

ISSN 0030-9885

14
Codon: PSIRAA 44(2)63-120 (2001)



PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol 44, No.2

April 2001

Physical Sciences. Pages 63-82
Biological Sciences. Pages 83-108
Technology. Pages 109-113

Published bimonthly by
Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
Karachi

Physical Sciences

Pak J Sci Ind Res 2001 44 (2) 63-66

SYNTHESIS OF 5 H-IMIDAZO [1, 2-a] THIOPYRANO-[4', 3': 4, 5] THIENO[2, 3-d] PYRIMIDIN-5-ONE

A Z M Shaifullah Chowdhury, M M Rahman Khandker, M M H Bhuiyan and M K Hossain*

Department of Chemistry, Chittagong University, Chittagong-4331, Bangladesh

(Received 5 August 1999; accepted 25 March 2000)

The enamino-ester, ethyl, 2-amino-4,7-dihydro-5H-thieno[2,3-c]thiopyrano-3-carboxylate (5) was prepared from tetrahydrothiopyran-4-one (4). Annelating reagent, 5-methyl-2-methylthioimidazoline (8) was prepared starting from 1, 2-diaminopropane (6) via 5-methyl-2-imidazolidinethione (7). The reaction of enamino-ester (5) with the annelating reagent (8) in HMPTA leaded to new 1, 2, 3, 6, 7, 9-hexahydro-5H-imidazo[1, 2-a]thiopyrano[4', 3':4, 5]thieno-[2, 3-d]pyrimidin-5-one (9) in good yield.

Key words: Tetrahydrothiopyran, Annelating reagent, Fused pyrimidines

MODIFICATION OF GELATIN BY GRAFTING WITH METHYL METHACRYLATE

A Rasheed Khan^{a*}, A F K Ifrahim^b, Kausar Ali Syed^b and Tehzeeb Akhtar^b

^aFuel Research Centre, PCSIR Karachi-75280, Pakistan

^bPlastic and Polymer Research Centre, PCSIR Laboratories Complex, Karachi-75280, Pakistan

(Received 9 March 1999; accepted 7 July 2000)

Modification of gelatin by grafting with methyl methacrylate in the presence of potassium persulphate was studied and the results were discussed with respect to grafting ratio (GR) grafting efficiency (GE), rate of grafting (Rg) and rate of conversion of monomer (Rp). The lower concentration of gelatin favours more grafting. Homopolymerization of monomer is not observed in most of the cases.

Key words: Gelatin, Grafting, Methyl methacrylate.

CHEMICAL, MINERALOGICAL CHARACTERIZATION AND LIBERATION STUDIES OF KOH-I-SULTAN SULPHUR

I H Khan, Fayyaz Mahmood and Mustansar Naeem*

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received 9 March 1999; accepted 24 August 2000)

Studies were undertaken on the sulphur samples from Batal area, District Nokkundi (Baluchistan) and the waste material from Quetta Sulphur Refinery which indicate the presence of sulphur contents from 17-50%. Chemical evaluation and liberation studies were carried out to determine the processing parameters for the upgradation of the sulphur samples. The studies revealed that fairly high-grade sulphur might be recovered from these samples.

Key words: Sulphur, Mineralogy, Liberation, Koh-i-Sultan sulphur, Upgradation.

POSITIONAL ISOMERS OF OCTADECENOIC ACID SEPARATED FROM OILS OF THREE CARUM SPECIES OF UMBELLIFERAE FAMILY

Tanweer Ahmad Chaudri*, Ijaz Ahmad, Din Muhammad and Manzoor Ahmed

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received 28 April 1998; accepted 14 September 2000)

In the family *Umbelliferae* octadecenoic acid ($C_{18:1}$) is a phylogenetic character having distribution on the different positions of triacylglycerol molecules. It has a role as a key intermediate in fat metabolism during seed germination which created an interest to investigate further to find out its positional isomers in the oils of *Carum* species. Therefore, the octadecenoic acid separated from the seed oil of *Carum capticum*, *Carum carvi* and *Carum roxburghianum* of *Umbelliferae* family was oxidized separated by Von Rudloff's reagents. The liberated mono and difunctional fatty acids were separated and identified by the application of thin layer and gas liquid chromatography to determine positional isomers. The positional isomers determined among these three species were *cis*-6-octadecenoic acid, *cis*-9-octadecenoic acid and *cis*-12octadecenoic acid. The percentage of these isomers varied from 4.5 to 46.0%

Key words: Octadecenoic acid, Von Rudloff's Oxidation, Positional isomers.

