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Physical Sciences Section

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ONE BOND COUPLING CONSTANTS OF THE α C-H BOND IN SOME SATURATED AND UNSATURATED DICARBOXYLIC ACIDS AND THEIR CORRESPONDING ANHYDRIDES

Misbah-ul-Hasan and M. Arab*

Fuel Research Centre PCSIR, Karachi-39

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The one bond coupling constants of the α -C-H bond in several saturated and unsaturated dicarboxylic acids and their corresponding cyclic anhydrides have been measured. As expected, cyclization into anhydrides causes significant changes in the one bond C-H coupling constants. These changes have been explained on the basis of electronegativity and ring strain in these compounds.

Key words: Coupling constant, Dicarboxylic acid, Anhydrides.

FREE RADICAL TERPOLYMERIZATION OF METHYL METHACRYLATE 2-ETHYLHEXYL ACRYLATE AND ACRYLIC ACID

A. Rasheed Khan and A.H.K. Yousufzai

PCSIR Laboratories, Off University Road, Karachi-39

(Received December 7, 1988, revised March 21, 1989)

The terpolymerization of methyl methacrylate, 2-ethylhexyl acrylate and acrylic acid in ethyl acetate has been accomplished at 100° using benzoyl peroxide as initiator. It has been observed that these three monomers form terpolymer in all monomeric/ratios. A terpolymers of 11300-20400 molecular weight is obtained. It is white solid substance soluble in most of the organic solvents that softens at 69-70°. The refractive index of terpolymer samples is 1.337-1.338. The terpolymer may be used as plasticizer in the preparation of nail varnishes.

Key words: Simultaneous polymerization, Degradation, Intrinsic viscosity.

**PREPARATION AND CHROMATOGRAPHIC ELUTION OF COPPER(II) AND NICKEL(II)
COMPLEXES OF MESO AND DL-BIS(TRIFLUOROISOPROANOYLACETONE)
STILBENEDIIMINE ON GLC AND ABSORPTION HPLC**

M.Y. Khuhawar and A.K. Talpur

Institute of Chemistry, University of Sind, Jamshoro

(Received August 28, 1988; revised March 12, 1989)

The copper and nickel complexes of new tetradentate ligands bis(trifluoroisopropanoylacetone) meso-stilbenediimine (meso- $H_2F_3PA_2S$) and bis(trifluoroisopropanoylacetone)dl-stilbenediimine (dl- $H_2F_3PA_2S$) are prepared and characterised. The metal complexes are fairly volatile as evaluated from recording their DTA and TG curves and the complexes could easily be eluted on stainlesssteel gas chromatographic column packed with OV101 and OV17, 3 % on chromosorb 80-100 mesh size, with detection limits corresponding to 5-10ng of metal ions, but without separation of copper and nickel complexes. However copper and nickel complexes are completely separated on adsorption HPLC column (250x4mm) packed with Licrosorb Si 100 5μ and complexes are isocratically eluted using binary mixture of chloroform-*n*-hexane. Detection was achieved using UV detector at 310 nm and detection limit were obtained at sub ng levels of metal ions.

Key words: HPLC separation of copper and nickel complexes.

MIXED LIGAND-SULPHITO COMPLEXES OF CHROMIUM (III)

Kamal A.R. Salib*, Salah B. El-Maraghy and Saied M. El-Sayed

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

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The reaction of Na_2SO_3 and $[\text{Cr}(\text{L})_2\text{X}_2]\text{Cl}$ complexes, $\text{L} = \text{ox}$, $\text{X} = \text{H}_2\text{O}$, $\text{L} = \text{bpy}$ or en , $\text{X} = \text{Cl}$, resulted in the replacement of the coordinated water molecules or chloride ions by hydroxide and/or sulphite ions. Although the medium of the reaction was acidic, hydroxosulphito products were obtained in the case of nitrogen containing ligands. The hydroxo group acts either as a unidentate ligand in monomeric species or as a bridging bidentate ligand in dimeric ones. The IR spectra of the complexes indicated the presence of a unidentate S-bonded coordinated sulphito groups. The magnetic moments and visible spectra of the complexes showed that they are hexaco-ordinated.

