Coden: PSIRAA 26 (1) 1–52(1983)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 26, No. 1, February 1983

Published bimonthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

THE KINETICS OF THE DECARBOXYLATION OF METHYLETHYLMALONIC ACID IN CATECHOL

M.A. Haleem, M.A. Hakeem, M. Jarallah and M.A. Basit

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

(Received February 12, 1981;revised August 12, 1982)

Kinetic data reveal decarboxylation of methylethylmalonic acid in resorcinol and catechol. The activation parameters are calculated and compared with those earlier reported for the decarboxylation of methylmalonic acid and ethylmalonic acid. The isokinetic temperature corresponds to the exact melting point of methylethylmalonic acid.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

DOES A SIMULTANEOUS TWO-ELECTRON TRANSFER OCCUR IN THE SYSTEM TETRAPHENYLETHYLENE AND ITS DIANION

Mahboob Mohammad

Electrochemistry Group, Department of Chemistry, Quaid-i-Azam University, Islamabad , Pakistan

(Received March 1, 1982; revised August 16, 1982)

The ^{13}C NMR spectrum of tetraphenylethylene ($\phi_2C{:}C\phi_2$), of its dilithium salt ($\phi_2C.C\phi_2 . 2Li^+$), and of their mixtures in C_6D_6 were recorded. The spectra of the mixture consist of two sets of the hydrocarbon and the lithium salt lines each. This domestrates that the exchange.

$$\phi_2C{:}C\phi_2 + \phi_2\bar{C}.\bar{C}\phi_2, 2Li^+ \rightarrow \text{exchange}$$

is very slow, even on NMR scale, and its bimolecular rate constant has, therefore, to be smaller than $100M^{-1}\,sec^{-1}$

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February, 1983

HETEROCYCLIC SYNTHESIS WITH MALONYL DICHLORIDE AND NITRILES

N.A. Zaidi , J.M. Al-Katti and F.H. Saeed

Chemistry Department, Faculty of Science, Binghazi, Libya

(Received May 24, 1981; revised October 2, 1982)

Reaction of malonyl dichloride with cyclopropane carbonitrile yielded 2-chloro-3-(2′-chloroethyl) 4-hydroxy-6-pyridone which on recrystallization from ethanol converted to 2-chloro-1,6,4′,5′-tetrahydro-6-oxo-furano-(3′,2′-3,4) pyridine. Cyclohexane carbonitrile with malonyl dichloride yielded the mixture of 2-cyclohexyl-4-chloro-6-pyrimidone and 2-cyclohexyl-7-chloro-4,5-dioxopyrano – [3,4-e] – [1,3] – oxazine. Reactions of malonyl dichloride with 1-phenylcyclopentane carbonitrile and pivalonitrile gave the corresponding bicyclic oxazines. Malonyl dichloride with pyruvonitrile yielded most probably a four membered heterocyclic compound.

Pakistan J.Sci.Ind.Res., Vol. 26, No. 1, February 1983

VOLUMETRIC DETERMINATION OF URANIUM AND VANADIUM WITH HEXAMINECOBALT (III) TRICARBONATOCOBALTATE(III)

Muhammad Hanif, Ishrat Ijaz, Mahmood Ahmad and Shams-ul-Haque Qureshi*

PCSIR Laboratories, Lahore - 16, Pakistan

(Received June 25, 1981)

Hexaminecobalt (III) tricarbonatocobaltate(III) has been successfully used as redox titrant for the volumetric determination of uranium from 59.5 μg to 35.7 mg with maximum error of –0.73% in 0.1 to 0.5N H_2SO_4 and vanadium from 0.54 to 31.74 mg with a maximum error of +5.55%. The method is quick, precise and rapid. There is no interference by Ag(I), Pb(II), Zn(II), and Ni(II) and chromium for uranium and vanadium determination respectively within the given limits whereas Fe(II) interferes seriously in both the cases.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February, 1983

