



ISSN 0030-9885

Coden: PSIRAA 40 (1-4) 1-50 (1997)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol.40, Nos. 1-4, January-April 1997

Physical Sciences. Pages 1-30

Biological Sciences. Pages 31-40

Technology. Pages 41-50

Published monthly by

Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res. vol., 40, nos. 1-4, January - April 1997

PEROXYMOLYBDATES PREPARATION, CHARACTERIZATION AND MILD STEEL CORROSION INHIBITION

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(Received September 18, 1995; revised December 23, 1996)

Six peroxymolybdates were prepared by varying pH (5, 6 & 7) and ratio between hydrogen peroxide and molybdate (2:1 & 1:1). These were characterized as mono-, di-, mixed and polymerized peroxymolybdates. The best corrosion inhibition of mild steel in simulated cooling water (SCW) was obtained by diperoxymolybdate. This shows the beneficial effect of peroxo group addition to molybdate. Other peroxymolybdates did not show improved corrosion inhibition compared to the molybdate. This was due to the decomposition of these peroxymolybdates before reaching the mild steel surface. With citric acid, peroxymolybdates provided highly improved corrosion inhibition of mild steel in SCW and the best result was obtained with monomeric monoperoxymolybdate. These results as well as the mechanisms of corrosion inhibition were discussed.

Key words: Mild steel, Peroxymolybdate, Corrosion inhibitor.

Pak. j. sci. ind. res., vol. 40, nos. 1-4, January-April 1997

COMPOSITION, ORIGIN AND ECONOMIC POTENTIAL OF KAKUL, LAGARBAN AND TARNAWAI PHOSPHORITE DEPOSITS OF HAZARA, PAKISTAN*

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(Received September 13, 1993; revised January 1, 1997)

The carbonate fluorapatite, dolomite, calcite, quartz, hematite, magnetite, feldspar, kaolinite, montmorillonite and illite were important minerals identified by XRD and microscopy. Apatite mainly occurs as microspherite and ovulitic or disc shaped pellets of variable size. The P_2O_5 content of these phosphorites ranges from 22 to 36% with major impurities of silica, magnesium, iron oxides, alumina and alkalis. All field and laboratory data generated on these phosphorites suggest that Hazara phosphorites were formed authigenically and underwent various phases of deformation, variable degree of weathering and recrystallization to produce pelletal or granular phosphorites.

Key words: Phosphogenesis, Hazara, Pakistan.

Pak. j. sci. ind. res. vol. 40, nos. 1-4, January-April 1997

ON THE ELECTRODEPOSITION OF ^{80m}Br , ^{80}Br AND ^{82}Br SPECIES FROM (η,γ) ACTIVATED DIBROMOMETHANE - N,N-DIMETHYLANILINE MIXTURE

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(Received January 9, 1995; revised January 7, 1997)

Thermal neutron activation has been carried out in dibromomethane (DBM) - N,N-dimethylaniline (N,N-DMA) system and the ^{80m}Br , ^{80}Br and ^{82}Br species have been electrodeposited on Ag/AgBr electrodes under a constant electric field of 175 volts cm^{-1} . With the addition of N,N-DMA in DBM, anodic deposition has been severely decreased for all the radiobromines and cathode plate shows zero activities. Results are critically discussed by explaining the chemical reactivity of the amine. Electrode deposition pattern and the chemical stabilisation mode of the nucleogenic bromine species in this system are deduced to some extent.

Key words: Nucleogenic bromine species, Electrodeposition, Amine scavenger.

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SYNTHESIS AND SPECTRAL STUDIES OF MIXED LIGAND COMPLEXES OF SOME AZOPYRAZOLONES

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(Received July 3, 1995; revised January 28, 1997)

Mixed complexes of Zr (IV) and UO_2 (II) with the ligands 4 (3-pyridylazo) 1-phenyl-3-methyl-2 pyrazolin-5-one (PMP); 4- (2-thiazolylazo) 1-phenyl-3-methyl-2-pyrazolin-5-one (PMT); methyl- (2-benzothiazolylazo)-1-phenyl (3-methyl-2-pyrazolin-5-one (PMB) and salicylaldehyde (SA) as secondary ligand have been synthesised. Elemental analysis, IR, molar conductance and electronic spectral data indicate the stoichiometric ratio of 1: 1: 1 complexes. The stereochemistry of octahedral for the complexes were discussed in the Light of electronic spectra of the solid complexes.

