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Physical Sciences Section

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SOME REACTIONS OF NITROGEN NUCLEOPHILES WITH 6-BROMO-2,4-DICHLOROQUINAZOLINE, 6-BROMO-2-CHLORO-3-METHYL-4(3H)- QUINAZOLINONE AND 6-BROMO-4-CHLORO- OR (6-BROMO-4-CHLORO-1-PHENYL)-1-H- QUINAZOLIN-2-THIONE

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(Received April 20, 1983; revised September 30, 1985)

6-Bromo-2,4-dichloroquinazoline (1) and 6-bromo-2-chloro-3-methyl-4 (3H)-quinazolinone (2) have been prepared by the reaction of 6-bromo- or 6-bromo-3-methyl-2,4 (1H, 3H)-quinazolinone with phosphorous oxychloride. The reaction of (1 and 2) with hydrazine and various amines to give amino derivatives (3) and (4) respectively have been described. Also 6-bromo-4-chloro- or 6-bromo-4-chloro-1-phenyl-1H-quinazoline-2-thione (5 and 6) respectively were prepared by treating 6-bromo- or 6-bromo-1-phenyl-4 (1H, 3H)-quinazolinone-2-thione with phosphorous oxychloride and their reaction with hydrazine and various amines gave the corresponding substituted amino derivatives (7) and (8) respectively.

DETERMINATION OF SELENIUM IN BIOLOGICAL MATERIALS WITH ASCORBIC ACID

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(Received August 21, 1984; revised, August 8, 1985)

Selenium reacts with ascorbic acid to give a light orange colour having maximum absorbance at 375 nm. The colour reaction has 1 $\mu\text{g}/\text{ml}$ as the visual limit of identification and provides the basis for a new spectrophotometric method for the microdetermination of selenium from pure solution and biological materials which are of vital importance. The quantitative assessment of the tolerable amounts of different ions which do not interfere with determination has been reported.

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SYNTHESIS OF AZAPHENOXAZIN AND PHENOTHIAZIN-3-ONES

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(Received July 9, 1985; revised August 20, 1985)

The cyclisation of 3-hydroxy-2'-nitrodiphenyl ethers provided a novel and convenient route to 3H-phenoxazin-3-ones. This paper describes further exploitation of the procedure to the synthesis of other hetrocycles. Thus preparation of azaphenoxazin and phenothiazin-3-ones was attempted from 2-(3'-hydroxyphenoxy)-3-nitropyridines and 3-hydroxy-2'-nitrodiphenyl sulphides.

ISOLATION OF A NEW TRITERPENIC ALCOHOL FROM *CARISSA CARANDAS*

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(Received February 10, 1985; revised September 7, 1985)

Chemical constituents of fresh fruits of *Carissa carandas* have been investigated. Thus a new triterpenic alcohol has been isolated from the fresh fruits of this plant. The compound has been provisionally named "Carissol" and its structure is elucidated on the basis of spectral studies which shows that it is hitherto an unreported epimer of α -amyrin.

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SYNTHESIS AND MOSSBAUER EFFECT STUDY OF IRON COMPLEXES OF TETRAOXALYL PARA – PHENYLENE DIAMINE

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(Received April 28, 1983)

Tetraoxalyl para phenylene diamine (TO p-Ph D) has been synthesised. Fe(II) and Fe(III) complexes have been prepared in different media and their structures were proposed on the basis of elemental analysis, Infra-red measurements and Mossbauer studies. The study indicated that iron existed in different states of coordination and valence, where their ratio depends upon the medium used.

Biological Sciences Section

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DEVELOPMENT OF ERUCIC ACID AND GLUCOSINOLATE-FREE RAPESEEDS (CRUCIFERS) IN PAKISTAN*

Part V. Performance Evaluation of Introduced Crucifers

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(Received June 6, 1984)

Performance evaluation of "double zero" germ plasm of crucifer species (zero erucic acid and zero glucosinolate), imported from abroad, has been studied. It has been observed that a number of such lines have adapted well in local environmental conditions and their seed and oil yield is comparable with the local oilseed crop.

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EFFECT OF AERATION ON THE LIPIDS OF *CANDIDA UTILIS*

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(Received September 16, 1984; revised September 29, 1985)

Lipid production by *Candida utilis* was studied by growing cells substituting glucose with "maizgur" sugar. Cultural conditions related to the oxygen supply, glucose concentration, pH of the medium and temperature were controlled. It was observed that changes in concentration of "maizgur" sugar from 2% to 3% enhanced the lipid content of *C. utilis*. Further increase in "maize gur" sugar had no effect on lipid content. The fatty acid composition of the lipid by gas liquid chromatography showed an increase in polyunsaturated acids with aeration.