Key words: Sulphito, Chromium (III), Complexes, Synthesis.

CHEMICAL EVALUATION OF ANTACID PROPERTIES OF SACCHARATED ALUMINIUM HYDROXIDE

I.H. Siddiqui, R. Jafri, S.A. Hussain and S.A.H. Zaidi

PCSIR Laboratories Complex, Karachi-75280

(Received November 10, 1988; revised March 30, 1989)

An vitro antacid properties of polynuclear Al-hydroxide chelate of sucrose (Al-saccharate) have been studied and compared with those of the pharmaceutical preparations available in Pakistan. 15.6225g of Al-saccharate contained 1g of elemental Al. The neutralizing capacity of Al-saccharate revealed that one g of elemental Al can neutralize 129.3meq HCl. In respect of efficacy of the dose, duration of activity and maximum pH, it was observed that 0.032g of elemental Al can neutralize 50ml of 0.1N HCl to pH 2 in 15 minutes. On successive addition of another 0.032g of elemental Al pH was raised to 3.8 and on third successive dose of 0.032g elemental Al pH was raised to 4.7. The buffering capacity showed that 3.943ml of 1N HCl was required to lower the pH of 0.064g elemental Al from 4 to 3.

Key words: Antacid, Aluminium saccharate, Chelate of aluminium.

EFFECT OF TEMPERATURE ON DENITRIFICATION IN SOILS MEASURED BY ACETYLENE INHIBITION TECHNIQUE UNDER LABORATORY CONDITIONS

G. Hussain Memon

Department of Soil Science, Sind Agriculture University, Tandojam

(Received December 5, 1988, revised February 19, 1989)

A method to measure denitrification in soils based on the observation that in the presence of acetylene the sole product of denitrification in soil is N_2O has been established. The soil samples collected from two research stations of Denmark varying in texture were incubated under helium atmosphere with 75% water holding capacity moisture and after injection of 10% acetylene in the head space of glass bottles. The bottles so treated were kept at a range of temperature, from 10-70° in incubator. After 5 days in the gas samples taken from head space and analysed for N_2O and CO_2 to determine the rate of denitrification and respiration respectively. It was observed that denitrification increased with increasing temperature and was maximum at 50°. Denitrification was comparatively greater in sandy loam soil than coarse sand. Rate of respiration of micro-organisms was same in atmosphere with or without acetylene.

Key words: Denitrification, Temperature, Incubation.

SYNTHESIS OF SOME MORE HETEROBICYCLIC DERIVATIVES BEARING A 1, 2, 4-TRIAZINE MOIETY AND THEIR ANTIBACTERIAL ACTIVITY

R.M. Abdel Rahman

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

(Received August 22, 1988; revised March 25, 1989)

Some new monohydrazones (IIa-e) and monoacyl 1, 2, 4-triazine derivatives (XIIa 1) have been prepared by reacting 3-hydrazino-5, 6-diphenyl-1, 2, 4-triazine (I) with some oxo-compounds. These products have been used to synthesize some new fused heterobicyclic derivatives by cyclization under acidic and neutral medium. UV, IR, PMR spectra and antibacterial activity of the new products have been recorded.

Key words: Heterobicyclic 1, 2, 4-Triazines, Antibacterial activity.

Short Communication

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AN IMPROVED SYNTHESIS OF ISATIN

M. Alam, M. Younas, M.A. Zafar and Naeem

Department of Pharmacy, University of the Punjab, Lahore-1

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Biological Sciences Section

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SPINDLE ANOMALIES IN MICROSPOROGENESIS IN A POPULATION OF *WITHANIA SOMNIFERA* (L.) DUNAL FROM KARACHI

Viqar Anjum Saeed, S. Afaq Husain and S. Shahid Husain

PCSIR Laboratories, Off University Road, Karachi-39

(Received February 26, 1988; revised March 22, 1989)

A population of *Withania somnifera* (L.) Dunal from Karachi, was investigated, primarily for its cytological behaviour. The observations revealed various types of anomalies during the course of microsporogenesis. At metaphase-I, all chromosomes were not arranged on metaphase plate, some were found lying away and bridges, univalents and laggards were recorded in many pollen mother cells. Multipolar and supernumerary spindles at 2nd meiotic divisions were of frequent occurrence resulting in 5-8 nucleate telophase-II and subsequently in abortive pollens.

