

Coden: PSIRAA 19(2) 45-100 (1976)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 19, No. 2, April 1976

Physical Sciences. Pages 45-65

Biological Sciences. Pages 66-79

Technology. Pages 80-100



Published bimonthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 19, No. 2, April 1976

OXIDATION OF FORMIC ACID WITH IODINE. PART I

J. SALAMAH, S. S. AHMED and M. A. HALEEM

College of Engineering, University of Riyadh, Riyadh, Saudi Arabia

(Received August 4, 1976)

Abstract. The reaction between formic acid and iodine was studied, and it was found to be of first order. The calculated energy of activation is 19.3 kcal/mole.

THERMOGRAVIMETRIC ANALYSIS OF TRIALKYLAMINE HALOBORANES. PART III

S. U. SHEIKH

Department of Chemistry, University of Islamabad, Islamabad

(Received July 18, 1976)

Abstract. Thermogravimetric analysis of trialkylamine haloboranes $[R_3NBX_3]$ shows loss in weight corresponding to the ejection of 1 mol. of alkyl halides with the formation of dialkylamine dihaloboranes.

INFRARED SPECTRA OF METAL COMPLEXES FROM 1,2-DIMORPHOLINOETHANE AND 1,3-DIMORPHOLINOPROPANE

M. SAKHAWAT HUSSAIN,* TAJ ALI** and S. MARGHOOB ALI

Department of Chemistry, University of Peshawar, Peshawar

(Received February 23, 1976 ; revised June 7, 1976)

Abstract. The ligands, 1,2-Dimorpholinoethane (DME) and 1,3-Dimorpholinopropane (DMP) form tetrahedral complexes of stoichiometry, MLX_2 where L, DME or DMP, M, Hg(II), Cd(II), Zn(II), Cu(II), Ni(II) and Co(II); X, Halogens and NO_3 . The solid state IR data of these complexes generally support tetrahedral coordination $MX_2 N_2$. The splitting of the C—O—C bands in the complexes is caused by solid state effects such as packing and its influence on ring conformations or long range intermolecular interactions of the oxygen atoms. The effects of chelation on some characteristic bands are discussed and the solid state data are examined in the light of electronic spectra and conductance data of the complexes in solution.

LOCATION OF ETHYLENIC BONDS IN FATTY/ALKANES COMPOUNDS

M. Y. RAIE

PCSIR Laboratories, Lahore

(Received May 22, 1976; revised July 28, 1976)

Abstract. The oxidative degradation of unsaturated long-chain compounds liberate short-chain fatty acids which are difficult to analyse due to their volatility and solubility in water. However, this difficulty is overcome by the development of an analytical technique which recommends the direct analysis of short-chain fatty acids in aqueous media onto a short ($18 \times \frac{1}{4}$ in) Porapak Q column. This physicochemical method is very useful for the structure elucidation and positional isomers of alcohols, acids and hydrocarbons of animal and vegetable origin.

INVESTIGATION ON EMINIUM SPECULATUM

Part 1. Compound and Free Amino Acid Composition

A. K. AL-MALLAH, M. NAZAR and D. S. AL-SAKKAL

Department of Physiology and Biochemistry College of Medicine, Mosul, Iraq

M. AFZAL

Department of Chemistry, College of Science, Mosul, Iraq

(Received May 21, 1975; revised May 29, 1976)

Abstract. The free and bound amino acids of extracts of *E. speculatum* have been determined by paper chromatography and no evidence has been found for the occurrence of nonprotein amino acids.

STUDIES ON CORDIA MYXA

Part I. The Monosaccharide and Polysaccharide Components of Fruits of Cordia Myxa

SAYED M. IFZAL and ANIS QURESHI

Department of Chemistry, University of Karachi, Karachi 32

(Received February 16, 1976)

Abstract. Monosaccharides and polysaccharides were extracted from the fruits of *Cordia myxa* in a stepwise manner.

The 95% ethanol extract afforded the monosaccharides, while stepwise extraction with cold water, hot water, ammonium oxalate and sodium hydroxide gave the polysaccharides. The monosaccharides were identified as glucose, fructose, xylose and an unidentified sugar was found to be present.

The polysaccharides from all the four extracts were found to have similar uronic acid anhydride (uaa) contents, and their specific rotations were measured. The major constituents of the polysaccharides were galacturonic acid, glucose, arabinose and xylose as a minor constituent.

Biological Sciences Section

Pakistan J. Sci. Ind. Res. Vol. 19, No. 2, April 1976

SUPPLEMENTATION OF ROTI AND NAN WITH GRAM (CHICK PEA) FLOUR*

M. Y. IKRAMUL HAQ† and M. SHAFIQ CHAUDHRY**

University of Agriculture, Lyallpur

(Received December, 23, 1975, revised June, 7, 1976)

Abstract. The effect of supplementation of roti and nan with 10, 15 and 20% levels of gram flour was studied. The protein content and protein quality of these products improved with the addition of gram flour. The effect of such supplementation on organoleptic qualities of roti was non-significant, while nans prepared with 15 or 20% gram flour were significantly more acceptable than control.

**STUDIES ON THE FIELD HABITS OF ADULT MELON FRUIT FLY
DACUS (STRUMETA) CUCURBITAE, COQUILLET**

ABDUS SAMI KAZI

Agricultural Research Institute, Tandojam

(Received May 15, 1975; revised December 24, 1975)

Abstract. There are 15 plants on which the adult flies perches. Activities of the female fly in the host field was maximum during 10.00-11.00 a.m., but consistently minimum on the resting sites and was vice versa in the early morning and late evening hours. This indicated female movement. Feeding habits of the adults in nature were also studied.

