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Physical Sciences Section

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SYNTHESIS OF SUBSTITUTED PYRIDINES

Part VIII. Formation of 1, 2-dihydro-4-hydroxy-2-oxo-1-phenylpyridine-3-methylcarboxy-6-substituted carbamates and thiocarbamates*

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Alkyl-1, 2-dihydroxy-2-oxo-1-phenyl pyridine-3-carboxylates (I) react with N-substituted isocyanates and isothiocyanates in the presence of a base like triethylamine to yield their respective carbamate and thiocarbamate salts (II). U.V. and I.R. spectra of the new products have been recorded.

Key words: Isocyanate; Carbamate; Thiocarbamate.

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SYNTHESIS OF SOME NEW 3-THIOXO-1,2,4-TRIAZINONE DERIVATIVES

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Synthesis of some new 3-thioxo-1,2,4-triazinone derivatives starting from the corresponding N¹ - substituted thiosemicarbazides, 1,4-disubstituted thiosemicarbazides and N¹-substituted thiosemicarbazone-4 has been described. The structure of the compounds synthesized have been established by chemical and spectral data. The antibacterial activity of some compounds prepared have been evaluated.

Key words: Synthesis of 3-thioxo-1,2,4-triazinone derivatives, Antibacterial activity.

ESTIMATION OF WATER QUALITY CHARACTERIZATION PARAMETERS FOR LOCAL SPRING WATERS

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(Received January 19, 1986; revised June 18, 1987)

Physico-chemical parameters and trace metal levels have been reported for selected natural spring waters from rural areas of Azad Kashmir and Northern Hill Tracts. Standard analytical methods, augmented by the atomic absorption technique, have been used for the estimation of quality characterization parameters such as conductance, hardness (CaCO_3), alkalinity, phosphate (PO_4), nitrate/nitrite (NO_3/NO_2), dissolved oxygen and other relevant parameters in addition to trace metals. Estimated metals include sodium, potassium, cadmium, zinc, iron, lead, mercury, strontium, copper, chromium, barium, nickel and cobalt. The results are discussed in terms of internationally recognised water quality limits for human consumption.

Key words: Spring water analysis, Physico-chemical parameters, Trace metal analysis.

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CHEMICAL COMPOSITION OF VARIOUS EUPHORBIA SPECIES FOR INDUSTRIAL APPLICATIONS

Part I. Latex of *Euphorbia cauducifolia*

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(Received October 19, 1986; revised June 21, 1987)

The latex of *Euphorbia cauducifolia* was resolved into different classes of compounds. The hydrocarbons (1.2 %) as determined by GLC ranged from heneicosane (C_{21}) to dotriacontane (C_{32}) with the highest percentage of nonacosane (C_{29}). The esters were composed of fatty acids and straight chain and cyclic alcohols. The fatty acids ranged from lauric (C_{12}) to behenic (C_{22}) with the highest percentage of myristic acid (C_{16}) (58.73). Glutinol was isolated from the alcoholic fraction. The possible use of this latex is discussed.

Key words: Euphorbiaceae, *Euphorbia cauducifolia*, Latex, Hydrocarbons, Lipids, Glutinol.

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COPPER, LEAD, TIN AND ZINC CONTENTS IN CANNED AND BOTTLED FRUIT AND FRUIT PRODUCTS

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(Received April 10, 1986; revised June 22, 1987)

Copper, lead, tin and zinc contents of canned and bottled foods were determined. Maximum levels of Cu, Pb, Sn and Zn in fruit and fruit products were 3.62, 9.67, 56.25 and 50.15 ppm respectively. These levels were comparatively less in products packed in glass jars than those in tin containers.

Key words: Trace element, Heavy metals, Fruit products.

A STUDY ON THE ELECTROPHORETIC PROPERTIES OF MILK PROTEINS DURING STORAGE AS AFFECTED BY THERMIZATION AND CO₂ TREATMENTS

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(Received March 22, 1987; revised June 15, 1987)

The attained electrophoretic patterns showed that the patterns of whey proteins from thermized and unthermized milk samples were the same, whereas some changes were noticed with respect to caseins of unthermized milk. CO₂ had no effect on the electrophoretic patterns of whey protein and casein with exception that the highest CO₂ concentration (10.0 g/l) caused some changes in the casein fractions during storage.

Key words: Milk, Thermizations, CO₂.

Biological Sciences Section

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PESTICIDE RESIDUES IN FRUITS AND VEGETABLES

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Residues of chlorinated insecticides were estimated in twenty five samples of fruits and vegetables. DDEpp' and dieldrin were found to be present in most of the samples. DDTpp' was only present in the samples of lettuce and tea. Amounts of residues of these insecticides were less than the permissible limits.