Key words: *Withania*, *Microsporogenesis*, Spindle anomalies.

EFFECT OF BAGASSE, CORN COBS, GROUNDNUT SHELLS AND THEIR NEUTRAL DETERGENT FIBRE (NDF) FRACTION ON DIGESTIVE ENZYMES

S. M. Gaonkar and P.R. Kulkarni

*Food and Fermentation Technology Section, Department of Chemical Technology,
University of Bombay, Matunga, Bombay-400019, India*

(Received June, 26, 1988; revised February 19, 1989)

Bagasse, corn cobs, groundnut shells and their neutral detergent fibre (NDF) fraction were tested for their ability to affect amylase, pepsin, trypsin, chymotrypsin and pancreatin activity.

Key words: Dietary fibre, Digestive enzymes, Neutral detergent fibre.

QUANTITATIVE GENETIC ANALYSIS OF GRAIN YIELD AND SOME OTHER AGRONOMIC TRAITS IN MAIZE

S.C. Debnath* and K.R. Sarkar

Genetics Division, Indian Agricultural Research Institute, New Delhi, India

(Received December 10, 1988; revised February 20, 1989)

A nine parent diallel set of maize (*Zea mays* L.) inbreds was studied for combining ability and nature of inheritance of grain yield, ear length, ear diameter, kernel rows per ear, number of kernels per row and 1000-kernel weight. Both additive and non-additive genes were important for all characters except 1000-kernel weight where only non-additive genes were important. Combining ability as well as component analysis revealed the presence of overdominance or predominant role of non-additive genes in the inheritance of all traits studied. The parental performance seemed to be a good indicator of general combining ability effects. Out of nine lines, two were good general combiners for grain yield, ear diameter and number of kernels per row. Desirable significant specific combining ability effects for grain yields were observed in three crosses. Variance component analysis correlated with those of combining ability analysis.

Key words: *Zea mays*, Diallel cross, Grain yield, Genetic analysis.

INFLUENCE OF NPK FERTILIZATION ON PRODUCTION POTENTIAL OF AUTUMN PLANTED SUGARCANE

Muhammad Ismail, M.S. Nazir, Muhammad I. Makhdum* and Dilbaugh Muhammad*

University of Agriculture, Faisalabad

(Received December 9, 1987; revised March 13, 1989)

A field investigation were carried out to study the effect of NPK fertilization alone or in combination on the production potential of September planted sugarcane under irrigated at University of Agriculture, Faisalabad, conditions. The results showed that nitrogen application increased cane yield and its components except cane thickness significantly, while phosphorus and potassium alone or in combination with each other had non-significant affect. The sucrose content was non-significantly affected. For the soil with an initial productive potential of 60 tonnes cane/ha, a fertilizer dose of $N_{200}P_{100}K_{100}$ kgs/ha is required to obtain yield of 146 tonnes per ha.

Key words: Sugarcane, Autumn planted crop, NPK fertilization.

CONTROL OF ANGUINOSIS OF WHEAT USING PLANT EXTRACTS

F. Qamar, M. Saeed, Aly Khan* and N. Seema

PCSIR Laboratories, Off. University Road, Karachi-32

(Received October 11, 1988; revised March 15, 1989)

Leaf extracts from *Azadirachta indica*, *Vinca rosea* and *Jatropha curcas* were applied in microplots to evaluate their efficacy against wheat gall nematode, *Anguina tritici* (Steinbuch 1799) Filipjev 1936. After 12 weeks, the number of cockles was zero in the plants treated with *Azadirachta indica* and *Vinca rosea*. In the plants treated with *Jatropha curcas*, the number of cockles was 10/plant whereas in control their number was 13/plant.

