Physical Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

SPECTROSCOPIC STUDIES OF ORGANOPHOSPHORUS COMPOUNDS

Part IX. IR Spectra of Tri-*o*-tolylphosphine and Alkyltri-*o*-tolylphosphonium Iodides*

M. ARSHAD A. BEG and SAMIUZZAMAN

PCSIR Laboratories, Karachi 39

(Received January 13, 1973)

Abstract. The IR spectra of tri-*o*-tolylphosphine and alkyl-tri-*o*-tolylphosphonium iodides where the alkyl group is methyl, ethyl, n-propyl or n-butyl group have been reported and assignments in the 1600–250 cm^{-1} region made on the basis of band position and integrated intensity measurements. The intensity of the spectral bands of these compounds is comparable with *m*-tolyl and lower than the phenyl and *p*-tolyl compounds. This is suggested to be a result of steric-overcrowding. This phenomenon is found to decrease as the chain length is ascended as shown by the intensity of various modes in general and mode *n* in particular. The bands at 745, 540 and 504 cm^{-1} are split into doublets or triplets with a separation of 10–40 cm^{-1}. The splitting is discussed in terms of quaternization. The ν_{as} P—$C_{aliphatic}$ absorbs weakly and occurs at 780 ± 10 cm^{-1}.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

THE REVERSIBLE AND IRREVERSIBLE SEPARATION OF GASES BY PARTITION CHROMATOGRAPHY

M. JAFFAR

Institute of Chemistry, University of Islamabad, Islamabad

(Received July 4, 1973)

Abstract. A conceptual, but concise, account of the nature of the partition gas chromatographic separation process, from the view point of thermodynamics and with special reference to entropy changes, is presented. Based on a philosophical and qualitative approach, illustrated through simple physical principles, the treatment embodies the quantitative aspects of the problem as well. This has been taken up with regard to the free energy of dilution, or for that matter, the entropy of mixing and unmixing. Furthermore, the quantitative contributions of the carrier gas and the liquid stationary phases to the overall entropy changes have been derived for a binary system, whereby the analysis reveals the isentropic nature of the chromatographic separation process.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

THE STRUCTURE OF DENDROPANOXIDE

I. MIR and S. AHMAD

PCSIR Laboratories, Peshawar

F.W. BACHELOR

Department of Chemistry, The University of Calgary, Calgary, Alberta, Canada

(Received August 20, 1973)

Abstract. The structure of dendropanoxide, otherwise known as campanulin, has been shown to be 3:10-epoxy-D:β-friedo-oleanane. The NMR and mass spectra show conclusively that it contains a 5-membered oxide ring.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

ISOLATION AND STRUCTURE OF CROTALARINE, A NEW ALKALOID FROM CROTALARIA BURHIA BUCH.-HAM.

M. AMJAD ALI and G.A. ADIL

PCSIR Laboratories, Karachi 39

(Received June 6, 1973; revised October 9, 1973)

Abstract. Crotalarine, $C_{18}H_{27}NO_6$, m.p. 167–68°, $[\alpha]_D^{26}$—79.8° (ethanol), a new alkaloid isolated from the aerial parts of the plant *Crotalaria burhia* was hydrogenated in the presence of platinum oxide catalyst to tetrahydrocrotalarine, the properties of which indicated it to be a salt. Crotalaric acid was obtained from the salt. By alkaline degradation crotalarine gave *s*-butyl methyl ketone, DL-lactic acid and retronecine. Crotalarine absorbed one mole equivalent of periodic acid in 25–30 min and formed a cyclic sulphite ester with thionyl chloride. The properties and IR spectra of crotalarine, tetrahydrocrotalarine and crotalaric acid resembled closely those of trichodesmine, tetrahydrotrichodesmine and trichodesmic acid. A structure formula is proposed which satisfies all the properties of this alkaloid.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

EFFECT OF SOLVENT-SOLUTE INTERACTIONS ON C—H AND C≡C STRETCHING VIBRATIONS OF ACETYLENE

AZHAR M. SYED

PCSIR Laboratories, Karachi 39

(Received December 20, 1972; revised September 25, 1973)

Abstract. The antisymmetric C—H and symmetric C≡C stretching vibrations (ν_3 and ν_2) of acetylene have been studied in solution. Accurate measurements of the frequency of the C≡C stretching vibration which appeared in a range of solvents have shown the involvement of C≡C group into specific interactions similar to the C—H group.