REACTION BETWEEN ACRYLIC ACID AND PEROXYDISULPHATE A KINETIC STUDY

G.M. Khan and A. Hamid

Department of Chemistry, University of Garyounis, Benghazi, Libya

(Received July 19, 1981)

The uncatalyzed reaction between acrylic acid and peroxydisulphate has been studied kinetically over the range 60 – 80° . The reaction is found to follow an overall first order. The products of the reaction have been analyzed and the rate law deduced.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

THE EFFECT OF SULPHATE IONS ON THE KINETICS OF THE REACTION OF IRON (III) WITH SULPHIDE ION IN PERCHLORATE MEDIA

M. A. Salam

Department of Applied Chemistry, University of Karachi, Karachi

(Received August 18, 1981; revised July 11, 1982)

The Kinetics of reduction of Fe(III) ions by sulphide ion have been investigated in perchlorate medium. In all cases the reaction is first order in sulphide ion and second order in ferric ion. Over all the reaction is found to be third order.

The decrease in the third order rate constant k_o, for the reaction of iron (III) with sulphide ion found with added sulphate ions. k_o decreases to a very low insignificant value.

This is interpreted in terms of complex formation between ferric ions and sulphate ions, the complex not reacting with sulphide ions. From the variations of k_o with concentration of sulphate ions the type of complex is distinguished. Formation constant are determined for the complex under experimental conditions.

Biological Sciences Section

Pakistan J.Sci. Ind.Res., Vol.26, No.1, February 1983

EFFECT OF SPLIT APPLICATION OF P ON P UPTAKE IN COTTON FROM P^{32}-LABELLED SUPERPHOSPHATE

A. Hamid and G. Sarwar

Nuclear Institute for Agriculture and Biology, Faisalabad, Pakistan

(Received June 25, 1981; revised September 8, 1982)

The effects of split application of P on cotton yield and P uptake from P^{32}-labelled superphosphate were studied in the field. Phosphorus was applied at four levels (i.e. 10, 20, 30 and 40 kg P/ha) in a single dose at seeding and in two equal splits at seeding as well as 60 days after the seeding. A significant increase in yield was obtained at 20 kg P/ha level and above. The application of P significantly increased P percentage in leaves at all growth stages irrespective of its rate. However P percentage in bolls did not differ significantly due to its application. . Percent P derived from fertilizer (% P dff) in leaves and bolls increased significantly with the increase in its rate of application. Splitting the P application slightly improved %P dff but it did not benefit the yield of seed cotton. The correlation coefficient of % P dff in leaves to yield showed that % P dff in leaves upto 90 days after seeding was a better and direct measure of utilization of fertilizer P.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

EFFECT OF GIBBERELLIC ACID (GA) ON GROWTH AND YIELD OF *CICER ARIETINUM* (GRAM) VARIETY C-727

Khalil Ahmad Khan and Abdur Rashid

Department of Botany, University of Agriculture, Faislabad, Pakistan

(Received August 23, 1981; revised March 13, 1982)

Seeds of *Cicer arietinum* variety C-727 were soaked in five concentrations (0, 100, 150, 200 and 250 ppm) of Gibberellic acid for 24 hrs. GA treated plants significantly increased the plant height, number of nodes, number of internodes, number of branches, number of leaves per plant and shoot dry weight. Number of pods per plant, yield per plant and total yield increased in plants treated with 100 ppm GA but the root dry weight and number of flowers per plant decreased.

Technology Section

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983.