**A BEAN CONTAINING DIET FOR MASS REARING OF PECTINOPHORA GOSSYPIELLA
(SAUNDERS) LEPIDOPTERA : GELICHIDAE**

M. RAFI SHAIKH, KHALIQUE AHMED and MRS. FEEROZA KHALIQUE

Department of Physiology, University of Karachi, Karachi. 32

(Received March 19, 1976; revised June 14, 1976)

Abstract Detailed description of medium apparatus and procedures are presented. Information on biology of artificial diet reared *Pectinophora gossypiella* (Saunders) upto three successive generations include average and range of incubation period, average larval period, and the range of it, average and range of full grown larval recovery, average and range of pupal period, normal and abnormal adult emergence percentage (physically deformed), percentage of pupal death, average and range of adult longevity, average and range of egg laying/female, temperature and humidity range,

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 19, No. 2, April 1976

EFFECT OF RATES AND CARRIERS OF NITROGEN ON YIELD AND COPPER AVAILABILITY TO RICE AND CORN ON TWO CALCAREOUS SOILS

M. A. KAUSAR, F. M. CHAUDHRY,* A. RASHID and RAHMATULLAH

Nuclear Institute for Agriculture and Biology, Lyallpur

(Received June 11, 1976)

Abstract. Increasing N application from 0 to 150 ppm gradually increased Cu uptake by flooded rice on two calcareous soils. Two processes were mainly responsible: increased plant growth and enhanced Mn concentration in soil solution increased Cu absorption by rice roots. Urea and $(\text{NH}_4)_2\text{SO}_4$ increasing plant growth and Mn solubility more than NH_4NO_3 resulted in greater increase in Cu uptake. Soil acidification from $\text{NH}_3\text{-N}$ application or lower redox potential from $\text{NO}_3\text{-N}$ addition causing higher Cu contents in plants were not involved. The effect of $\text{CO}(\text{NH}_2)_2$ in enhancing HCO_3^- contents of soils inducing decreased Cu availability was also not important. An interesting mechanism of N enhanced Cu retention in plant roots as an immobile Cu-protein complex inhibiting its translocation to plant shoots was evaluated.

QUANTITATIVE ESTIMATION OF GYPSUM BY DIFFERENTIAL THERMAL ANALYSIS**KHURSHID JAHAN and AINUL HASSAN KHAN***PCSIR Laboratories, Karachi 39***M. A. QAISER***PCSIR Laboratories, Peshawar*

(Received May 12, 1976)

Abstract . A quantitative method is presented for the estimation of gypsum rich rock by differential thermal analysis, using calcium hydroxide as an internal standard. The effect of variations due to impurities such as quartz, iron oxide, sodium chloride, dolomite, illite and anhydrite are discussed.

APPRAISAL OF SOME SALT AFFECTED SOILS OF D. I. KHAN DISTRICT (N.W.F.P.)**JEHANGIR KHAN KHATTAK and R. A. KHATTAK***Department of Soil Science, University of Peshawar, Peshawar***S. BABER***PCSIR Laboratories, Peshawar*

(Received May 29, 1976 ; revised June 24, 1976)

Abstract. Salt-affected soils of D.I. Khan were appraised by collecting eighteen composite samples from 0 — 15, 15 — 45 and 45 — 90 cm depth. Four samples were found to be saline and fourteen saline-alkali. The values of electrical conductivity ranged from 5.83 to 20.87mmhos/cm at 25°, pH from 7.80 to 8.40 and ESP from 13.15 to 28.08. Sodium and chloride were dominant soluble ions. These soils were from medium to fine in texture and strongly calcareous having low contents of organic matter, total nitrogen, and available phosphorus. Available potassium was adequate. Significant correlations were found between clay content and CEC, ESP and gypsum requirements and pH and organic matter.

EFFECTIVENESS OF ZINC SOIL TESTS FOR FLOODED RICE

F. M. CHAUDHRY,* A. LATIF, M. SHARIF and A. RASHID

Nuclear Institute for Agriculture and Biology, Lyallpur

(Received June 29, 1976)

Abstract. The DTPA [(carboxy methyl) imino] bis(ethylene nitrilo) tetraacetic acid, EDTA (ethylene diaminetetraacetic acid), dithizone (dithiocarbazone) and HCl methods successfully measuring available Zn for upland crops, failed to predict its availability for lowland rice (*Oryza sativa* L.). This discrepancy appears to be explained by the reported strong inhibition of Zn absorption in rice by flooding induced increased Fe and Mn contents of soil solution. Their contents in flooded soils are not related with those of air dried soils approximating field moisture conditions of upland crops.

A COMPARATIVE STUDY OF ANALYSIS OF TECHNICAL GRADE FENITROTHION BY THREE DIFFERENT TECHNIQUES

NASIMA KHAN, ZAFAR MASUD, J. A. OSMANI, TAHIR ZAKAI and M.M.H. BAIG

Agricultural Research Council, Malir Halt, Karachi 27

(Received March 3, 1976 ; revised June 28, 1976)

Abstract. Gas liquid chromatography and IR spectrophotometry were compared with WHO recommended chemical method for the quality control of technical grade Fenitrothion insecticide. The chemical method involves a diazonium reaction which is time-consuming. It is evident from the comparative data that results of the three methods are in close agreement with one another. GLC and IR spectrophotometric methods which are far more convenient and less time-consuming, may be reliably employed for the analysis of Fenitrothion insecticide.