



ISSN 0030 - 9885
Coden: PSIRAA 35 (3) 67-114(1992)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 35, No. 3, March 1992

Physical Sciences. Pages 67-94

Biological Sciences. Pages 95-107

Technology. Pages 108-114

Published monthly by

Scientific Information Centre

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

A STUDY OF THE PYROLYSIS OF CYCLOHEXENE AND 2-AMINOPYRIDINE WITH CARBON TETRACHLORIDE

J. PARRICK AND M. EHSAN

Chemistry Department, Brunel University, Uxbridge, U.K.

(Received July 16, 1990; revised April 2, 1991)

Reaction of trichloromethyl radical (from carbon tetrachloride in a flow system at 550°) with cyclohexene and 2-aminopyridine, has been investigated. The former gave benzene, chlorobenzene and decomposition products of carbon tetrachloride while the latter yielded cis trans-1, 4-dicyano-1, 3- butadiene.

Key words: Cyclohexene, 2-Aminopyridine, Carbon tetrachloride.

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

SYNTHESIS OF THIAZOLO [2,3-c][1,2,4]TRIAZINES AND RELATED DERIVATIVES

R. M. ABDEL-RAHMAN AND M. M. FAWZY

Chemistry Department, Faculty of Education, Ain Shams University, Roxy, Cairo, Egypt

(Received December 9, 1990; revised April 8, 1992)

A number of thiazolo[2,3-c][1,2,4] triazines and related derivatives have been synthesised by reaction of 5,6-diphenyl-2,3,4,5-tetrahydro-1,2,4-triazine-3-thione with various bifunctional halocompounds. The structure of the new compounds were elucidated by the help of elemental analysis and spectral data.

Key words: Synthesis, Thiazolo-1,2,4-triazine, Derivatives.

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

IMPROVEMENT IN EMULSIFYING NATURE OF A PLANT GUM BY CHEMICAL DERIVATIZATION. *Part -I*

R. K. AGRAWAL, ASHOK K. SHAKYA AND PRADEEP MISHRA

Department of Pharmaceutical Sciences, Doctor Harisingh Gour Vishwavidyalaya, Sagar (M.P.), 470 003, India

(Received April 8, 1991)

Anogeissus latifolia gum was chemically derivatised to obtain acetyl and methyl derivatives with different percentages of group content. They were quantitatively analysed and evaluated as o/w emulsifying agent. Methylated gum with maximum methyl content showed all the qualities desirable in a good emulsion formulation. It had the advantage over normally used emulsifiers like Span: Tween of imparting viscosity to the emulsion and allowing formulations of medicaments in it.

Key words: Plant gum, *Anogeissus latifolia*, Emulsifier.

Introduction

out of which three methoxyl derivatives were selected for final

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

KINETICS OF HYDROCHLORIC ACID LEACHING OF LATERITE

R.A. ODERINDE AND E.O. OLANIPEKUN

Department of Chemistry, University of Ibadan, Ibadan, Nigeria

(Received October 17, 1991; revised April 11, 1992)

The kinetics of the leaching of powdered laterite was studied in aqueous solutions of hydrochloric acid at temperatures of 40, 50, and 60°. The dissolution of iron was largely affected by the acid concentration, while those of aluminium and silica were not significantly affected, aluminium and silica dissolved in a nearly stoichiometric ratio with aluminium slightly more dissolved than silica. The dissolution followed a first-order kinetics with specific rate constants ranging from $(3.68-18.4) \times 10^{-2} \text{ hr}^{-1}$ for iron, $(1.05-5.07) \times 10^{-2} \text{ hr}^{-1}$ for aluminium and $(0.69-3.26) \times 10^{-2} \text{ hr}^{-1}$ for silica. The dissolution rates were well expressed by the rate equation based on the rate-determining step of the surface chemical reaction. The apparent activation energies were 56.7 KJ mol⁻¹ for iron, 65.2 KJ mol⁻¹ for aluminium, and 70.8 KJ mol⁻¹ for silica.

Key words: Kinetics, Leaching, Laterite.