Key words: Anguinos, Plant extracts, *Anguina tritici*, Wheat.

COMPARATIVE EFFICACY OF SOME INSECTICIDES IN CONTROLLING SAN JOSE SCALE ON PLUM IN PESHAWAR

Muhammad Zaman

Agriculture Research Institute Tarnab, Peshawar

(Received June 9, 1988; revised March 20, 1989)

Carbosulfan EC (400 ppm, a.i.), chlorpyrifos + dimethoate EC (1324 ppm), deltamethrin + dimethoate EC (625) ppm, deltamethrin triazophos EC (720 ppm), and quinalphos EC (800 ppm) were tested for their potential to control San Jose scale, *Quadraspidiotus perniciosus* Comstock, on plum trees. Scale mortality recorded one day after insecticide application showed that all the insecticides, either alone or as a mixture, killed scale. No reinfestation of scale was observed on trees treated 20 days previously with chlorpyrifos + dimethoate. Some reinfestation of scale occurred on trees treated with carbosulfan and deltamethrin + triazophos, and an even higher level of reinfestation with quinalphos. The highest level of reinfestation occurred with deltamethrin + dimethoate which was comparable to the control treatment.

Key words: San Jose scale, Insecticides, Plum.

SUSCEPTIBILITY OF NEW VARIETIES OF TRITICALE AND WHEAT TO
SITOPHILUS GRANARIUS L.

M. Munir Malik

Entomology Division, Nuclear Institute for Agriculture and Biology, Faisalabad

(Received December 6, 1988, revised March 4, 1989)

The cereal, triticale T-183 was compared with 3 varieties of wheat Pb-81, PK-81 and LYP-73 for attractiveness to *Sitophilus granarius* and in a specially designed olfactometer. It was observed that *Sitophilus* infested more on wheat varieties than triticale in multiple choice tests. However, when cereals were tested without choice, all were equally preferred. Insects preferred cereal from previous year than newly harvested crop. The studies on reproductive potential revealed that *Sitophilus* produced fewer progeny on triticale than on wheat during the test period of 30 days.

Key words: Susceptibility, Stored grain, Cereal.

HYGROTHERMO CONDITIONED EXTRACTION OF NEMATODES FROM DRY FARMYARD MANURE

Manzoor Saeed, Fatima Qamar and Hanif A. Khan

PCSIR Laboratories, Off University Road, Karachi-75280

(Received February 1, 1989; revised March 22, 1989)

A new method called hygrothermo-conditioned extraction (HTC extraction) of nematodes from dry farmyard manure is described to recover nematodes in dry farmyard manure. Moisture contents of a sample of manure was adjusted to 20 % (w/v) followed by 72 hr incubation at 30°. After this, sub. samples consisting of 50 cm³ of conditioned manure were subjected to Baermann funnel extraction. By this method 49 nematodes – *Cephalobus littoralis*, *Helicotylenchus indicus*, *Eudorylaimus* sp. and *Psilenchus hiliarus* in different life stages were recovered. In control 21 nematodes belonging to *C. littoralis* and *Eudorylaimus* sp. were recovered. Apparently *H. indicus* and *P. hiliarus* survived in dry farmyard manure in anhydrobiotic state. They were recovered due to the pre-extraction conditioning of the manure through incubation under optimized moisture and temperature.

Key words: Nematode extraction, Methodology, Farmyard manure.

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OSTRACODS (*F. CYPRIDAE*) FROM NORTHERN PUNJAB AND PESHAWAR

Sanjeeda Khatoon

Pakistan Museum of Natural History, Islamabad

(Received September 7, 1988; revised March 11, 1989)

Taxonomic studies of freshwater ostracods were carried out from different localities of Northern Punjab and Peshawar. Five genera and six species from the Cypridae were described.

Key words: Ostracods, N. Punjab, Peshawar.

