

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 27, No.2, April, 1984

Physical Sciences. Pages 57 – 87

Biological Sciences. Pages 88 – 95

Technology. Pages 96 – 120



Published bimonthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 27, No. 2, April 1984.

E.S.R. LINEWIDTHS IN $\text{Mn}^{2+}/\text{MgO}$

M. D. Hossain*, J. S. Thorp and A. D. Inglis

*Department of Applied Physics and Electronics,
University of Durham, United Kingdom*

(Received August 16, 1983)

The electron spin resonance linewidths of Mn^{2+} in single crystal MgO have been examined at both 9GHz and 30GHz over the temperature range 273K to 90K for manganese concentrations ranging from 880ppm to 4900ppm. For each of the doped crystals observations were made of the linewidth and lineshape as a function of polar angle; there were no changes in either 'g' value or hyperfine constant 'A' with polar angle over the temperature range. The predicted angular variations of linewidth for these manganese concentrations were also calculated, from the Van Vleck dipolar theory, and comparison showed that the observed linewidths were about sixty times less than expected. It was found that the peak-to-peak linewidths were concentration dependent (closely following a (concentration)^{1/2} law) and that the lineshape was Lorentzian. The E.S.R. data confirmed that Mn^{2+} entered the lattice substitutionally, occupying magnesium sites, even at the highest concentrations.

STUDIES ON HETEROCYCLIC QUATERNARY NITROGEN BASES

Effect of Substituents on the Kinetics of Trans-Alkylation of Primary Amines by N-substituted 2,4,6-triphenylpyridinium Cations

Sayed M.M. El-Shafie

*Chemistry Department, Faculty of Sciences, Minia University,
Minia, Egypt*

(Received June 21, 1982; revised August 18, 1983)

N-Substituents in 1-substituted 2,4,6-triphenylpyridinium cations are transferred to piperidine by unimolecular and/or bimolecular processes in chlorobenzene solution. The steric effects of the N-substituents was quite clear on the rate of the reaction constant.

SYNTHESIS OF SOME NEW MONO- AND DISUBSTITUTED N-TOSYL- OR N-PHTHALYL-AMINOACYL 3-AMINO-1, 2, 4-TRIAZOLE DERIVATIVES

A.M. El-Naggar, F.S.M. Ahmed, I.M. Ismail
and
H.M. Abd El-Bary

*Chemistry Department, Faculty of Science,
Al-Azhar University,
Nasr-City, Cairo, Egypt*

(Received February 1, 1981)

N-Pht-Gly-3-amino-1, 2, 4-triazole (II) and the corresponding N-Pht-DL-Phe-, N-Tos-B-Ala- and N-Tos-DL-Ala-derivatives (III-V) and 3-(N-Pht-B-Ala) amino-N-(N-Pht-B-Ala)-1, 2, 4-triazole (VI) and the corresponding N-Pht-L-Val-, N-Pht-L-Leu-, N-Tos-Gly-, N-Tos-L-Ala- and N-Tos-L-Val-derivatives (VII-XI) have been synthesized by the reaction of N-tosyl- or N-phthalyl-amino acid with 3-amino-1, 2, 4-triazole (I) in THF or DMF using the DCCD method.

**BEHAVIOUR OF 3 [2'-(3', 1')-BENZOXAZIN-4'-ONYL] COUMARIN
TOWARDS CARBON AND NITROGEN NUCLEOPHILES
(CONTRASTING THE REACTIVITY OF α -PYRONE AND OXAZINONE RINGS)**

M. Elkady, M. El-Hashash,* R.M. Saleh,* and A.M. El-Gendy*

*Chemistry Department, Faculty of Science, Ain Shams University,
Cairo, Egypt*

(Received January 2, 1983)

Alkylation of 3 [2'-(3', 1')-benzoxazin-4'-only] coumarin *1* under Friedel-Craft's condition gave 3(2'-aroylaniline) carbonyl-3, 4-dihydrocoumarin *2*. Acid hydrolysis of *2* yielded 3,4-dihydrocoumarin-3-carboxylic acid *3a*; which on reacting its acid chloride *3b* with amines gave the corresponding amide *4*. *1* also reacted with hydroxylamine hydrochloride or semicarbazide hydrochloride to yield the corresponding isoxazolidine *5* and triazole derivative respectively. Michael reaction of *1* with camphor and methyl isopropyl ketone have been utilized in the synthesis of *7* and *9*.