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

SYNTHESIS AND SPECTROSCOPIC STUDIES OF 1-(ARYLTHIOMETHYL) BENZOTRIAZOLES

AMIR SULTAN AFRIDI

Department of Chemistry, Government Postgraduate College, Kohat, Pakistan

(Received January 15, 1992)

1-Chloromethylbenzotriazoles convert a variety of aromatic thiols into their respective 1-(aryltiomethyl) benzotriazoles which further react with aldehydes and ketones to form 1-(1-aryltio-2-hydroxyeth-1-yl) benzotriazole derivatives. The products structure is established by ^1H , ^{13}C NMR and elemental analysis.

Key words: Synthesis and spectroscopic studies, Aminomethylation, Benzotriazole.

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

EXTRACTION SPECTROPHOTOMETRIC DETERMINATION OF MICRO AMOUNTS OF URANIUM (VI) IN THE THIOCYANATE SYSTEM

KAMIN KHAN, MUMTAZ AND M. AMIN

PCSIR Laboratories, Peshawar, Pakistan

(Received September 14, 1991; revised April 16, 1992)

A rapid and selective spectrophotometric method was developed for the determination of micro-amounts of uranium (VI) after extraction of its thiocyanate complex into isobutyl alcohol. The yellow coloured uranyl thiocyanate complex formed in presence of HCl is quantitatively extracted into isobutyl alcohol. The complex is stable upto a week. Beer's law is obeyed upto 50 μg of uranium and the molar absorptivity at 480 nm is $0.1 \times 10^5 \text{ l mole}^{-1} \text{ cm}^{-1}$. Most of the common cations do not interfere.

Key words: Extraction, Determination, Uranium.

Short Communication

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

Chemical Constituents of *Solidago Petradora*

M.A. METWALLY AND M. ABDEL-MOGIB

*Department of Chemistry, Faculty of Science, University of
Mansoura, Mansoura, Egypt*

(Received December 16, 1991; revised April 8, 1992)

Short Communication

Pak. j. sci. ind. res., vol. 35, no.3, March 1992

Non-Aqueous Titrimetric Determination of Oxytetracycline Hydrochloride

M. AMINUDDIN, T. H. ATHAR AND T. MAHMOOD

*Department of Chemistry, Islamia University,
Bahawalpur, Pakistan*

(Received December 31, 1990; revised April 29, 1992)

Short Communication

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

Lactones from *Pituranthos tortusus*

M. ABDEL-MOGIB, S. N. AYYAD*, M. A. METWALLY AND
A. M. DAWIDAR

*Department of Chemistry, Faculty of Science, University of
Mansoura, Mansoura, Egypt*

(Received December 12, 1991)

Biological Sciences Section

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

GENETICS OF OIL AND PROTEIN PERCENTAGE IN UPLAND COTTON

ASIF ALI KHAN, MANZOOR AHMAD KHAN, MUHAMMAD AMIN KHAN AND HAFEEZ AHMED SADAQAT

Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad, Pakistan

(Received October 12, 1989; revised April 27, 1992)

A 6 x 6 diallel cross experiment was laid out to study heterosis and gene action for oil and protein percentage in six cultivars of *G. hirsutum* L. Heterosis was pronounced in all the crosses. Oil percentage was found to be controlled by additive gene action with partial dominance, while protein percentage was conditioned by overdominance.

Key words: Heterosis, Heterobeltiosis, Variance, Co-variance.

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

THEORETICAL APPROACH TO LIFE PROCESSES

Part -VI. Evidence from Anhydrobiosis in Nematodes

MIRZA ARSHAD ALI BEG

136-C, Rafehe Aam Housing Society, Karachi-75210, Pakistan

(Received April 11, 1990; revised December 11, 1990)

The postulates of the theory concerning life processes and aging *vis-a-vis* hydrogen bonding in water and hydrogen bondable substances have been discussed in terms of anhydrobiosis observed among some nematodes. These organisms have the capability to modify their protein structure and yield small molecular weight carbohydrates and glycerol at the onset of desiccation. These metabolites, hydrogen bondable and lyophilic as they are, replace the structural and bulk water of their body. The replacement of water by these materials, which in turn are non-supporters of life processes, inhibits and slows down the metabolism infinitesimally and hence the organisms go into a state of anhydrobiosis. However, they have the remarkable capability to revive on rehydration. This, according to the theory, becomes possible by the lyophilic character of the glycerol and carbohydrates which get replaced by the surrounding water.

