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Physical Sciences Section

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SOME EXTENSIONS OF THE VON BRAUN (BrCN) REACTION ON ORGANIC BASES

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In continuation of studies on some extensions of the von Braun (BrCN) reaction on organic bases, work on some aliphatic, aromatic, heterocyclic and four medicinally important bases has led to various amido, methyl amino, methoxy imino methyl, ethoxy imino methyl, guanido and substituted guanido derivatives, which were characterized through spectral studies.

Key words: Extensions of von Braun reaction. Von Braun reaction on simpler amines. Von Braun reaction on alkaloidal bases.

OXIDATION OF ALKYL PYRIDINES BY USING COBALT (III) ACETATE. Part III

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Oxidation of 2-picoline and 3-picoline was carried out by using cobalt (III) acetate to obtain the corresponding carboxylic acids. Effects of the variations in temperature and time period during such oxidation were also studied and tabulated. The picolinic carboxylic acids upto 52% yield were obtained.

Key words: Oxidation, Picoline, Cobalt acetate.

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POTENTIOMETRIC DETERMINATION OF SULPHITE IN THE PRESENCE OF THIOSULPHATE, SULPHIDE, SULPHATE AND Fe (II)

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(Received June 18, 1984; revised November 6, 1986)

In this procedure potentiometric determination of sodium sulphite is described. N-Bromosuccinimide has been used as titrant. 10 to 50 mg samples of sodium sulphite were analysed with maximum error of 1.0 % when 10.0 mg sample was taken. Nitrogen gas was passed in the reaction vessel during titration. Interferences due to thiosulphate, sulphide, sulphate and Fe^{2+} have also been studied and removed.

Key words: Potentiometry, Sulphite, Thiosulphate.

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**SYNTHESIS AND CHEMICAL PROPERTIES OF N, N'-DIHYDROXY [2.2]
PARACYCLOPHANE-4, 5, 12, 13-TETRACARBOXYLIC ACID-BISIMIDE**

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[2.2] Paracyclophane-4, 5, 12, 13-tetracarboxylic acid dianhydride (I) reacts with hydroxylamine hydrochloride in pyridine to give N, N'-dihydroxy [2.2] paracyclophane-4, 5, 12, 13-tetracarboxylic acid-bisimide (II). The reaction of (II) with arylsulphonyl chlorides, acid chlorides, ammonia, primary aromatic amines, amino acids, hydrazines and base hydrolysis as well as its pyrolysis have been studied.

Key words: [2.2] Paracyclophane; Heterocyclic [2.2] paracyclophane; Imides.

STUDIES ON PROTEOLYTIC ENZYME

Part I. Characteristics of Protease Synthesis by *Penicillium expansum*

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The effect of environmental parameters on the growth and the protease synthesis by *Penicillium expansum* was investigated. The maximum production was achieved at 35°C at initial pH 6.0 after 48 hours incubation when 1 % Millet husk was used as a carbon and energy source.* The addition of carbon and nitrogen sources to mineral Millet husk medium tested, gelatin, peptone, and sodium nitrate promoted protease synthesis whereas glucose inhibited protease formation.

Key words: *Penicillium expansum*, Millet husk, Protease enzyme.

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TRAFFIC NOISE IN KARACHI

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The road traffic is one of the major sources of noise in urban areas. Due to dramatic increase in traffic, the noise levels have gone much beyond the acceptable limits in the big cities of Pakistan and apparently there is little concern about the noise nuisance to the city dwellers. In order, therefore, to have an assessment of the noise levels as a forerunner for adopting control measures, a survey of the traffic noise levels in Karachi city has been carried out. The measurements have been made at nine major traffic junctions in some of the busiest trade centres of the city. Various analyses of the data have been carried out, and the expected community response to the increasing noise level has been discussed with reference to some international criteria.

