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DETERMINATION OF SULPHIDE IN THE PRESENCE OF SULPHITE AND THIOSULPHATE

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A spectrophotometric method for the determination of sulphide in the presence of sulphite and thiosulphate has been developed. In this method sulphide when treated with selenium dioxide in the presence of gelatine gives a yellow colour which shows maximum absorption at 340 nm. The interference due to sulphite and thiosulphate has been studied. The maximum error was 2.6 % when a 10 μg sample of sulphide was analysed in the presence of 5 μg of sulphite. The method is convenient, precise and accurate.

Key words: Spectrophotometric, Sulphide, Selenium dioxide.

INVESTIGATION ON THE DOLOMITES AND LIMESTONES OF KAKUL, MIRPUR AND SHEIKHAN BANDI, HAZARA AREA, NWFP

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(Received September 2, 1985 revised May 3, 1987)

Dolomitic rocks of Abbottabad formation of Cambrian age are widely distributed in an area of 50 km. in Hazara, with a thickness ranging from 130 to 900 m. The beds of the Abbottabad formation are divided into three zones comprising dolomite, siliceous dolomite and calcitic dolomite respectively. The $\text{Ca}/\text{Ca}+\text{Mg}$ mole percent ranges from 48.5 to 52.0 and the SiO_2 ranges from 0.2 to 3.5 with an average of 1.6 % in most samples. The Fe_2O_3 ranges from 0.2 to 0.9 % and Al_2O_3 from 0.1 to 3.5 with an average of 1.05 %. The DTA examination indicated the genesis of dolomite from limestone by percolating pore solutions. The DTA curves showed a gradational shifting of peaks in high Mg-calcite to calcitic-dolomites to dolomites from 980 to 950°. The dolomites of Kakul, Mirpur and Sheikhan Bandi area were found to be of metallurgical and industrial grades.

Key words. Dolomites, Limestone, Kakul, Shaikhanbandi, Hazara.

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PURIFICATION AND CHARACTERIZATION OF ACID PHOSPHATASE FROM SORGHUM (*SORGHUM VULGARE*) SEEDS

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(Received October 10, 1985; revised March 19, 1987)

An acid phosphatase from sorghum (*Sorghum vulgare*) seeds was purified 90-fold by ion exchange chromatography on DEAE-Cellulose and gel filtration on Sephadex G-75 with enzyme recovery of 65 %. The purified enzyme preparation exhibited pH optimum at 4.9 and optimum temperature of 55°. Km value with *p*-nitrophenyl phosphate was 0.36 mM. The first order rate constant for the phosphorylation reaction (k_2) was $3.1 \times 10^{-5} \text{ sec}^{-1}$ and $3.6 \times 10^{-5} \text{ sec}^{-1}$ for *p*-nitrophenyl phosphate and phenyl phosphate respectively. Mercury, zinc and molybdate inhibited the enzyme strongly. The inhibition by inorganic phosphate was competitive while the fluoride was non-competitive. The kinetic studies revealed the inhibition by fluoride of mixed type and the dissociation constant (K_i) is important parameter of the reaction $EI \rightleftharpoons E + I$.

Key words: An acid phosphatase from sorghum (*Sorghum vulgare*)

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THE PHENOMENAL INTERFERENCE ON THE ATOMIC ABSORPTION OF MANGANESE CHROMIUM AND NICKEL

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The phenomenal effect of polymeric formations on the atomic absorption of manganese, chromium and nickel in cool flames, is a harmful effect due to the inclusion of the analyte inside the heteropoly anion lattice. The way to get rid of such interference rests with the addition of a laboratory synthesized ligand to the sample solution to deform heteropoly formation, thus shifting the equilibrium in favour of normalizing free atoms in the flame.

Key words: Polymeric formations; Manganese; Chromium and Nickel.

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SYNTHESIS AND SOME REACTIONS OF HEXAHYDRO-3-OXO-1-ARYL-2-PHENANTHRENECARBOXANILIDES

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(Received October 30, 1986; revised February 12, 1987)

Treatment of 2-arylidene tetralone with acetoacetanilide gave the phenanthrenecarboxanilides 1a-b. 1a underwent condensation with 5-aminotetrazole, 3-amino-1,2,3-triazole and 2-amino-5-carboethoxythiazole to give compounds 2,3 and 5 respectively. The structures of these compounds were established by their IR, $^1\text{H-NMR}$ and mass spectral data.

Key words: Phenanthrenecarboxanilides; Synthesis; Reactions.

