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Physical Sciences Section

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A CONVENIENT SYNTHESSES OF SOME NEW SUBSTITUTED GUANIDINES

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(Received April 26, 1987)

The cyanamides of piperidine, 2-methyl piperidine, 4 methyl piperidine, 2,6-dimethyl piperidine, indoline, tetrahydroisoquinoline, 2,3-dimethylaniline, 2,5-dimethylaniline, 2,6-dimethylaniline, α -naphthylamine and β -naphthylamine yielded their respective guanido derivatives on treatment with dry ammonia. Their structures have been confirmed through spectral studies.

Key words: Cyanamides; Guanido derivatives; Heterocyclic and Aromatic amines.

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DATUMELIN – A NEW WITHANOLIDE FROM *DATURA METEL* L.

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(Received July 9, 1987)

From the alcoholic extract of the fresh, undried leaves of *Datura metel*, a new withanolide datumelin has been isolated and its structure elucidated by spectroscopic studies.

Key words: *Datura metel*, Withanolide, Datumelin.

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SOME REACTIONS WITH 3-AMINOCOUMARIN

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(Received April 10, 1987; revised June 24, 1987)

3-Aminocoumarin was reacted with the diazonium salts of aromatic amines to obtain the azo compounds (Ia-e), which cyclized to as triazines (VI) upon treatment with benzaldehyde. Further, 3-aminocoumarin was reacted with chloroacetyl chloride to give the chloroacetylated derivative (II) which reacted with aromatic and aliphatic amines to afford its amide derivatives (IIIa-f), and with ammonium thiocyanate to afford the thiocyanate derivative (IV) which underwent cyclization by reaction with benzaldehyde to obtain the thiazolidone derivative (V) in good yields.

On the other hand, treating of 3-aminocoumarin with 4-(2-quinoline)-2-phenyl-2-oxazolin-5-one [10] in alcohol gave the quinoline coumarin acrylic acid derivative (IX) which undergoes cyclization to the 2-coumarin-4-quinoline imidazolone derivative X by refluxing in acetic acid.

Key words: 3-Aminocoumarin, Azo-compounds; Diazonium salts.

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NICKEL-SORBITOL-DEXTRIN-CITRIC ACID COMPLEX

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(Received August 13, 1986; revised July 5, 1987)

Chelate complexes of nickel with sorbitol; dextrin; sorbitol-dextrin; and -sorbitol-dextrin-citric acid are described. Complex formation with sorbitol alone is not satisfactory and dextrin is an essential component for its stability. With the exception of sorbitol complex others are stable between pH 10 to 4.2.

Key words: Nickel-chelate, Nickel complex, Nickel-sorbitol.

THE ETHYLENE CARBONATE-WATER SYSTEM: DENSITIES, VISCOSITIES AND DIELECTRIC CONSTANTS AT DIFFERENT TEMPERATURES

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(Received October 6, 1982; revised April 21, 1987)

The data obtained for density, viscosity and dielectric constant are used for the study of the physical properties of water-ethylene carbonate solvent mixtures. Density measurement of the solvent mixtures showed the presence of interaction between water and ethylene carbonate through hydrogen bonding which would lead to contraction in the volume of the mixture and also in the partial molal volume of the components. Viscosity data also provided supporting evidence of such interaction.

Key words: Solute-solvent interaction of binary system; Density-viscosity; dielectric constant measurements of binary mixture; Excess partial volume and deviation molar viscosity and dielectric constant for EC-H₂O system.

KINETICS AND EQUILIBRIA IN THE SYSTEM TRANS-BIS-(THIOSULPHATO)-BIS(ETHYLENE-DIAMINE)COBALT(III)-TRANS THIOSULPHATO-AQUA-BIS (ETHYLENEDIAMINE) COBALT(III)

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(Received January 22, 1987; revised June 3, 1987)

The aqua-thiosulphato-bis(ethylenediamine) cobalt(III) complex $[\text{Co}(\text{en})_2(\text{S}_2\text{O}_3)(\text{OH}_2)]^+$ has been prepared in solution by normal hydrolysis and/or stoichiometric oxidation of trans-bis(thiosulphato) bis(ethylenediamine) cobalt(III) complex with iodine. The product of oxidation has been isolated by ion-exchange chromatography and has been characterized on the basis of its UV spectroscopic parameters and its substitution chemistry. The acidity constant of the aqua-product has been measured using spectrophotometric titration method and was found to be 7.383 ± 0.03 .