Short Communications

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

HUCKEL MOLECULAR ORBITAL CALCULATION AND SPIN POLARIZATION PARAMETER IN A TRIVALENT NITROGEN: TRIS-*p*-NITROPHENYLAMINE CATION

MAHBOOB MOHAMMAD

Department of Chemistry, University of Islamabad, Islamabad

(Received July 23, 1973)

4. E.J. Strom, G.A. Russel and R. Konaka, J. Chem. Phys., 42, 2033 (1960).
5. A. Streiwieser, *Molecular Orbital Theory for Organic Chemists* (J. Wiley, New York, 1962), p. 135.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

CYCLIC VOLTAMETRIC STUDIES

Part I. 1-Ethyl-4-Carbomethoxypyridinium Iodide in Acetonitrile

MAHBOOB MOHAMMAD, M. SALEEM, SALEEM QURESHI and IMTIAZ HANIF

Biological Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

THE PECTIC SUBSTANCES OF PIGMENTED ONION SKINS : FORMATION OF GALACTURONE IN HEATED PECTIN AND PECTIC ACID SOLUTIONS

A.F. ABDEL-FATTAH

Laboratory of Microbiological Chemistry, National Research Centre, Dokki, Cairo, A.R. Egypt

M. EDREES

El-Nasr Company for Dehydrating Agricultural Products, Cairo, A.R. Egypt

(Received May 28, 1973; revised September 29, 1973)

Abstract. A galacturone was formed on thermal treatment of aqueous solutions of pectin or pectic acid suspensions. Isolation of the galacturone was performed by chromatography on a cellulose column and its characterization was achieved.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

STATISTICAL STUDIES OF LIGHT TRAP CATCHES OF ZYGINIDIA QUYUMI (AHMED) (CICADELLIDAE:HOMOPTERA) ON WHEAT IN PUNJAB

MANZOOR AHMED, ABDUL JABBAR and MOHD SHAFIQ

Bioecology Research Project, University of Karachi, Karachi 32*

(Received May 18, 1973; revised September 14, 1973)

Abstract. Light trap studies were made on the leafhopper species *Zyginidia quyumi* (Ahmed on wheat, at Tandlianwala (Distt. Lyallpur, Punjab). The species is quite abundant on the crop and was particularly prevalent between March 28, 1972 – April 6, 1972, when the studies were made. Five coloured lights (60W each) red, green, yellow, blue and ordinary lights were used to attract leafhoppers for a period of about 30 min from sunset. The arrangement of lights was rotated daily, and the catches continued for 10 days. The daily catches have been analysed statistically for the relative preference of light colours by the leafhoppers, the involvement of sex in light attraction, and the interaction of sexes and lights. It has been concluded that there is no significant sex effect on the attraction of *Z. quyumi* to various light colours, the overall effect of colours on *Z. quyumi* is highly significant and the interaction of sex and light is not significant.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

A CONTRIBUTION TO THE KNOWLEDGE OF COREID FAUNA IN NATIONAL INSECT MUSEUM OF PAKISTAN (HEMIPTERA, COREIDAE)*

NARJIS YOUSUF and IMTIAZ AHMAD

Department of Zoology, University of Karachi, Karachi 32

(Received April 27, 1973; revised October 3, 1973)

Abstract. The 34 identified species of the coreid fauna in the National Insect Museum of Pakistan, belonging to the former British India, are listed below. This list is being published in order to provide information to all the workers about the existence of these rare specimens in Pakistan.

Special Paper

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

THE PHYSIOLOGICAL ASPECTS OF ABSCISSION WITH A REFERENCE TO COTTON PLANT

A. S. BHATTI

Nuclear Institute for Agriculture and Biology, Lyallpur

(Received May 15, 1972; revised September, 25, 1973)

Short Communications

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

CONSTITUENTS OF DELPHINIUM ORIENTALE

M. IKRAM and I.H. SIDDIQUI

Department of Pharmacology, Medical School, Pahlavi University, Shiraz, Iran

(Received July, 6, 1973; revised September 28, 1973)

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

STUDIES ON NEEM PLANT AS REPELLENT AGAINST STORED GRAIN INSECTS

GHULAM JILANI and MOHAMMAD MUNIR MALIK

Nuclear Institute for Agriculture and Biology, Lyallpur

(Received June 11, 1973; revised October 6, 1973)