Key words: Pesticide; Fruits; Vegetables.

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ORGANOCHLORINE PESTICIDE RESIDUES IN CATTLE FEED SAMPLES IN KARACHI

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(Received November 17, 1986; revised June 11, 1987)

Chlorinated hydrocarbon insecticides were monitored in animal feed samples collected from the Karachi Cattle Colony. Seventy nine random samples were screened for lindane, α -BHC, β -BHC, δ -BHC, endrin, aldrin, dieldrin, pp'-DDT, pp'DDE, p'p', DDD, dicofol, heptachlor and heptachlor epoxide. Gas chromatographic analyses revealed that approximately 46 % of the samples were contaminated with different pesticides and their metabolites. α -BHC and γ -BHC were found to be present in most of the compounds.

Key words: Pesticides; Control of vector borne diseases; Animal feeds.

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OBSERVATIONS ON EFFICIENCY AND ECONOMICS OF COTTON PEST CONTROL WITH DELTAMETHRIN ALONE AND ITS COMBINATIONS WITH MONOCROTOPHOS AND DDT

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(Received May 13, 1986; revised May 11, 1987)

Experiments were conducted to evaluate, against cotton pest complex, the efficacy of insecticide deltamethrin alone or its combinations with monocrotophos and DDT. Data obtained was statistically analysed by method described by Baluch *et. al.* [6-8, 10-11]. The results were compared with the conventional mixture of DDT and monocrotophos, taken as a standard. Deltamethrin + monocrotophos combination demonstrated the best results.

Key words: Cotton; Pyrethroids alone and combinations.

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EFFECTIVENESS OF SOME SOIL APPLIED GRANULAR SYSTEMIC AND FOLIAR INSECTICIDES AGAINST *HELIOTHIS ARMIGERA* ON OKRA

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(Received April 6, 1986; revised April 23, 1987)

Ten days post-germination side-dressed application of aldicarb G (3.36 kg a.i./ha), carbofuran G (1.68 kg), mephosfolan G (2.22 kg) and thiofanox G (2.8 kg) did not control the incidence of *Heliothis armigera* (Hub.). Sprays of cyhalothrin (0.0017 %), decamethrin + dimethoate (0.031 %), fenprothrin (0.011 %) and fluvalinate (0.033 %) were significantly effective against the eggs and larvae of the pest.

Key words: Insecticides, Okra, Pod borer.

THE YIELD AND YIELD COMPONENTS OF FINE RICE AS INFLUENCED BY DIFFERENT SPACINGS

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(Received February 10, 1985, revised May 25, 1987)

Basmati-370 was grown at the rate of 44 (15x15 cm), 25 (20x20 cm), 16(25x25 cm), 11(30x30 cm) and 6(40x40 cm) hills per square metre to ascertain their effects on the yield and yield components of the rice cultivar Basmati-370. There has been consistent increase in the number of total as well as panicle bearing tillers per hill and 1000-grain weight with the decrease in planting densities. Plant height, number of grains per square metre and paddy yield per sq. m. were not affected significantly by the various planting densities. The maximum and minimum paddy yield of 280.07 and 219.7 g. per sq. m. was obtained by growing rice at the rate of 11 and 6 hills per sq.m. respectively.

Key words: *Oryza sativa* L. Spacing, Seedling densities.

EVALUATION OF POTASH APPLICATION TO WHEAT CROP IN SOUTHERN PUNJAB

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(Received July 8, 1985, revised June 14, 1987)

The influence of potash on grain yield and its components of wheat cultivar "Punjab-81" was studied under the irrigated conditions of southern Punjab. Potash as potassium sulphate applied before sowing increased grain yield per unit area by approximately 5 %. Most of the effect of potassium on grain yield occurred through increased number of grains per spike and 1000 grain weight.

There was little effect of potassium application on the number of tillers per unit area and number of spikelets per spike. The grain yield increased with increasing levels of nitrogen phosphorus and potassium. The application of potassium was economically beneficial when applied with urea and single super-phosphate.

Key words: *Triticum aestivum*; potassium response; silt loam soil; Southern Punjab, economic response.

ALLELOPATHIC EFFECTS OF PAKISTANI WEEDS *XANTHIUM STRUMARIUM* L.