Key words: Preparation and characterization of aqua-thiosulphato bis(ethylenediamine) cobalt (III) complex.

UTILIZATION OF NEPHELINE SYENITE IN GLASS FOUNDING

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(Received July 2, 1986; revised July 8, 1987)

A large deposit of nepheline syenite has been discovered in Koga, Tehsil Bunnair, Swat (Pakistan). It is acidic igneous rock but it does not contain free quartz, being silica deficient as compared with granites and syenites and mineralogically is a mixture of several minerals of which major ones are: albite, microcline and nepheline. In this paper the use of nepheline syenite in glass-founding of four kinds with a skeleton formula of 75 % SiO_2 , 15 % NaO and 10 % CaO is discussed at length.

Key words: Nepheline syenite; Glass.

Biological Sciences Section

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ANTIMICROBIAL ACTIVITY OF ESSENTIAL OILS OF UMBELLIFERAE FAMILY

Part VI. *Stewartiella baluchistanica*, *Psammogeton canescens* and *Ducrosia anethifolia*

Meena Syed, M. Javaid Iqbal, F.M. Chaudhary and M.K. Bhatti

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(Received June 2, 1987)

The essential oils of *Stewartiella baluchistanica*, *Psammogeton canescens*, and *Ducrosia anethifolia* were studied for their inhibitory activity against *Staphylococcus aureus*, *E.coli*, *Salmonella typhi*, *Shigella dysentery*, and *Vibrio cholera* in emulsified broth by spectrophotometric method. All the oils showed inhibitory effect but the oil of *P. canescens* was found to be the most effective.

Key words: *Stewartiella baluchistanica*, *Psammogeton canescens*, *Ducrosia anethifolia*.

AFLATOXIN CONTAMINATION OF POULTRY FEED AND ITS INGREDIENTS

Part IV. Animal Source of Protein and Pulses

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(Received April 4, 1987; revised June 30, 1987)

Three hundred and eighty one samples of fish meal, blood meal, meat meal, guar meal and matrie were collected and sixty four samples (16.79%) have been found positive for aflatoxin B₁. Highest contamination 22.84% was found in the fish meal samples with an average level of 49.11 µg/kg and highest amount detected was 259 µg/kg. The samples were analysed according to the method of Association of Official Analytical Chemist and quantification was made through comparison with standards and confirmation acheived by making derivatives by TFA and H₂SO₄ spray of TLC Plates.

Key words: Aflatoxins *Aspergillus flavus* Poultry feed ingredients.

STUDIES ON THE ESSENTIAL OILS OF THE PAKISTANI SPECIES OF THE FAMILY UMBELLIFERAE

Part LII. *Bupleurum stewartianum* Seed Oil

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(Received June 10, 1987)

Bupleurum stewartianum belongs to the genus *Bupleurum* of N.O. Umbelliferae. The physico-chemical properties and the chemical composition of the essential oil of the seed of *Bupleurum stewartianum* have been studied. The yield of the *B. stewartianum* seed oil is 0.3 % and has the following composition: α -pinene (1.98 %), α -thujene (1.65 %), santene (9.30 %), camphene (3.45 %), myrcene (3.64 %), β -phellandrene (2.46 %), limonene (2.34 %), γ -terpinene (1.21 %), *p*-cymene (1.02 %), geranyl acetate (9.14 %), citronellyl acetate (8.40 %), borneol (2.86 %), α -terpineol (20.4 %), coumarins (21.34 %) and a mixture of hydroxy compounds (3.45 %). Certain species of the genus *Bupleurum* have been used medicinally for stomach and liver ailments. However, the physiological effects of the oil will have to be evaluated for determining the medicinal importance of the oil.

Key words: Umbelliferae, essential oil, *Bupleurum stewartianum*.