MICROBIOLOGICAL STUDIES ON SOME COMMONLY USED SPICES IN PAKISTAN

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(Received, June 2, 1984; revised July 10, 1985)

Microbiological investigations were carried out on commonly used spices such as turmeric, coriander, red chilli and black pepper, available locally both packed and un-packed. The total bacterial count in packaged samples ranged from 1.3×10^5 CFU/g (coriander) to 2.8×10^7 CFU/g (black pepper). The corresponding total bacterial count in unpacked samples ranged from 1.4×10^5 CFU/g (red chilli) to 4.7×10^7 CFU/g (turmeric). No significant difference was observed in total bacterial count in unpacked and packaged samples. Coliforms were present in most of the samples tested, ranging from 0 to > 1100 /g. Chilli samples were found to be contaminated with faecal coliforms.

No *Salmonella* and enterococci were isolated from any sample. *Bacillus licheniformis* was the dominant species found in spices, followed by *B. pumilus*, *B. subtilis*, *B. cereus*, *B. sphaericus*, *B. megaterium*, *B. laterosporous*, *Micrococcus* sp., and *B. coagulans*.

Aspergillus niger and *A. flavus* were the dominating fungi isolated from both types of the samples. No yeast was isolated from any sample.

FATTY ACIDS FROM INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS**Part VIII, Investigations of Some Species of Compositeae Family**

Shafiq Ahmad Khan, Khizar Hayat Khan, Shahina Zaka, Imran Waheed, M. Yaqub Raie and M.K. Bhatti

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(Received December 21, 1984)

The seed oils from *Carthamus oxycantha* (34.8%), *Saussuria candicans* (30.0%), *Silybum marianum* (25.7%), *Vernonia anthelmintica* (26.3%), and *Vernonia pauciflora* (37.0%). (N.O. Compositeae) have been analysed for their fatty acid composition. The occurrence of high percentage of vernolic acid (72-80%) in the Vernonia varieties and oleic (30-40%) and linoleic (40-60%) in *Carthamus oxycantha*, *Saussuria candicans*, and *Silybum marianum* suggests that these seed oils can find applications both for industrial and edible purposes.

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EFFECT OF LEAF RUST INFECTION ON AMINO ACID AND AMIDE CONTENT OF WHEAT (*TRITICUM AESTIVUM* L.) Var. Pak-70

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(Received November 12, 1984)

Studies were made on amino acid and amide content of wheat (*Triticum aestivum* L.) Var. Pak-70 infected with leaf rust fungus (*Puccinia recondita*). Healthy plants were taken as control for comparative studies. 19 ninhydrin positive compounds were detected from the leaf and 15 from the stem. In the leaves glutamate, glutamine, histidine, arginine and tryptophan were present only in diseased samples whereas cystine and tyrosine were present only in healthy controls. Glycine, leucine, alanine, phenylalanine aspartate and asparagine were found both in healthy and diseased samples. In the case of the stem alanine appeared only in diseased samples whereas lysine was present only in healthy samples. Aspartic acid, arginine, glycine, phenylalanine, serine and leucine were found both in healthy and diseased stem samples.

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NODULATION STUDIES ON *SESBANIA SESBAN* (L) MERR. 2. GREEN MANURING FOR WHEAT

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(Received April 30, 1985)

A fertility cum inoculation trial was carried out on *Sesbania sesban*. Nodulation was studied four weeks after emergence. Nodule formation increased significantly in inoculated treatment in farm fertility level. The crop was ploughed under in the same field 86 days after its sowing and was allowed to decompose. Wheat variety Sonalika was cultivated in green manured and adjacent nongreen manured plots. The yield data on pair t test bases showed a significant increase at 5% level of confidence over non-green manured treatments.

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IN VITRO* PROPAGATION OF *RAUWOLFIA SERPENTINA*. THROUGH STEM TISSUE

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(Received November 26, 1984; September 29, 1985)

Callus cultures were initiated on Murashige and Skoog's medium supplemented with 1% casein hydrolysate, 1 mg/l NAA and 0.5 mg/l kinetin. Buds regeneration was noticed after 20 weeks culture of callus on White's root culture medium containing 100 ml/l coconut milk, 10 ml/l biotin, 250 mg/l sodium diethyl-dithiocarbamate and 0.8 mg/l NAA. The plantlets formed roots both with 0.8 mg/l NAA given continuously or with 24 hr. treatment of 3 mg/l each of IAA and IBA. The plantlets established themselves quite easily in soil. For the first few weeks in soil they were nourished with half strength Knop's solution. Afterwards they became completely autotrophic.

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PESTICIDE RESIDUES IN FOODSTUFFS IN PAKISTAN – ORGANOCHLORINE PESTICIDES IN FRUITS AND VEGETABLES

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(Received May 20, 1984, revised July 15, 1985)

Residue levels of organochlorine pesticides were determined in fruits and vegetables procured from the wholesale market of Karachi, during August 1982 to March 1983. A total of 141 samples were analyzed, of which only three fruits and six vegetable samples were found to contain varying amounts of different chlorinated pesticides or their metabolites. One sample of mango peel contained a residue of heptachlor, and a sample of cauliflower was found to contain aldrin, both of which were above the levels proposed by FAO/WHO. No other residue approach the proposed maximum residue limit.