Key words: Noise, Traffic, Survey

A COMPARATIVE STUDY OF PHYSICO-CHEMICAL PARAMETERS AND TRACE METAL CONTENTS OF HOLY WATER ZAMZAM AND LOCAL POTABLE AS WELL AS HOT SPRING WATERS

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(Received March 16, 1986; revised July 20, 1986)

Using standard analytical methods and the atomic absorption technique, certain physico-chemical parameters and trace metal levels are estimated for the water samples from holy water Zamzam, collected from Mecca, Saudi Arabia, during Haj period from 1983 through 1985. The estimated parameters include pH, chloride, sulphate, hydrogen carbonate, hardness (CaCO_3), conductance, nitrate, Total Dissolved Solids (TDS) and silica. At optimized atomic absorption conditions the trace metal analysis is conducted for sodium, potassium, iron, zinc, calcium, magnesium, lead, cadmium, strontium, copper, cobalt, manganese, mercury and chromium. Averaged results for replicate measurements are reported at $\pm 2S$ confidence level. The data obtained are compared with those for local, non-treated surface potable water, hot spring water and sea water. The interrelationship is examined from seasonal and/or regional viewpoints.

Key words. Parameter, Tracemetal, Water

Short Communication

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INHIBITORY EFFECTS OF AQUEOUS EXTRACTS OF NATURAL PRODUCTS ON CRYSTALLIZATION OF URINARY LITHIASIS *IN VITRO* Part I Carbonato Apatite

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Biological Sciences Section

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EFFECT OF FUNGICIDES AND PHENOLIC COMPOUNDS ON THE PRODUCTION OF PROTEASES BY *BACILLUS SUBTILIS*

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(Received November 27, 1985; revised September 1, 1986)

Addition of fungicides and phenolic compounds to the basal medium caused marked changes in the production of neutral as well as alkaline proteases by *Bacillus subtilis*. All the fungicides tried were found to inhibit the production and activity of proteases. Brassicol and Bavistin were most effective. Phenolic compounds other than Ferulic Acid were observed to have an inhibitory effect on enzyme production.

Key words: Fungicides, Phenolic compounds, Proteases.

EFFECT OF SIZE OF NUTRITIONAL AREA ON THE GROWTH AND YIELD OF MAIZE GROWN AT DIFFERENT FERTILITY LEVELS

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(Received November 21, 1985; revised January 15, 1987)

Studies investigating the effect of varying nutritional area on the growth and yield of maize grown at different fertility levels were carried out on a sandy loam soil. The fertilizer treatments comprised of 0, 150 kg N, 150 kg N + 75 kg P_2O_5 , 150 kg N + 75 kg P_2O_5 + 75 kg K_2O /ha, while the size of nutritional area varied as 60 x 20 cm, 60 x 25 cm and 60 x 30 cm giving rise to crop stand of 83, 67 and 56 thousand plants/ha, respectively. The various yield components like number of cob bearing plants/plot, number of grains/cob, 1000-grain weight were significantly affected with the application of 150 kg N + 75 kg P_2O_5 /ha. It was also observed that the application of K in addition to N and P did not help in increasing the grain yield of maize to a considerable extent because of already high K level in the experimental soil (500 ppm). A plant population of 67 thousand/ha as maintained in the planting pattern of 60 x 25 cm appeared to be the best for obtaining the highest grain yield of maize.

Key words: Nutritional area, Fertility level, Maize yield.

SCREENING OF HIGHER PLANTS FOR ANTIBACTERIAL ACTIVITY

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The crude alcoholic extracts of 65 plants species belonging to 34 families, which were selected on the basis of literature and medicinal folklore reports, were tested for antibacterial activity against 14 different pathogenic bacteria. A total number of 88 plant extracts were evaluated. 26% of the total extracts exhibited broad spectrum antibiosis, while 21% were totally inactive. The rest showed some level of bacteriostatic activity against few specific microorganisms.

Key words: Screening; Plant extracts; Antibacterial activity.

GROWTH OF WHITE CLOVER (*TRIFOLIUM REPENS* L.) EXPOSED TO LOW
CONCENTRATION OF SO_2 AND NO_2 AT DIFFERENT LEVELS
OF SULPHATE AND NITRATE NUTRIENTS

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(Received September 23, 1986; revised February 2, 1987)

Separate treatment of SO_2 and NO_2 pollution at low concentration (6.8 ppm) had stimulated the growth of *Trifolium repens* L. slightly at low and medium levels of sulphate and nitrate, whereas at high level of nutrients, the plants showed reduction in growth. When plants were treated with a mixture of SO_2 (6.8 ppm) and NO_2 (6.8 ppm), all the measured variables were greatly reduced at all levels of nutrients. On the other hand, dead dry matter was greatly increased.