THE STUDY OF CORRELATION OF B-COEFFICIENT WITH OTHER ADDITIVE PROPERTIES FOR CROTONIC ACID

Fahim Uddin, Rehana Saeed and Samiullah*

Department of Chemistry, University of Karachi, Karachi-75270, Pakistan.

(Received 10 March 1999; accepted 17 October 2000)

Viscosities of crotonic acid solutions in aqueous and aqueous butanol mixtures (2%, 4%, 6%, v/v) were measured at various concentrations 1.0×10^{-3} to 5.0×10^{-3} mol.dm⁻³ at different temperatures 35° to 50°C. Ion-ion and ion-solvent interactions were studied in terms of A and B-coefficients of Jones-Dole equation. The negative values of B-coefficients increased with rise of temperatures led to the conclusion that crotonic acid in aqueous and aqueous butanol mixtures behaves as structure maker. Thermochemical data in terms of activation parameters such as energy of activation (E_a), change in free energy of activation (ΔG^*) and change in entropy of activation (ΔS^*) as a function of temperature, salt concentration and solvent composition were also evaluated.

Key words: Viscosities, Jones-Dole equation, Ion-ion interaction, Ion-solvent interaction, Thermodynamic parameters.

Biological Sciences

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SDS-PAGE OF HAPTENISED MOUSE SKIN MICROSOMAL PROTEIN

L Khan^{a}, N Shafi^a and R J Schmidt^b*

^aPCSIR Laboratories, Peshawar-25100, Pakistan

^bWelsh School of Pharmacy, UWCC, P O Box 13, Cardiff CF1 3XF, United Kingdom

(Received 23 July 1998; accepted 15 June 2000)

As an approach to resolve the haptenised proteins involved in the production of dermatoses 2, 4-dinitrochlorobenzene and 2, 4-dinitrofluorobenzene were chosen as model haptens with a well established and understood mechanism of protein preactivity. These haptens were applied to mouse skin *in Vivo*. Prior to sacrifice after 6 days, control and treated skin was homogenized and the microsomal proteins examined by dialysis, gel permeation and SDS-PAGE. Rather unexpectedly only one protein band in DNFB treated skin, appeared to have become labelled with an apparent molecular mass of 47,000 Da.

Key words: Hapten, Microsomal Proteins, SDS-PAGE.

EFFECT OF MARINE ALGAE ON CHOLESTEROL METABOLISM IN RABBIT

Shahnaz Ismail^{a}, Maryam Mirza^a, Alia Bano^a, Viqaruddin Ahmed^b and Yasmeen Badar^a*

^a *PCSIR Laboratories Complex, Karachi-75280, Pakistan*

^b *Hussain Ebrahim Jamal Institute of Chemistry, University of Karachi, Karachi-75270, Pakistan*

(Received 15 January 1999; accepted 29 June 2000)

Brown seaweed species *Cystoseira barbata*, *Iyengaria stellata* and *Sargassum boveanum* were collected from Karachi coast at **Ras Mauri (Capemonze)** and **Bulleji**. Studies have been carried out to determine their fat content and the effect of weed *S. boveanum* diet on the cholesterol level of rabbit serum. To estimate the extent of the effectiveness of seaweed, a parallel study was made with a drug "LOPID" [gemfibroxil; 2, 2-dimethyl-5- (2, 5-Xylyloxy) Valeric acid; (Parke-Davis Corp.)]. The tested seaweed is more effective than the standard drug used.

Key words: *Sargassum boveanum*, Hypo-cholesteremic activity, Rabbit serum, Lipid.