SYMBIOTIC BIODEGRADATION OF CELLULOSIC RESIDUES

Part II. Biodegradation of Bagasse and Beet Pulp Feed

F.H. Shah, M.H. Sedi, Zia-ur-Rehman, Nusrat Begum and Tahira Firdos

PCSIR Laboratories, Lahore, Pakistan

(Received August 18, 1980; revised September, 1982)

Biodegradation of bagasse and beet pulp feed was studied by submerged fermentation process. Biodegradation of beet pulp feed was 36.36% and 40.30% when Penicillium and Trichoderma were employed singly. Symbiosis of Penicillium with Trichoderma degraded 48.37% of the cellulose present in beet pulp feed with 32.58% increase in nitrogen contents. In case of bagasse 25.30% increase in the degradability of cellulose was observed with the same combination. In beet pulp feed, maximum biodegradation of cellulose (70.20%) was observed due to the symbiotic effect of *Bacillus pumilus* and Streptomyces. Reduction in particle size increased the susceptibility to enzymic hydrolysis.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

NEUTRAL LIPIDS FROM SEEDS OF *TRIGONELLA CORNICULATA*

Muhammad Nazir, Muhammad Riaz, Jamilur Rehman, Muhammad Akbar Saeed and Muhammad Khurshid Bhatty

PCSIR Laboratories, Lahore, Pakistan

(Received September 3, 1981)

The fatty acids of the oil of the seeds of *Trigonella corniculata*, were identified as myristic (0.90%), palmitic (16.78%), stearic (3.48%), oleic (12.65%) linoleic (50.54%), linolenic (15.71%) and arachidic acid (1.13%). The oil gave unsaponifiable matter (5.92%) which was resolved into hydrocarbons, alcohols, sterols etc. The distribution of *n*-alkanes ranged from C_{15} to C_{35}, with two maxima at C_{21} (34.67%) and C_{29} (14.26%). The *n*-alkanols ranged from dodecanol to triacontanol with maxima at octadecanol (5.04%) and hexacosanal (62.53%). Cholesterol and β-sito-sterol have also been confirmed.

Pakistan J.Sci.Ind.Res., Vol.26, No.1, February 1983

THERMAL DEGRADATION OF COPOLYMERS OF VINYL ALCOHOL AND VINYL BUTYRAL

Mohammad Feroze Bakht

Pakistan Institute of Nuclear Science & Technology, Nilore, Rawalpindi

(Received December 14, 1980)

A series of copolymers of vinyl alcohol (V-OH) and vinyl butyral (VB) with different degrees of VB substitution were prepared from poly(vinyl alcohol) (PV-OH), and were subjected to thermal degradation under vacuum. The degradation products were then identified. Alcohol rich copolymers showed increased thermal stability, whereas it decreased with the increase in VB contents in the copolymer. No interaction between adjacent V-OH and VB units in the chain was observed. A degradation mechanism is proposed to account for the principal features of the reaction and the products of degradation.

Pakistan.J.Sci.Ind.Res., Vol.26, No.1, February 1983

ACID TREATMENT OF LATERITE FOR THE RECOVERY OF IRON, ALUMINIUM AND TITANIUM*

M.A. Lodhi, F.M. Zafar Kaifi and R.A. Shah

PCSIR Laboratories, Peshawar, Pakistan

(Received August 9, 1982)

Ziarat laterite was leached with different acids for recovering titanium, aluminium and iron. Solvent extraction with high molecular weight amines and alkylphosphates was used for separation of iron from leach liquors. Titanium and aluminium recoveries were of good purity. The residue left after the acid treatment was rich in aluminium. The process is promising for commercial exploitation of laterite.

Pakistan J.Sci.Ind.Res., Vol. 26, No. 1, February 1983

SANTONIN CONTENT OF *ARTEMISIA* SAMPLES OF PARACHINAR AREA OF PAKISTAN: A SIMPLIFIED PROCEDURE FOR ITS DETERMINATION

Yusuf Ahmad, S. Khaqan Hasan and (Miss) Nuzhat K. Sherwani

PCSIR Laboratories, Karachi 39, Pakistan

(Received January 21, 1983)

Six samples of *Artemisia* plants have been collected from Parachinar area of Pakistan, and their santonin contents have been determined by a simple procedure developed by us. Santonin content of these sample varied in the range of 1.27 to 2.75%.