SYNTHESIS AND REACTIONS OF BENZOFURANYL-L-ASCORBIC ACID ANALOGUES

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(Received January 1, 1986; revised April 27, 1987)

Substituted benzofuranyl analogues of dehydro-L-ascorbic acid were prepared. The reaction of 2-formyl-3-5- or 3,7-dimethylbenzofurane with glyoxal afforded 4(3,5- or 3,7-dimethylbenzofuran-2-yl)-2-hydroxytetronimides [4], that formed monoacyl derivatives [6]. Oxidation of the tetronimides (4) with nitrous acid yielded the corresponding 4-(3, 5- or 3,7-dimethylbenzofuran-2-yl)-2, 3-dioxbutyrolactones (7). With acyl- or arylhydrazines, compound (7) gave the corresponding bis-acyl- (12) or bis-aryl-hydrazones (13). Treatment of (4) with an excess of arylhydrazines in aqueous acetic acid gave the methane derivatives (10), whereas with *o*-phenylenediamine under similar conditions they gave the methylquinoxalines (11). Reaction of (7) with *o*-phenylenediamine afforded the quinoxalinone derivatives (14), whereas with *o*-phenylenediamine and (*p*-chlorobenzoyl) hydrazine gave the product (15).

Key words: Synthesis; L-Ascorbic analogues.

**REACTION OF 2-METHYL-2-AMINO-1,3-PROPAN-DIOL WITH ALDEHYDES AND KETONES
SYNTHESIS OF OXAZOLIDINE AND IMIDAZOLINE DERIVATIVES AS ANTIMICROBIAL AGENTS**

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(Received January 14, 1986; revised April 9, 1987)

Aromatic aldehydes as well as ketones reacted with 2-methyl-2-amino-1,3-propandiol to give mono-oxazolidine or di-oxazolidine derivatives according to molar ratio. Aromatic amines, hydrazine hydrate and ammonium hydroxide, reacted with oxazolidines to give the corresponding imidazolidines, triazines and pentazines. The antimicrobial character of the prepared products was studied.

Key words: Methyl, Amino, Aromatic aldehydes Ketones, Antimicrobial Character.

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PHASE SEPARATION OF ETHANOL/GASOLINE BLEND. PART. I

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(Received May 18, 1986; revised May 26, 1987)

Improvement in water tolerance of 25/75 v/v ethanol/gasoline blend, by the addition of 5 %v of aromatic and aliphatic inhibitors has been investigated. Aromatic hydrocarbons proved to be very poor water stabilizing agents, whereas aliphatic compounds registered 22 % mass improvement in the water tolerance of the blend.

Key words: Alcohol gasoline blends.

Biological Sciences Section

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KASHMIR LAC WITH ITS THREE FORMS OF YELLOW COLOURED INSECTS AND ARIZONA LAC

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Lac insects in India are mostly red coloured but up north in Kashmir the species is yellow coloured. Lac would be *Laksha* in Sanskrit and the word occurs first in *Atharvaveda* Book V, hymn 5, to be dated 1500 B.C. Scientifically this Kashmir lac would be *Kerria fici*. The Aryans at that time were pastoral nomads. They came in contact with the Chinese who used an insect-wax as a styptic drug. The theory was that if wax is adhesive it will also join parts of the flesh torn apart in a wound and can even join fractured bones. This styptic effect would also reveal itself if the wax is taken orally. Scientifically this Chinese was belonged to the insect *Ericerus pela*. This was the crude material. It was treated with boiling water when the insect debris and plant particles were decanted and rejected leaving purified wax as sediment. This wax was the form in which the drug was used. The etymology of the word, lae, has been discussed and shown to be of Chinese origin.

Key words: Lac insect, Arizona lac, Kashmir lac.

POND CULTURE OF JAIRA AND KALRI (PENAEID SHRIMPS) IN PAKISTAN

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(Received February 16, 1987; revised May 4, 1987)

Preliminary investigations were conducted in experimental pond having an area of 50 m X 2 m. In this pond 2,500 juveniles of *Penaeus merguensis*, *Penaeus penicillatus* ("jaira"), *Metapenaeus affinis* and *Metapenaeus monoceros* ("kalri") were stocked at 3-5 cm size. After feeding for three months, the shrimps were harvested on 21 July 1986. The catch was 60 kg of large shrimps with an average length of 15 cm and average weight of 33 g each, which is the largest size available in the local market today at a cost of about Rs. 200/- per kg.

Key words: Penaeid shrimps, Pond culture, shrimp trade.

CORRELATIONS AND PATH ANALYSIS OF YIELD AND ITS COMPONENTS IN PIGEONPEA

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(Received July 29, 1986; revised April 28, 1987)

High genotypic and phenotypic coefficients of variation were observed for pods per plant and yield per plant. Genotypic correlation of yield per plant with pods per plant was high and positive. Association between seeds per pod and pod length was very high and positive. Direct effect of pods per plant on grain yield was low and negative.

Key words: Pigeonpea; Genotypic correlation; Phenotypic correlation; Environmental correlation; Path coefficients.

PHENOTYPIC STABILITY FOR YIELD IN CHICKPEA

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(Received May 13, 1986; revised May 24, 1987)

The nature and magnitude of genotype X environment interaction in 14 genotypes of chickpea (*Cicer arietinum* L.) were studied for determination of yield and calculation of phenotypic stability. The study indicated that GL-769 gave the highest yield under favourable environments. However, E-5, CM-72 and CM-68 were the most stable genotypes by being less sensitive to changes in the environment.

