

Physical Sciences Section

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THE PREPARATION AND SPECTROSCOPIC PROPERTIES OF SOME COMPLEXES FORMED BETWEEN VANADIUM (4) OXYDICHLORIDE AND ORGANIC LIGANDS

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The complexes of vanadium (4) oxydichloride with tetrahydrofuran, 1, 2 - dimethoxyethane, pyridine and picolines were prepared having general formulae $\text{VOCl}_2\text{L}'_2$, $\text{VOCl}_2\text{L}'$ and $\text{VOCl}_2\text{L}'\text{L}''$ (here L' = tetrahydrofuran, and L'' = 1, 2 - dimethoxyethane, pyridine or picoline). The infrared spectra of complexes were determined in nujol and hexachlorobutadiene (HCB) mull and assignments of vanadium - oxygen double bond ν ($\text{V}=\text{O}$), vanadium - oxygen single bond ν ($\text{V}-\text{O}$), vanadium - nitrogen ν ($\text{V}-\text{N}$), and vanadium - chlorine ν ($\text{V}-\text{Cl}$) stretching vibrations were made. The electronic spectra of complexes were determined in dimethoxyethane and toluene solution. The λ_{max} in electronic spectra of the complexes was shifted to longer wavelength by less polar solvent. This red shift in the λ_{max} was discussed by considering that the dipole moment of the complexes was changed during transition. The possible structural formations of the complexes were proposed.

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EFFECTS OF INORGANIC SALTS ON THE COPOLYMERIZATION OF VINYL AND ALLYL MONOMERS

Part-VII Copolymerization of Styrene and Methyl Acrylate in the Presence of Some Inorganic Salts

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The thermal copolymerization of styrene and methyl acrylate in the presence of CoCl_2 , SrCl_2 , CdCl_2 , ZnCl_2 and PtCl_6 has been investigated. Platinic chloride decreased the rate of copolymerization whereas the rest of the salts accelerate the rate. These salts act as chain transfer agents and do not change the reactivity ratio values of the monomers appreciably.

INTRODUCTION

BDH cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) strontium chloride

SYNTHESIS OF TRISUBSTITUTED PYRAZOLES WITH POSSIBLE ANTIMICROBIAL ACTIVITY

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Several 2,5-disubstituted oxadiazoles and 1,3,5-trisubstituted pyrazoles have been synthesized. Condensation of 2-aryl-4-formyl triazoles with acylhydrazines afforded the corresponding acylhydrazones, which upon oxidation with iodine-mercuric oxide mixture in dry ether gave the corresponding 2,5-disubstituted oxadiazoles.

Similarly, condensation of α , β -unsaturated ketones with arylhydrazines, afforded the corresponding arylhydrazones. Heating with ethanolic hydrogen chloride gave the corresponding pyrazolines. Oxidation of the pyrazolines with bromine water gave the brominated pyrazole derivatives.

On the other hand, condensation of α , β -unsaturated ketones with ethyl oxalate gave ethyl 2,4-cioxo-6-substituted hex-5-enoate which with arylhydrazines gave the corresponding pyrazole-3-esters.

The structure of the synthesized compounds was affirmed by m.p., microanalysis, i.r., p.m.r. and m.s. spectral analysis.

SAPONIFICATION OF POLY(VINYL ACETATE) IN AQUEOUS ALCOHOLIC SOLUTIONS

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(Received May 28, 1983; revised, February 19, 1985)

Saponification of poly(vinyl acetate) PV-OAc, in various methanol/H₂O and ethanol H₂O mixtures was studied using NaOH as catalyst. The rate of reaction was dependent upon temperature and solvent compositions and it followed second order kinetics in the initial stages of the reaction. In mixtures richer in water in ethanol/H₂O system, the rate was enhanced by a closer coiling of the macromolecules. Viscosity measurements of the polymer solutions revealed the state of coiling of the polymer molecules. Partially soluble polymers exhibited autocatalytic properties.

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**VOLTAMETRIC METHOD FOR THE DETERMINATION OF SULPHUR:
A PLASTICIZED SULPHUR CONSTRUCTION MATERIAL**

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Electrochemistry Group, Quaid-i-Azam University, Islamabad

(Received April 26, 1984)

A new voltametric method for the determination of sulphur has been developed. The method, though general, was particularly found useful in the monitoring of plasticization reaction of sulphur where many analytical techniques were found inapplicable.