Key words: Mixed complexes, Analysis, Azopyrazolones.

CHEMICAL CONSTITUENTS OF *CAESALPINIA BONDOC*

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(Received October 6, 1996; revised March 18, 1997)

Four known triterpenoids (1-4) α -amyrin (1), β -amyrin (2), lup-20(29)-en-3 β -ol (3), lup-20(20)-en-3 β -yl acetate (4) and two known sterols (5,6) β -sitosterol (5) and β -sitosteryl galactoside (6) were isolated first time from the *Caesalpinia bonduc*.

Key words: *Caesalpinia bonduc*, Triterpenoids,

Pak. j. sci. ind. res., vol. 40, nos. 1-4, January-April 1997

THE CATALYTIC EFFECT OF SULPHUR ON SODIUM DIETHYL DITHIOCARBAMATE OXIDATION IN REACTION WITH PLATINUM AND HEAZLEWOODITE

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(Received October 16, 1995; revised March 31, 1997)

The cyclic voltammetric studies were carried out on platinum and heazlewoodite (Ni_3S_2) electrodes in 0.1 mol. dm^{-1} sodium tetra borate buffer with and without sodium diethyldithiocarbamate (DTC) and sodium sulphide (Na_2S) added separately or in combination under comparable conditions. The combination of DTC and Na_2S and the effect of sulphur so produced on DTC and its oxidation is described. Flotation experiments were also conducted to study the effect of Na_2S concentration on heazlewoodite recoveries. An increase of about 6% in flotation recovery was observed for addition of 10^{-4} mol. dm^{-3} Na_2S concentration.

Key words: Cyclic voltammetry, Sodium sulphide, Diethyldithiocarbamate, Flotation.

Pak. j. sci. ind. res., vol.40, nos.1-4, January-April, 1997

**SYNTHESIS AND REACTIONS OF 4-[3-OXO-1-PHENYL-3-(P-SUBSTITUTED PHENYL)-
PROPYL]-1-[4-CHLORO-PHENYL]-2-(3-METHYL-5-OXO-2-PYRAZOLIN-1-YL)
THIAZOLE**

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(Received July 3, 1995; revised April 5, 1997)

Compounds 4-[3-oxo-1-phenyl-3-(p-chloro or p-methoxyphenyl)-propyl]-1-[4-chlorophenyl]-2-(3-methyl-5-oxo-2-pyrazolin-1-yl)]-thiazole (II a-b) have been prepared. The reactions of compounds (II a-b) with hydrazines in ethanol and in acetic acid, hydroxylamine hydrochloride, aromatic aldehydes, zinc dust, Grignard reagents, P_2S_5 and polyphosphoric acid have been investigated.

Key words. Michael Adducts, Thiazoles pyrazolone Derivatives.

Biological Sciences Section

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EFFECT OF INITIAL CALLUS SIZE/QUANTITY, AGAR, PHYTAGEL AND THIAMINE ON FURTHER GROWTH OF LEAF AND PETIOLE-DERIVED CALLUS CULTURES OF *GOSSYPIMUM HIRSUTUM* L.

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(Received August 19,1996; revised August 19,1996)

Effects of initial size of cotton callus on its further growth *in vitro* were investigated. It was observed that reduction in initial size/quantity of cultured callus resulted in reduced growth rate. Phytigel was found to be a superior gelling agent compared to agar. Thiamine at its higher concentration promoted the callus growth compared to the lower concentration.

Key words: Callus size, Gelling agent, Thiamine, Cotton.