In conclusion it is suggested that *T. repens* which was collected from a polluted area might have adapted itself to the local environment. In addition, the low level of SO_2 and NO_2 could be used by plants in the form of sulphate and nitrate respectively under favourable growing conditions.

Key words: White clover growth, Sulphate and nitrate, SO_2 and NO_2 pollution.

ROOT CALLUS CULTURES OF *RAUWOLFIA SERPENTINA* BENTH.*

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(Received October 31, 1985; revised January 29, 1987)

Root explants obtained from mature plants and juvenile aseptic seedlings were subcultured for callus formation with 2,4-D, NAA and K. Explants taken from seedling roots gave the best response for callus formation on WRC medium containing 1 mg/l 2,4-D and 100 ml/l CM. Callus propagation in subcultures was found good both on initiation medium and on AM medium with BAP, K, AS, NAA, 2,4-D and CH at 0.1, 0.3, 4.0, 1.0, 6.0 and 1000 mg/l. The alkaloids screened were serpentine, ajmaline, raubasine, raupine and reserpine. The major alkaloid present in cultures was ajmaline. Its maximum percentage was 0.0573 % in the cultures grown under dark on AM medium, corresponding to an increase of 94.61 % over cultures kept in 16 hr light.

Key words: *Rauwolfia serpentina*, Root callus growth, Precursor, Ajmaline.

Technology Section

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COPOLYMERS FROM α -PINENE

Part III. Free Radical Copolymerization of Acrylonitrile with α -Pinene

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(Received May 14, 1985; revised December 6, 1986)

The homopolymerization of α -pinene and copolymerization of α -pinene with acrylonitrile (AN) has been carried out at 70° and 100° using a free radical initiator. α -pinene homopolymerizes with very low degree of polymerization. The rate of copolymer formation decreases with increased concentration of α -pinene. At higher concentration of catalyst, good yields of copolymer is obtained. The monomer reactivity ratios of AN (r_1) and α -pinene (r_2) were determined to be 13.5 ± 0.1 and 0.07 ± 0.01 respectively. With increasing concentration of α -pinene in the binary mixture, copolymers with decreasing molecular weight (2300-4910) were obtained and α -pinene also acts as a chain transfer agent. The copolymer obtained were yellowish powdery substances soluble in many organic solvents. It decomposes around 120-135°.

Key words: Homopolymerisation; Tackifying agents; Isomerisation.

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EFFECT OF WAXING ON FREE AMINO ACIDS OF KINNOW MANDARINS (*CITRUS RETICULATA* BALNCO) DURING STORAGE

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(Received November 4, 1986; revised January 10, 1987)

Free amino acids identified in kinnow juice in decreasing order of concentration were serine, aspartic acid, glutamic acid, arginine, threonine, proline, lysine, alanine, valine, cystine, glycine, phenylalanine, tyrosine, histidine, leucine, isoleucine and methionine. Preliminary investigations revealed that there was no effect of waxing on free amino acids of kinnows. However, there was considerable decrease in most of the amino acids during postharvest storage at room conditions (12-26°, 68-90% RH). Further studies are needed in this direction to understand the metabolism of free amino acids and their relation to internal quality deterioration during postharvest handling of citrus fruit.

Key words: Waxing, Newspaper lining, Free amino acids.

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BIOGAS FROM AGRICULTURAL AND MUNICIPAL SOLID WASTES

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(Received October 24, 1985; revised December 28, 1986)

Dry matter content of the crop residues, cow dung, poultry droppings and municipal wastes varied from 20.0 to 37.4%. Adjustment of solid content (as 10 %) of the waste materials by dilution with water and anaerobic fermentation resulted in maximum production of biogas. Biogas produced from cow dung, bagasse pith mixed with dung, poultry droppings and municipal wastes was 0.35, 0.29, 0.16 and 0.22 m³/kg of the dried material respectively. The rate of production of biogas was effected adversely during the winter season.

Key words: Biogas; Cow dung; Agricultural waste.