COMPARATIVE FASTNESS ASSESSMENT PERFORMANCE OF CELLULOSIC FIBERS DYED USING NATURAL COLORANTS

Adeola Victor Popoola

Department of Industrial Chemistry, Federal University of Technology, P.M.B. 704, Akure, Ondo State, Nigeria

(Received 16 February 1998; accepted 17 July 2000)

Two natural dyes of plant origin, namely bixin and curcumin were extracted, purified and used as color additives in two fibrous constructions of floor carpet and cotton fabric by the 'exhaust dyeing' technique. The fastness properties of these dyes both to light and washing and their use were assessed comparatively. Curcumin showed higher average fastness ratings to light and to alkaline wash over its bixin counterpart.

Key words: Curcumin, Bixin, Dyestuffs, Fastness.

THE FATTY ACID COMPOSITION OF SEED OILS OF *CITRUS SINENSIS* VARIETIES: VALENCIA AND SALUSTIANA

Shahid Mahmud*, Shazia Akbar and Abdul Sattar

Applied Chemistry Research Centre, PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received 13 July 1998; accepted 17 July 2000)

The percentage yield and chemical composition of fixed oil of *Citrus sinensis* varieties Valencia and Salustiana have been studied. The percentage yield of fixed oils from the seeds of these two varieties were 40.01 and 36.66% respectively. The percentage fatty acids composition of the respective oils were characterised as C_{12} (1.55, 0.0), C_{14} (5.04, 0.0), C_{16} (47.33, 29.13), $C_{18:0}$ (7.50, 4.23), $C_{18:1}$ (18.40, 26.03), $C_{18:2}$ (18.39, 37.51) and $C_{18:3}$ (0.0, 3.07) respectively. This chemical composition suggests that the oils, when available in quantity can find application both for edible or soap making purposes.

Key words: Fatty acid, *Citrus sinensis*, Seed oils.

DIURETIC STUDIES ON LEMON GRASS TEA FROM *CYMBOPOGON CITRATUS* (DC) STAPF IN RAT

Maryam Mirza, Abid Askari, Zahra Yaqueen, Zamir Ahmad and R B Qadri*

PCSIR Laboratories Complex, Karachi-75280, Pakistan

(Received 12 June 1999; accepted 12 August 2000)

The safety of lemon grass tea prepared from *Cymbopogon citratus* (DC) Stapf. (lemon grass) was evaluated in rats. The extract was administered for 6 weeks intragastrically and produced no adverse effects after its use. No morphometrical or histological changes were noticed in the vital organs of the test and control animals. Besides no biochemical changes were noticed in the blood and urine of test rats under our experimental conditions. The results were comparable with standard green tea. It was diuretic in action.

Key words: *Cymbopogon citratus* (DC) Stapf., Green tea, Toxicity, Diuretic effect.

EFFECT OF THE PREDATOR, *MENOCHILUS SEXMACULATUS* (FAB.) IN CONTROLLING POTATO APHID, *MYZUS PERSICAE* (SULZER)

M A Mannan^{*a}, K S Islam^b and M Jahan^b

^aDepartment of Entomology, Regional Agricultural Research Station, Jamalpur-2000, Bangladesh

^bDepartment of Entomology, Bangladesh Agricultural University, Mymensingh, Bangladesh

(Received 24 June 1999; accepted 30 August 2000)

Studies were made on the performance of a coccinellid predator, *Menochilus sexmaculatus* (Fab.) for the control of potato aphid, *Myzus persicae* (Sulzer). The daily feeding of *M. sexmaculatus* larvae increased with age and reached a maximum (30.72 aphids) on the 6th day. The rate of aphid consumption declined at pupal initiation. The predator showed a density dependent response both at the larval and the adult stages. Five larvae of *M. sexmaculatus* consumed 80.67% and 90.63% of aphids in caged potato plants in 72 hours when released on 150 and 160 aphids, respectively. In contrast, the adult beetles consumed 98.25% and 94.25% of potato aphids in 72 hours when the release was made on 80 and 125 aphids respectively. When the number of aphids was 170 at release time, the adult and larvae reduced the aphid population by 69.53% and 67.65% respectively.