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GAS CHROMATOGRAPHIC BEHAVIOUR OF VARIOUS TYPES OF ORGANIC COMPOUNDS ON PORAPAK R

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Porapak R, a vinyl pyrrolidone copolymer with vinyl benzene, was characterised by gas chromatography for *n*-pentane, *n*-hexane, *n*-heptane, *n*-octane, *n*-nonane, *n*-decane, cyclohexane, benzene, toluene and ethyl benzene at four different temperatures in the range 160–190°. Plots of $\log V_R$ vs reciprocal of absolute temperature were linear with correlation coefficients between 0.991 and 0.999.

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MODIFIED X-RAY DIFFRACTION METHOD, INCORPORATING MASS ABSORPTION CORRECTION, FOR THE QUANTITATIVE DETERMINATION OF CALCITE AND DOLOMITE IN SEDIMENTS

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(Received 4 February, 1984; revised 16 January 1985)

A method of X-ray diffraction, incorporating mass absorption, for the quantitative determination of calcite and dolomite (ferroan), using rock powder pellets of the Oxford Clay sediments, presented in this paper, has produced satisfactory results. Ratios of the peak heights for calcite at 29.43° , 2θ , and for dolomite (ferroan), at 30.84° , 2θ , peak positions obtained by X-ray diffraction, corrected for mass absorption and the values of carbon dioxide determined by dividing the total contents of calcite + dolomite; by a factor of 2.2, have been used in this method. The method, presented in this paper has been found fairly rapid and produces accurate and reproducible results.

Biological Sciences Section

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ROLE OF PTERIDINES IN CHAEMOTAXONOMY OF IMMATURES OF TREEHOPPERS (HOMOPTERA: MEMBRACIDAE)+

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(Received July 22, 1984; revised March 11, 1985)

Four different pteridines, viz. xanthopterine, isoxanthopterine, biopterin and pterine, were separated through paper chromatography from whole body squash, from squashed body parts, and haemolymph of the immatures of four different species of treehoppers using seven different solvent systems. Whole body squash and squashed body parts of the third instar immatures of all the species gave the most characteristic patterns in *n*-butanol. R_f values were found to be similar to those of pteridines provided by Blakley [1]. Pterine and biopterin were found only in *Oxyrhachis taranda* Fabr. and only the latter in *Oxyrhachis* sp. in addition to xanthopterine and isoxanthopterine in both species and also in *Gargara contraria* Distant but only the former in *G. nigroapica* Funk.

CONTAMINATION OF FORAGE CROPS WITH LEAD FROM VEHICLE EXHAUST

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(Received November 27, 1984; revised January 24, 1985).

Contamination of fodder crops growing near the highway with lead from vehicle exhaust was determined. Lead contamination in *Pennisetum typhoideum* (65.0-82.0 ppm), *Trifolium alexandrinum* (56.8-76.1 ppm), *Cynodon dactylon* (42.2-60.3 ppm), *Oryza sativa* (52.1-70.2 ppm) and *Avena sativa* (54.0-72.2 ppm) was maximum in the vicinity of the highway. An inverse relation was found between lead accumulation and distance from the road side.

SCALE-UP STUDIES OF EXTRACELLULAR POLYSACCHARIDE PRODUCTION BY *XANTHOMONAS CUCURBITAE* IN STIRRED FERMENTERS*

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(Received January 31, 1984)

Xanthomonas cucurbitae (PCSIR-52) isolated from infected plant leaves, was grown in stirred fermenters of 10, 50, and 100 capacity using sucrose-salt medium by batch process. The fermentation patterns of microbial polysaccharides were greatly improved by the addition of cottonseed meal as "proflo extract", a source of amino acids and other growth factors. The supply of oxygen also plays an important role in such non-Newtonian fermentation process. Partial replacement of air by oxygen or addition of hydrogen peroxide as a source of oxygen concentrate, enhanced the rate of gum fermentation.