KINETICS OF THE ACETYLATION OF SOME CONDENSED AND ISOLATED-RING HYDROCARBONS BY FRIEDEL-CRAFTS REACTION

M.M.T. Anous, A.Y. Salem, N.A. Ibrahim, A.M. Ahmed and M.M. El-Banna

Chemistry Department, Alexandria University, Alexandria, Egypt

(Received January 26, 1983)

The rates and orders of reactions on the acetylation of biphenyl and *p*-terphenyl by acetyl chloride and anhydrous aluminium chloride according to Friedel-Crafts reactions in the highly polar solvent nitrobenzene (34.83D at 25°) as well as the weakly polar solvent 1,2-dichloroethane (1.0D) by the so-called complex I and II are studied together with the acetylation of naphthalene and anthracene in the latter solvent 1,2-dichloroethane. The rates and orders of reaction of the transformation of complex I to complex II in 1,2-dichloroethane as solvents are also studied and compared to the published results obtained for the same reaction in nitrobenzene as solvents.

All acetylation reaction in the polar solvent nitrobenzene are of a global orders one with respect to the acetylating complex and independent of the concentration of the aromatic hydrocarbon, while the global order is two in the weakly polar solvents 1,2-dichloroethane with partial first order respect to the aromatic hydrocarbon as well as the acetylating complex. The energies of activation and other thermodynamic parameters are calculated.

Pakistan J. Sci. Ind. Res., Vol. 27, No. 2, April 1984

**STRUCTURAL STUDIES OF 2-ACETO-1-NAPHTHOL-N-SALICYL
HYDRAZONE COMPLEXES OF Cu(II), Co(II), Ni(II),
Mn(II), Ce(III), AND UO_2^{2+}**

M.A. Khattab, G. El-Enany★ and M.E. Soliman

Chemistry Department, Faculty of Science, Mansoura University, Egypt

(Received November 30, 1981)

Complexes of Cu(II), Co(II), Ni(II), Mn(II), Ce(III) and UO_2^{2+} with 2-aceto-1-naphthol-N-salicyl hydrazone (AN.S.H.) have been prepared and characterized on the basis of analytical, spectrophotometric, infrared and magnetic moment data. Isolation of solid complexes and physical measurements revealed the existence of mono- and bis-ligand complexes in the keto-form. Spectrophotometric studies supported the use of this ligand for the micro-determination of metal ions in solution. The apparent formation constants of complexes are also determined. The electronic spectra of the solid complexes in dimethyl formamide indicate that Cu, Ni, Co and Mn complexes have octahedral structure.

Pakistan. J. Sci. Ind. Res., Vol.27, No. 2, April 1984

**PREPARATION AND CHARACTERISATION OF BIS (PICROLONATE)
TRANSITION METAL(II) DIHYDRATE AND TRIS (PICROLONATE)
LANTHANIDE(III) TRIHYDRATE COMPLEXES**

M.M. Osman*, S.A. Abou Ali and G.Y. Ali

Chemistry Department, Faculty of Science, Alexandria, Egypt

(Received March 2, 1981; revised November 11, 1983)

The complexes of picrolonic acid with the divalent Mn, Fe, Co, Ni, Cu and Zn and the trivalent La, Nd, Eu, Gd, Dy and Er were prepared. The compounds were characterised by the chemical and thermal analyses and IR. The electronic spectra and magnetic data suggest the octahedral structure for the metal(II) complexes. Neutral complexes of the general formula $MP_2 \cdot 2H_2O$ and $MP_3 \cdot 3H_2O$ were isolated for the metal(II) and metal(III) ions respectively (P = picrolonate ion). Coordination of the ligand with the metal ion occurs through the carbonyl and adjacent nitro-group.

Biological Sciences Section

Pakistan J. Sci. Ind. Res. Vol. 27, No. 2, April 1984

THE ALLELOPATHIC POTENTIAL OF *EUCALYPTUS TERETICORNIS* Sm.

Nazir Ahmed, Farrukh Hussain* and Mehmood Akram

PCSIR Laboratories, Peshawar, Pakistan

(Received April 19, 1982; revised November 30, 1983)

The allelopathic potential of *Eucalyptus tereticornis* Sm., an introduced species, was assayed by using aqueous extracts from leaves, flower-buds and bark against *Sorghum vulgare* var. Dale, *Sorghum vulgare* var. Wiay, *Phaseolus mungo*, *Brassica chinensis*, *B. campestris*, *Sisymbrium irio*, *Nigella sativa*, *Raphanus sativus* and *Setaria italica* in filter paper bioassays. The germination and radicle growth of various species was reduced by aqueous extracts, especially by leaf and flower bud extracts *Sisymbrium*, *Nigella* and *Brassica* were more susceptible than other species. The phytotoxicity depended upon the part assayed, and test species used with an independent effect on germination and growth. Aqueous extracts through soaking is one of the suggested routes for releasing phytotoxins in this plant. Further study is underway to envisage other aspects of allelopathy by this euclypt.

