen donor ligands.

TECHNIQUES USED IN TRACE ELEMENT ANALYSIS OF URINARY CALCULI BY ATOMIC ABSORPTION SPECTROSCOPY

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(Received July 11, 1993; revised November 28, 1993)

Atomic absorption spectroscopy (AAS) was found to be a suitable method for the estimation of iron, copper, zinc, magnesium, aluminium and lead in urinary calculi; graphite furnace electrothermal atomisation was required for lead and flame atomisation for the others. A standard urinary stone solution was made up and calibrated for each element using the method of standard additions. In all case, absorption varied linearly with concentration; reproducibility, accuracy and recovery were satisfactory for all elements. Conventional atomic absorption standards in 1% nitric acid solution had low apparent analyte concentrations against the standard stone solution. If those were used as primary standards it was found that apparent values as a percentage of the true values would be: Fe, 108.5; Cu, 103.1; Zn, 106.4; Mg, 125.0; Al, 103.6; Pb, 102.2%. Also, apparent concentrations of magnesium, zinc and copper in dilute nitric acid solution varied significantly with acid strength. It was concluded that in order to minimise matrix and pH effects, urinary stone analysis should only be done against standard urinary stone solution.

Key words: Techniques, A. A. S. Methods, Urinary calculi.

SYNTHESIS OF GRAFT COPOLYMER OF CASEIN WITH ACRYLAMIDE

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Acrylamide has been graft copolymerized onto casein in phosphate buffer medium. The grafting was characterised by elemental analysis, solubility, FTIR, intrinsic viscosity and refractive index measurements. It was observed that grafting ratio increases with increasing concentration of acrylamide and decreases with increasing concentration of casein. The effects of concentration of acrylamide and casein on grafting ratio, grafting efficiency, rate of conversion of monomers and rate of graft copolymerization have been discussed.

Key words: Grafting efficiency, Degradation, Backbone radicals.

ADSORPTION OF PALLADIUM IONS BY MODIFIED CARBONS FROM RICE HUSKS

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Steam activated carbon of high surface area does not show any Palladium ions adsorption. Treatment of this carbon with HF acid increases to a great extent the gas adsorption capacity expressed as nitrogen surface area as well as the adsorption capacity of Palladium ions from aqueous solution. HHB was loaded in different amounts on to these carbons. The acid sites represent the active fraction of the surface on which the adsorption of Palladium ions proceed. The uptake of Palladium ions by HHB treated carbons is related to the total number of HHB molecules loaded on the carbon surface.

Key words: Activated carbon, Surface modification, Adsorption of palladium.

Biological Sciences Section

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IMPERATA CYLINDRICA (LINN.) P. BEAUV AFFECTS GERMINATION, EARLY GROWTH AND CELL DIVISION AND DEVELOPMENT IN SOME CROP SPECIES

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(Received April 6, 1991; revised November 22, 1993)

Imperata cylindrica (Linn.) P. Beauv., is a troublesome grass that may exclude associated species from common habitat. Laboratory studies indicated that the aqueous extracts, rain leachates and litter from shoots and rhizomes suppressed either germination, seedling growth or both of mustard (*Brassica campestris*), Bajra (*Pennisetum americanum*) and lettuce (*Lactuca sativa*). The percentage of dividing cells and their sizes in root tips of test species were small under test condition. Rain leachates contained caffeic, *p*-coumaric, *p*-hydroxy-benzoic, syringic, chlorogenic, *iso*-chlorogenic, ferulic and vanillic acids and scopolin and scopoletin. The findings suggest that the decreased radicle growth may have resulted from inhibition of cell division and development. The observed aggression of this species may be attributable at least in parts to its allelopathic influences.

Key words: *Imperata cylindrica*, Allelopathy, Cell division inhibition.

EFFECT OF RATES AND METHODS OF NITROGEN APPLICATION ON THE GRAIN YIELD AND NITROGEN UPTAKE OF WETLAND RICE

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(Received August 23, 1993; revised November 14, 1993)

Two field experiments were carried out during dry and wet seasons of 1991 to study the effect of three application methods and four rates of nitrogen fertilization on yield and N nutrition of wetland rice using randomised complete block design. The test varieties were BR3 and BR11 during dry and wet seasons respectively. Regarding grain yield, urea super-granule (USG) point placement was significantly superior to prilled urea (PU) broadcasting at all the levels of applied N in both the cases of BR3 and BR11, whereas PU injection was significantly superior to PU broadcasting only at the highest N rate. Agronomic efficiency, total N uptake and apparent recovery of added N was the highest with USG point placement followed by PU injection and was lowest with PU broadcasting in both the seasons. Agronomic efficiency and apparent recovery of added N decreased gradually with increasing N rates irrespective of fertilizer application methods in both the cases of BR3 and BR11.

Key words: N application methods, Wetland rice.

TERPENOIDS AND STEROIDS OF THE AERIAL PARTS OF *MIRABILIS JALAPA* LINN.

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(Received November 14, 1993)

Three compounds including a diterpene, *trans*-phytol, a pentacyclic triterpenoid, methyl 3-oxo-urs-12-en-28-oate and a steroid, β -sitosterol acetate have been isolated for the first time from the fresh aerial parts of *Mirabilis jalapa* Linn. along with oleanolic acid, ursolic acid, β -sitosterol, brasicasterol and stigmasterol. Their structures have been established with the help of spectral data. This is the first report of 2D NMR studies (Hetero-COSY, COSY-45, NOESY, J-resolved) of *trans*-phytol.

Key words: *Mirabilis jalapa*, Terpenoids, Steroids.

Short Communication

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De novo Synthesis of Streptolysin S (SLS)

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Technology Section

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STUDIES ON THE ECONOMIC POTENTIAL OF GLASS SAND DEPOSITS OF DAU DAM DISTRICT DADU SINDH FOR GLASS MANUFACTURE

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In the Dau Dam silica sand deposits, the main impurity is iron, present as heavy black particles of magnetic and hornblende and yellow to reddish coatings of limonite on some of the grains. Simple beneficiation methods of water washing, screening and dry magnetic separation render these sands suitable for the manufacture of glass.

Key words: Potential, Sand, Glass.

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SUPPLEMENTATION OF TRADITIONAL PAKISTANI FOODS WITH VEGETABLE PROTEINS

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(Received January 6, 1993; revised October 26, 1993)

Supplementation of traditional foods with 5% (w/w basis) low fibre detoxified mustard seed meal improved nutritive value of Pakistani dishes. Fortified dishes were readily acceptable to the consumers.

Key words: Traditional foods, Vegetable protein.