Key words: *Cicer arietinum* L., Genotype X Environment interactions, Yield stability.

PREPARATION OF POST DIARRHOEAL FOOD FOR INFANTS AND ITS BIOLOGICAL AND CLINICAL EVALUATION

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(Received June 7, 1986; revised April 26, 1987)

A post-diarrhoeal food formulation based on a blend of rice, soymilk and moong pulse and fortified with essential vitamins and potassium salt has been prepared. Chemical and biological evaluation showed that it is of high nutritive value. It is a good source of proteins (19.5 %). The nutritional quality of recipe was measured by feeding trials on albino rats. Net protein utilization (NPU), protein efficiency ratio (PER), Net dietary protein calorie per cent (NDP cal %) and digestibility (D) were 57, 2.4, 11.6 and 92 % respectively. Clinical evaluation showed that it is a satisfactory food product for feeding babies during and after diarrhoeal period. All babies fed on the formulation showed great improvement and recovered from diarrhoea within a few days of being fed upon it.

Key words: Post diarrhoeal food; Infant food; Nutrition evaluation.

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LIPIDS FROM LUPINUS TERMIS SEEDS

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Gas-liquid chromatography was employed to determine the fatty acid compositions of lipid fractions obtained from *Lupinus termis* seeds as well as the unsaponifiable matter including hydrocarbon, tocopherol and sterol content.

Key words: *Lupinus termis*, lipids, fatty acids, sterols.

Short Communication

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GROWTH AND NUTRIENT CONTENT OF RICE PLANT UNDER FLOODED AND UNFLOODED CONDITIONS

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Technology Section

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EVALUATION BENEFICIATION AND UTILIZATION OF KOGA NEPHELINE SYENITE AS GLASS AND CERAMICS RAW MATERIALS

Part II. Beneficiation and Pilot Plant Studies

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(Received January 2, 1986; revised April 9, 1987)

The present investigation shows that commercial grade feldspar, the raw material for glass and ceramic industry, could be produced from nepheline syenite rocks. Pilot plant beneficiation of bulk samples were undertaken to study the grade-recovery parameters. Rod mill grinding in close circuit with a classifier was found superior to ball mill grinding. The grindability studies gave a work index of 13-14.7 Kwh. A recovery of 70 % on classified feed basis with Fe content of less than 0.1 % was achieved in three stages. The study led to the development of a process flow sheet for subsequent designing and operational trials.

Key words: Nepheline; Syenite; Beneficiation;

SCIENTIFIC STUDY AND DEVELOPMENT OF MEAT BARIAN – A TRADITIONAL FOOD PRODUCT Part I. An Overview

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(Received August 30, 1986; revised February 10, 1987)

This overview is a part of the systematic study of a rural-based traditional dry food of the subcontinent, "barian" or "varian". It is usually made by wet or dry grinding and mixing of generally consumed pulses. The traditional method of "barian" making, drying and mode of selling are described. The possibility of its export and the marketing aspects for a traditional product have been also examined. The discussion is based on reasons to a detailed study of this traditional food item.

Key words: Pulses; Barian; Meat.

A MODIFIED TECHNIQUE FOR REFRACTIVE INDEX INCREMENT MEASUREMENTS FOR CETYLTRIMETHYL AMMONIUM BROMIDE SOLUTIONS USING AN INTERFERENCE REFRACTOMETER

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(Received June 26, 1985; revised April 2, 1987)

A modified technique for the measurement of refractive index increments on detergent solutions using an interferometer is presented in this paper. The study is being carried out on various concentrations of cetyltrimethyl ammonium bromide (CTAB) in absence and presence of 10^{-4} M, 10^{-3} M, 0.1 M potassium bromide at pH ranging between 8.0 and 9.2. The technique was applied on two known values of refractive index increments for an anionic surfactant which agreed well with the published ones.

Key words: Refractive index increment; Rayleigh interferometer; Surfactant solution.

ASCORBIC ACID AND QUALITY RETENTION IN ORANGE SQUASH AS RELATED TO EXPOSURE TO LIGHT AND CONTAINER TYPE

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(Received April 20, 1986; revised May 4, 1987)

The effect of fluorescent light (20 Ft-C) and packaging material on the physicochemical and organoleptic characteristics of orange squash stored at room temperature (22.5-35⁰) was studied. More ascorbic acid was retained and better sensory quality characteristics (colour and flavour) were maintained in the samples stored under darkness than those kept under fluorescent light. As far as the container type was concerned, amber and green glass bottles proved superior for the retention of both ascorbic acid and organoleptic characteristics of orange squash as compared to uncoloured glass, white polyethylene and poly vinyl chloride bottles.

Key words: Fluorescent light; Container type, Ascorbic acid.