BROWN ROT OF POTATO IN THE PUNJAB

M.A.R. Bhatti , W. Ahmad and M. Siddique

University of Agriculture, Faisalabad, Pakistan

(Received October 2, 1982)

Incidence of brown rot of potato in Sialkot, Faisalabad, Jhang and Lahore varied between 3.6 to 6.0 percent whereas losses caused by this disease ranged from 4.3 to 5.7 percent. As the sources of seed for the spring potato crop in the plains lie in the hills, it is proposed to concentrate efforts to produce seed free from brown rot in the hilly areas. Since brown rot does not affect winter crop, it is suggested that the possibility of using the produce of this crop as seed on regular basis should also be encouraged.

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 27, No. 2, April 1984

PHARMACOKINETIC ANALYSIS AND CALCULATIONS USING A PROGRAM FOR THE MINICOMPUTER SHARP-PC 1500

Tasneem Ahmad, S.M. Khursheed and Muhammad Aslam

Department of Pharmaceutics, University of Karachi,

Karachi-32, Pakistan

(Received July 28, 1983; revised February 12, 1984)

This paper describes a biomedical computer program for computing blood level data after intravenous administration of the drug. This program may be utilized to determine pharmacokinetic parameters like C_1 , λ_1 , C_z , λ_z , K_{12} , K_{21} , K_{10} , V_c and CL. The program is written in BASIC language for minicomputer Sharp-PC 1500. However, it can be utilized with minor adjustment to a variety of computers working with this language.

OIL SEED PROCESSING TECHNOLOGY IN PAKISTAN

Part I. State of the Art

Din Muhammad, Khizar Hayat Khan and Shafiq Ahmad Khan

PCSIR Laboratories Lahore

(Received December 14, 1983)

The oil seed processing technology as existing in Pakistan, has been surveyed and reviewed. It has been observed that there are about ten thousand animal-driven kohlu units, almost two thousand five hundred power-operated large expellers and two thousand mini-expellers and fourteen solvent-extraction units processing various oil-bearing materials in the country. A quantitative treatment of the data concerning this technology, both traditional as well as modern, is described.

Pakistan J.Sci.Ind.Res., Vol. 27, No. 2, April 1984

GYPSUM PLASTER AS MATERIAL OF CONSTRUCTION

Mohammad Zubair, M.A. Chaudhry, Ainul Hasan Khan*

PCSIR Laboratories, Peshawar, Pakistan

(Received June 9, 1983)

The shortage of portland cement can be partially substituted by gypsum plaster in Pakistan. A historical perspective of use of plaster in European countries is reported in this paper. The details of researches conducted recently at Peshawar Laboratories are given. The cheap additives like calcined magnesite, dolomite, limestone and gypsum improve the strength and hardness of ordinary gypsum plaster. An organic retarder is used to control the setting time.

A CALIBRATION TECHNIQUE FOR A MERCURY GLASS THERMOMETER USING A PLATINUM RESISTANCE THERMOMETER

Anwar Ejaz Beg

Department of Pharmaceutics, Faculty of Pharmacy, University of Karachi

(Received January 4, 1983)

A technique to calibrate a mercury glass thermometer and a thermostated bath (viscometry bath) using a Platinum Resistance Thermometer and a Stabaumatic Potentiometer, has been developed. The method is based on the measurement of potential difference across the thermometer at a particular temperature under a known current supplied from a standard resistor. The study was carried out over the nominal temperature range 25-35°C. A plot between Hg/Glass temperature against bath temperature was a straight line showing a good linear co-relation over the temperature range studied.

COMPOSITION OF VARIOUS VARIETIES OF GUR (AN INSPISSATED SUGARCANE JUICE) PRODUCED IN PAKISTAN

Part II

S.T. A. Bokhari, S. Shaukat Ali, Shafiullah Khan, M.Y. Ikram-ul-Haq,
Fazal-ur-Rehman and Ehsan Ali.

PCSIR Laboratories, Lahore, Pakistan

(Received October 31, 1983)

Fifty five samples of gur were collected from different parts of Pakistan and analysed with respect of moisture, total ash, acid insoluble ash, reducing and non-reducing sugars, and colour. Moisture content varies from 3-11%. Presence of high amount of moisture affects the shelf-life of gur. Ash content varies from 2-4.5%, but most of the samples give less than 4% ash. The Ash comprises of sugarcane juice ash and ash due to added inorganic salts. An appreciable amount of acid insoluble ash indicates the presence of silica. Reducing sugar varies from 3.5 to 10%, depending upon the pH for the juice and the stage at which the clarifying agents are incorporated. Increase in the amount of reducing sugar affects the colour and shelf-life adversely. Such a wide range of variation of the characteristics of gur are due to the non-uniformity of the processing techniques employed for gur manufacturing, soil and the harvesting time.

Short Communication

Pakistan J. Sci. Ind. Res. Vol. 27, No. 2, April 1984

PESTICIDE RESIDUES IN FOODSTUFFS

Part I. A Note on the Survey of Vegetables for Pesticide Residues

S. Zafar Masud

*Federal Pesticide Laboratory, Pakistan Agricultural Research Council,
Malir Halt, Karachi-27.*

(Received December 11, 1982)