STUDIES ON THE ESSENTIAL OILS OF THE PAKISTANI SPECIES OF THE FAMILY UMBELLIFERAE

Part LIII. The Essential Oil of *Bupleurum tenue* Buch Seed

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(Received June 10, 1987)

The essential oil of *Bupleurum tenue* Buch growing wild in Pakistan, has been characterized and studied with respect to its physico-chemical properties and chemical composition. The percentage composition of the oil as determined by column chromatography coupled with gas liquid chromatography of the hydrocarbons and the oxygenated components have been reported. The composition thus obtained is santene (8.70 %), *p*-cymene (1.81 %), β -phellendrene (2.11 %), camphene (3.95 %), α -pinene (1.68 %), α -thujene (1.97 %), limonene (2.99 %), geranyl acetate (9.78 %), citronellyl acetate (8.39 %), borneol (3.02 %), mixture of unknown hydroxy compounds and coumarins (22.80 %) and tarry matter (9.70 %).

Key words: Umbelliferae, essential oil, *Bupleurum tenue*.

Short Communication

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***ASCOLANTHANUS TRISPORUS* CAILLEUX FIRST RECORD FROM PAKISTAN**

Sultana

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SOME USEFUL PLANTS OF NORTHWEST FRONTIER PROVINCE AND ITS SUBURBS

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(Received January 13, 1986; revised July 2, 1987)

Local nomenclatural studies on 63 species belonging to 36 families of vascular plants from different parts of NWFP and Punjab have been conducted. Two species belong to gymnosperms and 61 to angiosperms, of which 7 taxa are noncotyledonous while 54 are dicotyledonous. Families, genera and species have arranged in alphabetic order in Tables 1, 2 and 3.

Key words: Medicinal plants.

NUTRITIONAL AND ORGANOLEPTIC EVALUATION OF WHEAT ROTIS SUPPLEMENTED WITH SOYBEAN FLOUR

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(Received November 11, 1986; revised June 18, 1987)

Proximate and mineral composition, sensory characteristics and biological value of wheat rotis (unleavened Pakistani bread) supplemented with soybean flour at (0, 5, 10, 15, 20 % levels) were studied. Protein, fat, ash, calcium, phosphorus, iron and phytic acid contents of wheat rotis were increased with supplementation. The carbohydrate content of rotis significantly decreased with the incorporation of soybean flour, but the crude fibre content remained unchanged. Protein efficiency ratio, net protein utilization and biological value of supplemented rotis were higher than those of control samples; however, there was no significant effect of supplementation on the true digestibility of wheat rotis. Addition of soybean flour upto 20 % level did not cause any adverse effect on the sensory acceptability of rotis.

Key words: Proximate composition; Mineral and phytic acid content; Biological value.

EFFECT OF VARIOUS CONCENTRATIONS OF POTASSIUM ON THE GROWTH OF SORGHUM PLANT

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and

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(Received March 9, 1986)

To see the effect of various concentrations of potassium on the growth of plant and potassium content in sorghum crop, an experiment was designed and carried out in the glass house, Department of Agriculture, University of Queensland using conventional still culture method. Five nutrient levels of potassium were evaluated (1, 10, 90, 850 and 8000 μM K). Results of the experiment show that, on fresh weight basis potassium concentration ranged from 18 to 129 $\mu\text{mol/g}$ fresh weight in tops of the plant and 5 to 30 $\mu\text{mol/g}$ fresh weight in roots. When these results expressed on dry weight basis these values comes to 0.37 to 3.87 g/100 g dry weight in tops and 0.33 to 1.47 g/100 g dry weight in roots. Critical concentration when expressed on dry weight basis comes to 0.8% K in tops and on fresh weight basis 80 $\mu\text{mol/g}$ fresh weight. Increasing the potassium concentration in nutrient solution increased the growth of plant and potassium content in tops and roots.

Key words: Sorghum crop, Concentrations of potassium; Critical K limit.

ESTIMATION OF LOSSES CAUSED BY INSECT AND WEED PESTS TO MAIZE CROP

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(Received March 18, 1987; revised June 28, 1987)

The experiment was conducted to estimate the losses caused by insect and weed pests to the maize crop. The results revealed that differences in total yield of ears in various treatments were significant. The difference in average plant height, number of grains per ear, weight of grains per ear and weight per ear in different treatments were significant when compared with control. However, the difference among the treatments were non-significant. The percentage loss in ears caused by weeds, insects and weeds plus insects was found to be 18, 14, and 31% respectively.

Key words : Losses, insects and weeds.