EFFECT OF BROWN RUST ON SUGAR CONTENT OF WHEAT

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(Received November 12, 1984)

Changes in the amount of reducing sugars and total carbohydrates were studied in wheat plants infected by the brown rust fungus, *Puccinia recondita*. Initially, the amount of both reducing sugars and total carbohydrates increased in leaves due to infection, but decreased at the time of the appearance of ears. The maximum difference in sugar content between healthy and infected leaves was approximately of the order of 45%. In the stem of healthy plants the amount of reducing sugars and total carbohydrates were initially higher but at maturity their concentration increased in the infected plants. Accumulation of sugars is discussed in relation to the growth and development of the pathogens in this paper.

CULTIVATION CONDITIONS AND PHYSICO-CHEMICAL PROPERTIES OF *LUFFA ACUTANGULA* VAR. *ACUTANGULA* SEED OIL

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(Received, September 10, 1984; revised, March 10, 1985)

Luffa acutangula var. *acutangula*, known as ribbed gourd (N.O. Cucurbitaceae), is a cultivated climber and used as a vegetable and medicine for haemorrhoids and leprosy. A study regarding its cultivation conditions and characteristic of the seed oil was made with a view to determining its possibility as an oilseed crop. It has been observed that the amount of oil in the *Luffa acutangula* seeds is 25.8% and the fatty acid composition (amount by weight) of this oil is linoleic (33.56%), oleic (24.42%), palmitic (23.09%), stearic (9.84%), myristic (1.48%), lauric (1.78%) and other unidentified acids (3.32%).

GENETIC DIVERGENCE FOR MORPHOPHYSIOLOGICAL CHARACTERS IN *VIGNA RADIATA* L. WILCZEK

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(Received September 10, 1984; revised March 3, 1985)

The genetic diversity in 12 indigenous varieties of green gram was studied for 6 characters using D^2 estimates. The study indicated the presence of ample genetic diversity among the cultivars irrespective of their origin. Days to flowering, economic yield and plant height contributed maximally towards genetic divergence.

INORGANIC ELEMENTS IN FOUR SPECIES OF OYSTERS FROM KARACHI COAST

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(Received November 20, 1984)

The levels of inorganic elements were studied in four species of oysters, namely, *Crassostrea glomerata*, *C. tuberculata*, *C. rivularis* and *C. madrasensis*, sampled from Karachi, northern Arabian Sea. The elements studied were calcium, potassium, sodium, magnesium, phosphorus, iron, copper, zinc, manganese and cobalt. The calcium and iron contents were found to be greater in the species occurring at a higher tidal level. The results showed that *C. glomerata* is the least suitable for commercial exploitation as it possesses the lowest dry tissue and highest ash content. Of the four species studied, in *C. rivularis* are concentrated the highest levels of sodium, potassium and phosphorus but the lowest of magnesium and cobalt.

ASCORBIC ACID AND DEHYDROASCORBIC ACID CONTENTS OF MARINE ALGAL SPECIES FROM KARACHI

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(Received December 2, 1984; revised March 11, 1985)

Ascorbic acid (AA) and dehydroascorbic acid (DHA) contents of 59 species of marine algae belonging to the Chlorophyceae, Florideophyceae and Phaeophyceae collected from Karachi, northern Arabian Sea, showed wide variations between the species studied. The amounts of AA and DHA were on the whole greater in species of brown seaweeds as compared to red and green seaweeds. With few exceptions, DHA was greater than AA. Vitamin C contents were remarkably high in all the species of *Sargassum* (Phaeophyceae) and *Ulva* (Chlorophyceae) tested and these may be utilized for the extraction of vitamin C on commercial scale.