Abstract. The extracts of various plants were tested against stored grain insects; the 'neem' plant possessed maximum repellent property. The maximum repellency was exhibited by seeds compared with leaves, flowers and fruits of 'neem' plant. It was further observed that the adults of *Rhyzopertha dominica* F. were less affected. The flour beetles fed on neem-extract-impregnated flour failed to reproduce and their feeding activity, determined by using P^{32} labelled-flour, was greatly reduced.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

ANODIC OXIDATION OF HYDRAZINE ON SILVER

ZAFAR AHMAD KHAN*

Electrochemistry Research Laboratory, School of Chemistry, University of Newcastle-Upon-Tyne, U.K.

(Received June 7, 1973)

Abstract. The oxidation of hydrazine in alkaline solutions was investigated on silver electrode. Coulometry, potentiostatic pulse and sweep methods were employed to investigate the reaction. The results show that the overall reaction involves four electrons and that the rate of reaction is limited by 1 *e* transfer in the first step. The reaction was found to be first order with respect to hydrazine and independent of hydroxyl ion concentration in the range, investigated.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

CORRELATION OF SOLAR RADIATION AND SUNSHINE DURATION IN RIYADH, SAUDI ARABIA

J.A. SABBAGH, A.A.M. SAYIGH and E.M.A. EL-SALAM

College of Engineering, University of Riyadh, Saudi Arabia

(Received January 20, 1973; revised September 4, 1973)

Abstract. This paper presents the measurements of the intensity of incident solar radiation on a horizontal surface and sunshine duration during clear days in Riyadh. These measurements have been studied and presented in tabular and graphical form.

Empirical formulae based on sunshine duration are suggested for estimating solar radiation on a horizontal flat-plate.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

CURLED-LEAF DISEASE OF PAPAYA TREE

MOHSIN AZIZ FARUQI and M. RAFIUZ-ZAMAN

PCSIR Laboratories, Karachi 39

S. MAHDIHASSAN

S.D. 34, Block A, North Nazimabad, Karachi 33

(Received October 17, 1973)

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

PLANT PARASITIC NEMATODE FAUNA OF SIND

MOHAMMAD AHMAD, MANZOOR SAEED

and H. A. KHAN

PCSIR Laboratories, Karachi 39

(Received August 28, 1972; revised October 25, 1973)

A survey of plant parasitic nematodes of Sind region has been undertaken in order to determine their prevalance, host-range and pathogenicity. Although

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

THE ROLE OF ORGANIC ACIDS IN CONTROLLING THE REACTION OF PHENOL WITH FORMALDEHYDE TO FORM PHENOLIC RESINS

M.M. Zafar, A.H.K. Yousufzai, S. Ali Husain and A.A. Chisti

PCSIR Laboratories, Karachi 39

(Received October 18, 1972; revised September 12, 1973)

Abstract. A study has been made of the acid-catalysed phenol–formaldehyde reactions using ten carboxylic acids of different basicities. It has been observed that the molecular weights of resultant resin seem to be dependent upon the acid concentration a, p*K* value of the acid and other reaction variables

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

SPHEROIDAL-ASBESTOS FROM QILLA, CHARSADDA TEHSIL

KHURSHID JEHAN and AINUL HASAN KHAN

PCSIR Laboratories, Karachi 39

(Received June 25, 1973; revised September 12, 1973)

Abstract. Spheroidal-asbestos has been found near the village Qilla in Charsadda tehsil (Pakistan). The chemical composition, X-ray powder data and DTA show that the asbestos is composed of chrysotile mineral. The genesis of the mineral is also discussed.

Pakistan J. Sci. Ind. Res., Vol. 16, No. 6, December 1973

A METHOD OF EXTRACTION AND ESTIMATION OF AJMALINE IN DOG'S BLOOD

R.A. SHAH

PCSIR Laboratories, Peshawar

(Mrs.) RUQIA MAHMUD and (Mrs.) NARGIS HUSSAIN

PCSIR Laboratories, Karachi 39

(Received April 3, 1973; revised October 3, 1973)

Abstract. A rapid absorptiometric technique has been described for the extraction and estimation of microquantities of ajmaline in dog's blood. Ajmaline is extracted from serum with ethyl acetate and the red colour of nitroajmaline is measured spectrophotometrically at 510 nm. The method has an accuracy of $\pm 1.0\%$.