RELATIVE GROWTH IN THREE SPECIES OF OYSTERS

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(Received March 16, 1987; revised July 19, 1987)

Allometric relationships between the shells and tissues of three species of oysters namely, *Crassostrea glomerata*, *C. rivularis* and *Saccostrea tuberculata*, were studied. Analysis of convariance indicated significant differences in relative growth of various shell dimensions of the three species. Shell weight increased exponentially with increase in shell length. The growth rate of the dry tissue in *S. tuberculata* and *C. rivularis* was faster than in *C. glomerata*. Condition index increased with shell size in *C. rivularis* and *C. glomerata* but decreased with size in *S. tuberculata*. The results are discussed with reference to their occurrence under different environmental conditions.

Key words. Relative growth, condition index, tidal level.

MULTIPLE DRUG RESISTANCE FACTORS AMONG INDIGENOUS CLINICAL *STAPHYLOCOCCI*

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(Received February 17, 1987; revised May 12, 1987)

108 *Staphylococcus aureus* isolates, collected from various clinical sources of Karachi, were screened for their resistance to 8 different antibiotics. Among these cultures, 98 were found resistant to single or multiple antibiotics in different combinations. Generally, the isolates showed the highest frequency of resistance to ampicillin and the lowest to chloramphenicol, followed by tetracyclin and gentamycin. A total of 14 different patterns of antibiotic resistance were observed at a level as high as 500 µg/ml. Some of the antibiotic determinants were cured by acridine orange treatment, indicating the widespread of antibiotic resistance through plasmids among *Staphylococcus aureus*.

Key words: Plasmids, Indigenous staphylococci, Acridine orange.

Technology Section

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THE FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part XIII. Physico-chemical Studies on the Seed Oils of *Feutral* and *Tangarine* Varieties of *Citrus Reticulata blanco*

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(Received May 24, 1987)

The seed oils of *Feutral* and *Tangarine* varieties of *Citrus Reticulata blanco* obtainable in 34.76% and 41.4% respectively on fresh seed basis, were analysed by gas chromatography to have a fatty acid composition of C 12:O (1.5%, 4.0%), C 14:O (1.9%, 2.1%), C 16:O (26.4%, 27.1%), C 18: O (5.7%, 14.2%) C 18:1 (26.0%, 18.7%), C 18:2 (34.1%, 19.5%), C 18:3 (0.0%, 3.7%) and unknown (3.8%, 0.0%) respectively. The physico-chemical data of the oils was comparable with other citrus seed oils.

Key words: Rutaceae; *Citrus Reticulata blanco*; *Feutral*; *Tangarine*; Seed oils; Fatty acid composition.

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THE SAPONIFICATION OF POLY(VINYL ACETATE)

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(Received March 19, 1983; revised March 29, 1987)

The saponification of poly(vinyl acetate) PV-OAc, in various actone/H₂O mixtures was studied using NaOH as a catalyst. Viscosity measurements of the polymer solutions revealed the state of coiling of the polymer molecules. Partially soluble polymers exhibited autocatalytic properties.

Key words: Poly (vinyl acetate), Saponification, Solvent composition effect.

DEVELOPMENT OF A PROCESS FOR PREPARING COMMINUTED GUAVA DRINK

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(Received October 3, 1985; revised June 6, 1987)

Comminuted guava drinks prepared with different bases, water and sugar: acid ratios were evaluated for physicochemical and organoleptic characteristics during storage at room temperature (11-36^o). Drink prepared with the base: water and sucrose: citric acid ratios of 100:200 and 450: 7.6 was superior organoleptically (odour + taste) to all the other formulations studied. The ascorbic acid and the acid content decreased, and the total soluble solids/acid ratio increased whereas the total soluble solids remained unchanged during the storage of this drink.

Key words: Comminuted guava drink,, Ascorbic acid, Sensory scores.

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STUDIES ON THE SOFT DRINK TABLETS (SDT) POST COMMERCIAL PRODUCTION PROBLEMS AND ITS SOLUTION

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(Received October 2, 1986; revised April 29, 1987)

Bulging of commercial packets of Soft Drink Tablets (SDT) can be avoided by using preheated sodium bicarbonate or non-heated sodium carbonate. The granulation of the ingredients of the SDT has no significant effect on bulging of packets.

Key words: Soft drink tablets; Granulation; Soft drink powder; Moisture absorption.