ABUNDANCE OF RICE GREEN LEAFHOPPERS, *NEPHOTETTIX* SP. (HOMOPTERA: CICADELLIDAE) IN DIFFERENT RICE VARIETIES AND THEIR INTERRELATIONSHIPS WITH NATURAL PREDATORS

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(Received January 4, 1995; revised January 8, 1997)

Abundance of green leafhoppers, *Nephotettix* sp. and interrelationship between green leafhoppers and their natural predators was studied on 21 rice varieties/lines. The variety Kladoma and line BG-915 showed minimum and maximum susceptibility to green leafhopper attack. The highest leafhopper population was recorded 35 days after transplanting and thereafter a gradual density decline on plant age occurred. Out of five predators namely, *Conocephalus*, *Tetragnatha*, *Micraspis*, *Oxyopes* and *Agriocnemus*, predator *Micraspis* is the most important which made highly positive correlation (0.169), maximum direct effects (0.144) and maximum influences (2.85%) on the abundance of green leafhoppers.

Key words: Green leafhoppers, Rice varieties, Predators.

ANTIFUNGAL ACTIVITY OF THE PLANT *TRACHYSPERMUM AMMI*(L).

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(Received May 2, 1995; revised February 22, 1997)

Antifungal activity of the plant *T. ammi* (L.) Sprague, was carried out against fungi, *A. niger*, *A. flavus*, *F. solani*, *A. alternata* and *Helminthosporium* sp, as test organisms. Different parts of the plant were extracted in various solvents and zone of inhibition method was used to detect the fungi-toxic activity. Among all, particularly ethanol (95%) extract of the seeds was moderately effective against test fungi; benzene and pet ether extracts also showed some activity and root extracts in water, alcohol and acetone showed stimulating activity.

Key words: Fungi toxicity, *Trachyspermum ammi* (L), Antifungal activity.

Technology Section

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COCONUT PALM (*COCOS NUCIFERA*) HUSK AS A POTENTIAL ADSORBENT FOR LEAD, CADMIUM AND ZINC IONS IN INDUSTRIAL WASTE EFFLUENTS

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(Received March 5, 1994; revised January 22, 1997)

Sorption of lead, cadmium and zinc ions from aqueous effluents by coconut (*Cocos nucifera*) husk is reported. Results show that more than eighty percent removal could be achieved in the column experiments. The sorption of the metal ions vary markedly with the type of metal ion and follows the order lead > cadmium > zinc ions and its initial concentration. Its use for binding lead, cadmium and zinc ions in mining waste effluents is recommended.

Key words: Coconut husk, Adsorbent, Industrial waste, Toxic minerals.

SAPONIFICATION CATALYSTS

Part-III. Catalytic activity of O-hydroxybenzaldehyde and 4-allyl-2-methoxy-phenol for the saponification of oils and fats

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(Received May 20, 1995; revised February 19, 1997)

A simple economical and quick method for the saponification of oils and fats under mild conditions, using O-hydroxybenzaldehyde and 4-allyl-2-methoxy phenol as catalyst has been investigated.

Key words: Saponification catalysts, Soaps, Hydroxybenzaldehyde, Allyl-methoxy phenol.

Pak. j. sci. ind. res., vol. 40, nos. 1-4, January-April 1997.

EXTRACTION AND PRECIPITATION OF PEPSIN FROM BOVINE GASTRIC TISSUES

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(Received January 29, 1995; revised April 26, 1997)

Optimum conditions for the extraction and precipitation of bovine pepsin from young buffalo were studied. Changes in pH, temperature and extraction time significantly affected the extraction of pepsin. Maximum pepsin activity (222 units g^{-1}) was observed when minced gastric tissues were suspended in acidic solution of pH 2.2 at 40°C for 18 hr. Pepsin was precipitated from the extract by adding sodium chloride at the rate of 200 g^{-1} . Pepsin activity in camel, cow, buffalo and chicken gastric tissues, under these conditions was found to be 101, 141, 190 and 222 units respectively, while 172 units g^{-1} pepsin activity was observed in cases of sheep and goat. These gastric tissue samples of different animals were kept at -10°C for six months and a gradual decrease in pepsin activity by 18-68% was observed during storage.

Key words: Pepsin, Bovine, Extraction.