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TASTING ABILITY OF PHENYLTHIOCARBAMIDE (PTC) IN PAKISTAN HUMAN POPULATION

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(Received December 10, 1984; revised, July 28, 1985)

In order to determine the incidence of the lack of ability to taste phenylthiocarbamide (PTC) in some Pakistani human populations, 499 probands were tested for two different concentrations of PTC solution (0.5% and 1%). The incidence of tasting ability of PTC in the sample was found to be 54-62% for two solutions which has been compared with the incidence found in other ethnic groups. The χ^2 - analysis of the data shows that the two sexes do not differ significantly from each other in their relative proportions of tasters and non-tasters, thus indicating an autosomal inheritance of the trait.

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EFFECT OF DIFFERENT NPK COMBINATIONS ON THE GROWTH, YIELD AND QUALITY OF MAIZE

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(Received December 28, 1982; revised, June 17, 1985)

The effect of different NPK combination viz 0, 100-50-0, 100-50-30, 100-50-60 and 100-50-90 kg/ha. on the yield and grain quality of maize UM 81 was studied during 1981. The application of NPK in a combination of 100-50-60 kg/ha increased plant height, grains per cob, and 100-grain weight significantly over control. Tasselling, silking and maturity were delayed in the fertilized plots over the control. Protein contents in grain were affected appreciably with the application of NPK. However, the application of K beyond the level of 60 kg/ha in combination with 100 kg^N+50kg P₂O₅ did not help in improving the protein contents in grain and on the other hand tended to reduce it to a considerable extent.

INSECTICIDAL EFFECTS OF INDIGENOUS VEGETABLE OILS (TARAMIRA AND ARTEMISIA) ON SOME RICE DELPHACIDS IN PAKISTAN

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(Received June 15, 1983; revised August 4, 1985)

Toxic potentiality of indigenous vegetable oils, i.e., Taramira and Artemisia, were assessed separately as well as in combination with organic synthetic insecticides, i.e. DDT (40%, product of Itehad Pesticides Ltd., Pakistan, and Lindane Gamma BHC, introduced by ICI Ltd. under the trade Mark Gammaxane) against some rice pests namely, *Perkinsiella insignis* Distant, *Sogatia striatus* Qadri & Mirza, *Sogatella longifurcifera* Esaki and Ishihara, *Toya attenuata* Distant, *Perigrinus maidis* Kirkaldy.

For laboratory experiments direct and indirect sprays were used. These vegetable oils separately and in combination with DDT and Lindane have proved effective insecticides against the above rice pests.

Technology Section

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FON GAS AS A DILUENT FUEL IN ACETYLENE-AIR BASED ATOMIC ABSORPTION ESTIMATIONS OF TRACE METALS IN NATURAL WATERS

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(Received August 21, 1984; revised August, 11, 1985)

Use is proposed for FON gas as a diluent fuel in the conventional acetylene/air based atomic absorption method. When applied to the estimation of trace metals in natural waters, the proposed method warrants an overall 50% economy in acetylene consumption with a positive gain in absorption sensitivity. The reliability of the method is ascertained quantitatively through the optimization of flow conditions both for the fuel and the oxidant (air). The experimental data are interpreted in terms of 95% confidence level for replicate measurements of the concentrations of sodium, potassium, zinc, magnesium, nickel, and strontium in various natural waters.

STUDY ON THE AGEING EFFECT ON THE FLEXIBLE POLYETHYLENE PIPE IMMERSED IN WATER ALL THE TIME Part II

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(Received, January 24, 1985)

Ageing effect on flexible polyethylene pipe permanently immersed in water all the time was studied for a period of five years. It was observed that even after five years no noticeable change was observed in the flexibility of the pipe. The carbonyl group appeared very slowly which clearly indicates that the rate of oxidation process has decreased as compared with open atmosphere. Different sources of water affect the pipe differently.

**ANALYSIS OF SUGARS DERIVED FROM THE HYDROLYSATES OF WOOD PULP,
SHOULDER MATERIAL AND UNFRACTIONATED CELLULOSE TRIACETATE BY PAPER
PARTITION CHROMATOGRAPHY – PART I**

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(Received December 12, 1985)

Commercial cellulose triacetate samples derived from wood pulp have shown a separate peak or shoulder on the high molecular weight side of the GPC distribution curve. Material isolated from this region by fractional precipitation was found to be highly enriched in mannose and xylose, attributed to the presence of a hemicellulose derivative. Cellulose triacetate from cotton linters did not show this behaviour.

The wood pulp and shoulder material after acid hydrolysis were analysed by paper partition chromatography against known calibration standards of glucose, mannose and xylose. Both wood pulp and shoulder material were found to contain mannose and xylose, resulting from the presence of hemicellulose derivative.