Key words: Life Processes, Nematodes, Dehydration, Oxidative dehydration, Aging.

EFFECT OF DIMECRON ON THE ORGANIC MATTER CONTENT IN SOILS COLLECTED FROM DIFFERENT AREAS OF BANGLADESH

M.A. SATTAR, B. SAH, S.S. MALAKAR AND M.M. RAHMAN*

Department of Soil Science, Bangladesh Agricultural University, Mymensingh, Bangladesh

(Received July 12, 1990; revised October 15, 1991)

Five representative Bangladesh soils were treated with a pesticide dimecron at 0, 10, 100 and 1000 $\mu\text{g/gm}$. They were kept at room temperature ($30 \pm 2^\circ$) for 40 days at field capacity moisture content in glass containers. The correct moisture level was checked once in a week. After mixing, 50gm soil from each sample was collected after 0, 5, 10, 20, 30 and 40 days of incubation to study the organic matter content in soils. The results showed that the dimecron decreased the organic matter content in all five soils upto 20 days of observation and then slightly increased it with future incubation time. Dimecron significantly reduced the organic matter content in soils with increasing the rates of application for the five soils. The reduction was linear with high dosages of dimecron in soils. For control treatments, the organic matter was almost constant over the period of observation. The t-test results confirmed that the yields did not vary when the incubation periods were compared but they differed significantly ($P < 0.001$ to 0.01) when the dosages or levels were compared in a particular soil.

Key words: Dimecron, Organic matter content, Soils, Pesticide, Dosage.

Short Communication

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

**Effect of Saline Irrigation Water on the
Fruit Yield of Cucumber
(*Cucumis sativus* cv. Chipper)**

S.M. ALAM

*Atomic Energy Agricultural Research Centre, Tandojam,
Pakistan*

(Received August 5, 1989; revised April 23, 1992)

Short Communication

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

**Effect of Saline Irrigation Water on the
Fruit Yield of Cucumber
(*Cucumis sativus* cv. Chipper)**

S.M. ALAM

*Atomic Energy Agricultural Research Centre, Tandojam,
Pakistan*

(Received August 5, 1989; revised April 23, 1992)

Technology Section

Pak. j. sci. ind. res., vol. 35, no. 3, March 1992

COMPARISON OF MOZZARELLA CHEESE: PREPARED FROM BUFFALO MILK BY STARTER CULTURE AND DIRECT ACIDIFICATION TECHNIQUES

IZHAR H. ATHAR AND MUHAMMAD ANWAR*

Animal Sciences Institute, National Agricultural Research Centre, Park Road, Islamabad, Pakistan

(Received May 2, 1991; revised April 25, 1992)

The starter culture technique (SCT) and direct acidification technique (DAT) were used for preparation of Mozzarella cheese from buffalo milk. The results indicated that there were significant differences ($P < 0.05$) in the constituents of cheese and whey obtained by SCT and DAT except in ash of cheese and in protein of whey. Higher cheese yields were obtained by using SCT as compared to DAT and the difference in cheese yield was significant ($P < 0.05$). However, organoleptic evaluation indicated that cheese prepared by DAT was liked more as compared to SCT.

Key words: Mozzarella cheese, Buffalo milk, Starter culture, Acidification technique.

COMMERCIAL DEHYDRATION OF VEGETABLES

Part -II. Processing Parameters for Various Vegetables

NAZAR MOHAMMAD, M. JAMIL, M. ANWAR AND A.F.M. EHTESHAMUDDIN
PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received March 3, 1990; revised February 13, 1992)

Commercial scale dehydration trials were carried out on a locally designed tunnel dehydrator to evaluate processing conditions for 14 vegetables. Various processing operations have been described along with different parameters that yielded dehydrated product of good quality. It was found that dehydrated vegetables were organoleptically comparable to fresh ones and were acceptable upto one year when packed in air-tight tin containers.

Key words: Drying, Dehydration, Vegetable processing.