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(Received February 18, 1987, revised June 7, 1987)

Xanthium strumarium L. is both a weed and waste land species in Pakistan. Aqueous extracts from different parts, litter incorporated into growth medium and rain leachates severely reduced either germination, early growth, fresh or dry mass of *Lactuca sativa*, *Brassica campestris*, *Pennisetum americanum* and *Zea mays* in various experiments. Chromatographic study revealed the presence of caffeic, *p*-coumaric, *p*-OH-benzoic, chlorogenic and ellagic acids in rain leachate and shoot extracts. The toxicity depended upon the test species and the part assayed. The findings suggest strong allelopathy by *X. strumarium* L. which is subjected to modification by other factors of the environment.

Key words: *Xanthium strumarium*, weed, allelopathy, growth inhibitors, crop.

A COMPARATIVE MORPHOLOGICAL STUDY ON THIRD INSTAR LARVAE OF SOME *DACUS* SPECIES (*TEPHRITIDAE: DIPTERA*) IN PAKISTAN

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(Received May 9, 1983; revised June 2, 1987)

A comparative morphological study on third instar larvae of *Dacus cucurbitae* Coquillett, *D. dorsalis* Hendel, and *D. zonatus* Saunders has been made. A detailed account of anterior spiracle, cephalopharyngeal skeleton and posterior spiracular plates has been given.

Key words: Morphology, *Dacus*, Larvae.

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POPULATION STRUCTURE AND SOME ASPECTS OF THE BREEDING BEHAVIOUR OF THREE GASTROPOD SPECIES FROM KARACHI MANGROVES

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(Received April 23, 1987; revised June 22, 1987)

Seasonal abundance and population structure of three mangrove gastropod molluscs, *Cerithedia cinquilatus* (Gmelin), *Holotha Japónica* (Pilsbry) and *Melampus nuxcastanea* (Kurada) were examined from the Karachi coast. Observations were also made on some aspects of the breeding habits of opisthobranch *Holotha* and pulmonate *Melampus* eggs; masses of *Holotha* were collected from the field and those of *Melampus* were spawned in the laboratory. The three species seem to possess long spawning seasons with optimum spawning activity during spring-summer.

Key words: Gastropods; Population; Spawning, Eggmass.

Technology Section

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THE INFLUENCE OF POST-BLANCH TREATMENTS ON THE STORAGE LIFE OF SUN-DRIED SHRIMP

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(Received January 10, 1985; revised April 4, 1987)

Seven dip solutions were screened for their ability to extend the shelf life of sun-dried shrimp during storage at room temperature. Treatments with ascorbic acid and potassium sorbate, ascorbic acid and sodium benzoate and potassium metabisulphite and citric acid proved to be equally effective in extending shelf life.

A comparative study of the sensory, biochemical and microbiological changes in laboratory processed and commercially processed shrimp during storage at room temperature was also conducted. Laboratory processed shrimp were found to be acceptable upto 7 months whereas commercially processed shrimp spoiled in 3 months.

Key words: Storage, sun dried, shrimp.

QUALITY EVALUATION OF INDIGENOUS HONEY

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Twenty five samples of honey were analysed for honey. Twelve samples of honey conformed to the standard specifications. The remaining samples were of inferior quality.

Key words. Honey, Hydroxymethyl, furfural, diastase.

STUDIES ON BIOCONVERSION
Part I. On the Effect of Urea for Improving Biogas Yield

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(Received September 21, 1986; revised June 10, 1987)

On analysis, chemical constituents of buffalo dung varied from barn to barn and season to season. This variation may possibly be related to the age of animal and diet consumed. 0.05 and 0.1% urea/kg raw materials were found to be adequate doses for mixing with dung without altering optimum C/N value of fermentation. Addition of urea for prolonged periods though improved biogas yield by 34%, it also increased carbon dioxide value with passage of time. It is, therefore, suggested that either urea should be added periodically, or a single shock dose may be given for improving the efficiency of biogas digester.

Key words: Biogas, Urea, Cow dung.

SCIENTIFIC STUDY AND DEVELOPMENT OF MEAT BARIAN – A TRADITIONAL FOOD PRODUCT**Part II. Study of Various Formulations and Technologies**

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(Received September 10, 1986; revised May 9, 1987)

Part II of this study deals with the multiple formulations of pulses used in the traditional methods. Dal Mash, Mung, Lantils and gram singly and in combination have been tested. The possibility of using a machine in the method of "barian" making has been tested. Three different drying methods, i.e. open-sun, solar and oven-drying have been used to see their effect on the product quality and the drying time. In effort has been made to incorporate beef in the traditional pulses-mix of "barian". Fresh and pre-treated beef, minced, fibre-like or chopped, were examined for their use in giving meaty look and taste to the traditional product.

Key words: Pulses, Barian, Meat.