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BIOCHEMICAL ALTERATIONS IN THE FEMALE GENITAL TRACT OF OVARIECTOMIZED RATS TREATED WITH AQUEOUS EXTRACT OF *MORINGA OLEIFERA* LAM

Sangeeta Shukla, R. Mathur and A.O. Prakash

School of Studies in Zoology, Jiwaji University, Gwalior-474011 (M.P.) India

(Received October 25, 1987; revised March 25, 1989)

Biochemical alterations have been observed in the uterus, cervix and vagina of ovariectomized rats in relation to antifertility effect of aqueous extract of *Moringa oleifera* Lam. Its administration has increased glycogen, protein, total cholesterol, acid and alkaline phosphatases in all the organs, however, in vagina the glycogen level decreased significantly. Its combined treatment with estradiol acted synergistically, however, with progesterone it behaved antagonistically.

Key words: *Moringa oleifera* Lam, Biochemical constituents Reproductive organs.

STUDIES OF SIND-LAC HELPFUL IN ITS CULTIVATION

Part I. Further Studies of Crown-Shaped Cell of Sind Lac Insect

S. Mahdihassan

SD-34, Block A, N. Nazimabad, Karachi-33

(Received January 3, 1989, revised March 22, 1989)

The lac insect has two species which show a special way of continuing its kind. Mother insects feeding on trees well watered, as during monsoon, grow well in size but give rise to a generation which one and all become winged males. Some larvae are transported singly by flies which come to lac because it also secretes honey dew. As single larvae they become bisexual and construct cells different from those of normal females, growing singly or apart from the main colony, which forms an encrustation. These cells of bisexual insects appear crown-shaped. The lac cell is built on a skeleton of hard wax filaments. In the normal all they grow only upwards from the equatorial region. In the crown shaped cell these wax filaments grow upwards and downwards giving the cell an ornamented appearance. The two species which show the tendency to produce winged males when the mother insects feed on trees well watered would be *Kerria communis* found all over South India and *K. sindica* which has been studied specially in this article.

Keywords: Lac, Insect, Cultivation.

Technology Section

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ACTIVATED CARBON FROM INDIGENOUS INFERIOR WOODS *Part I. Impregnation Ratio Influence*

Tanzil H. Usmani, Tamoor Wahab Ahmad and S. Zafar Ahmed

PCSIR Laboratories, Off. University Road, Karachi-39

(Received December 10, 1988; revised March 13, 1989)

The effect of zinc chloride in different impregnating ratios on the properties of activated carbon prepared from indigenous inferior woods has been studied. The activity of carbon has been determined against iodine, methylene blue and molasses. It has been found that product activity is optimum against low molecular weight substances at comparatively lower ratio of activating agent whereas for high molecular weight compounds, higher ratio of activating agent is desired. Activated carbon suitable for any particular industrial requirement may be prepared by variation in ratio of impregnating agent.

Key words: Activated carbon, Inferior woods, Impregnation ratio.

SCIENTIFIC STUDY AND DEVELOPMENT OF MEAT BARIAN – A TRADITIONAL FOOD PRODUCT

Part III. Study of Different Processing and Drying Methods

Hamid Ahmad, S.S. Chaudhry, Shagufta Nasreen and Razia Rafiq Siddiqui

PCSIR Laboratories, Lahore

(Received September 20, 1988; revised March 8, 1989)

Part III of this study deals with the selected formulations of 'Barian' made from dal mash, mung with the use of 25% beef in the fresh state. Three methods of drying, namely (i) open sun (ii) in solar dryer (iii) mechanical drying using natural gas, have been tested for the quality of the dried product. Drying temperature of 70° and mechanical drying proved to be the most quality effective means. The nutritional and biological evaluation, carried out by the measurement of available lysine, vitamins B₁ and B₂ and rat trials proved again in favour of mechanically dried 'Barian'. The microbiological testing, after drying by the three methods, as well gave the most hygienic product in case of natural gas drying.

Key words: Pulses, Meat, Barian.