Key words: Predator, *Menochilus sexmaculatus*, Aphid, *Myzus persicae*.

STABILITY AND ADAPTABILITY ANALYSIS OF SOME QUANTITATIVE TRAITS IN UPLAND COTTON VARIETIES

Mohammed Jurial Baloch

Cotton Research Institute, Sakrand, Nawabshah, Sindh, Pakistan

(Received 3 March 2000; accepted 29 August 2000)

Five cotton varieties, all *hirsutum* types were compared for their adaptability and stability parameters in six environments over three year period for seed cotton yield, lint percentage and fibre length. The regression coefficient (b) was used as a factor for adaptability whereas the terms coefficient of determination (r^2) and sum of squared deviations (S^2d) from regression were used as a measure of stability parameters. Varieties, CRIS-121 and CRIS-5A were considered well adapted to all types of environments, Rehmani and NIAB-78, to less favourable environments and BH-89, to highly favourable environments. CRIS-121 and CRIS-5A were adaptable to highly favourable environments and other three varieties, to less favourable environments for lint. In respect of fibre length, CRIS-5A and Rehmani preferred highly favourable environments and other varieties, to less favourable environments. All the varieties had good stability in the test environments for yield and were more stable for lint percentage as compared to fibre length. CRIS-121 was generally more adaptable as well as stable for all the traits in test environments.

Key words: Adaptability and Stability Parameters, Genotype-environment interaction, Cotton.

Technology

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BULK SOLID STATE COPOLYMERIZATION OF ACRYLAMIDE WITH PHTHALIC ANHYDRIDE UV-IRRADIATION AT $60\pm 1^\circ\text{C}$

A Rasheed Kan^{a}, Z H Farooqui^b and Muhammed Ejaz^b*

^aFuel Research Centre, PCSIR Karachi-75280, Pakistan

^bPlastic and Polymer Research Centre, PCSIR Laboratories Complex, Karachi-75280, Pakistan

(Received 8 September 1999; accepted 14 February 2000)

Bulk solid state copolymerization of acrylamide (r_1) with phthalic anhydride (r_2) under UV-irradiation was carried out at 60°C a temperature below the m.p. of reactants. It was observed that yield of the products differed for different sets of experiments but the trend remained same. The monomer reactivity ratios $r_1 = 1.4$ and $r_2 = 0$ were determined graphically by using the arranged form of copolymer composition equation. Molecular weights of the products were determined as $3.0 \times 10^5 - 5.5 \times 10^5$. All copolymer samples were off white in colour which became light yellow at 140°C .

Key words: Copolymerization, Acrylamide, Phthalic anhydride, UV-irradiation.

Review Article

Pak J Sci Ind Res 2001 44(2) 114-120

PORE SIZE MEASUREMENT IN SOIL: A REVIEW OF METHODOLOGY

M Mahmood-ul-Hassan

Land Resources Research Institute, National Agricultural Research Centre, Islamabad, Pakistan

(Received 14 October 1999; accepted 7 July 2000)

An accurate and complete analysis of pore size distribution of a soil is useful for interpreting structural changes and for predicting water flow rate, water storage capacity, water availability to plant and rate of diffusion of gases. Water release curve (relationship between soil water content and suction) is widely used to obtain pore size distributions but is not dependable in fine-textured soils that shrink on drying. There are other methods (nitrogen sorption, mercury intrusion porosimetry, non-polar liquid desorption and image analysis) to overcome this problem. In analysing the pore size distribution from the methods (except image analysis) generally capillary model is used assuming the pores are cylindrical or slit-shaped. Like water desorption, other methods also have disadvantage of pre-drying of soil samples without changes in the pore system along others. Stereological image analysis (of a soil) can provide quantitative three-dimensional information about its structural parameters and also used to identify patterns of water and solute movement. These methods of pore size measurements are discussed, compared and their use in soil studies is discussed.

Key words: Pore size distribution, Water release curve, Nitrogen sorption, Mercury intrusion porosimetry, Non-polar liquid desorption.