Short Communication

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VIRUS INFECTION COMMON TO PAPAYA AND TOMATO PLANTS

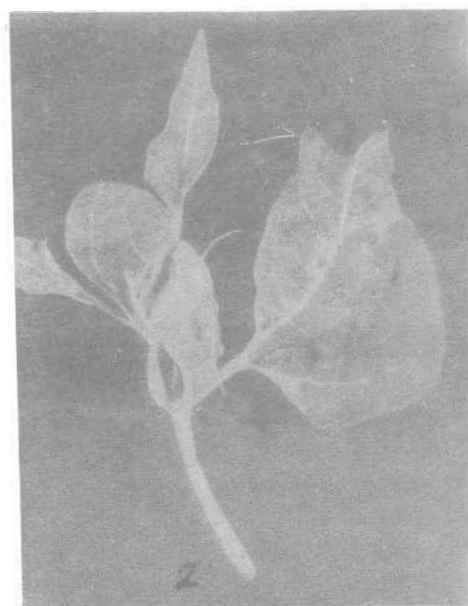
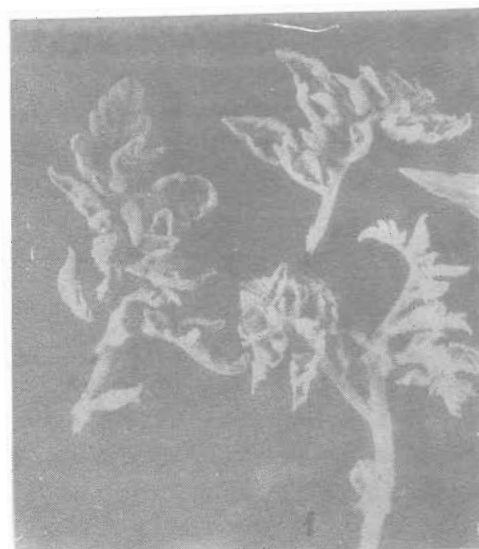
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(Received May 11, 1983)

Whereas any plant disease would interest an economic botanist, this author does not know of any infection that reveals such a wide range of symptoms as does the virus disease of papaya. It has been designated *shredded disease of the papaya tree* [1]. Illustrations were offered to show how the leaf is reduced in size and far more, in appearance, as mere "shreds". Another symptom of the disease shows the leaf, which, in the case of papaya plant, is conspicuously large, would curl to acquire a ball-like appearance; even this phenomenon of the "curled-leaf" has been illustrated [2]. Moreover, the flower would show characteristic deformation and correspondingly the fruit, which was illustrated [3], becomes shaped like a flower with finger-like divisions. Moreover, an abnormal seedless fruit which looking more like a banana than a Papaya fruit, has also been shown [4]. The effect of this virus infection was responsible in one case at least for reversing the sex; a male plant was photographed bearing male flowers but also fruits naturally quite abnormal in shape [ref. 3; Fig. 12]. Thus here we have an infection which affects leaf growth, malformation of fruit and even sex reversal. As far as I know no such disease of plant shows such a wide range of changes.

The same house-garden which had supplied the material reported in the earlier paper now contained a number of small papaya trees. But these were not more than two feet tall and all suffering from the "shredded leaf" disease, preventing their growth from want of foliage. Accidentally a tomato plant was also found growing with a diseased papaya plant, not farther than at one-foot distance. The tomato plant showed typical "Curled leaf" symptoms and was unable to grow erect, but instead grew like a creeper. Other plants also grew at the same spot, mostly sun-flower but no other plant showed any abnormality except the papaya and the tomato. The leaf of each of these two plants is illustrated in Fig. 1-2. The leaves of the tomato plant on the left, no. 1, showed remarkable reduction in size and also curling, giving leaves a concave shape. Papaya leaf. (no. 2) likewise abnormal, has to be indicated as such for it surpasses its natural appearance. It represents the "shreds" of leaves. Fig. 2. represents what was the topmost portion of a papaya plant not more than 2 ft. high, with reduced growth from want of proper foliage. Thus Fig. 1-2 show the effect of the same virus on the foliage of tomato



and papaya plants. (Fig. 1). Tomato leaves infected by virus showed stunted growth in size and curling giving them a concave appearance. (Fig. 2). Topmost leaves of a papaya plant, showed a "shredded" condition; the plant was not more than two feet high and a foot apart from the tomato plant (no. 1).

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Technology Section

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COPOLYMERS FROM α -PINENE

Part I. Free Radical Copolymerization of Methyl Methacrylate with α -Pinene

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A study of the copolymerization of α -pinene with methyl methacrylate has been made at 80° using benzoyl peroxide as a catalyst. The rate of copolymer formation is found to decrease with increased concentration of α -pinene. At a higher concentration of the catalyst, good yields of the copolymer is obtained. The monomer reactivity ratios of MMA (r_1) and α -pinene (r_2) are determined as $r_1 \mp 10.0$ and $r_2 \mp 0.08$. With an increasing concentration of α -pinene in the binary mixture, copolymers with decreasing molecular weight are obtained and α -pinene also acts as a chain transfer agent. The copolymers are white powdery substances and soluble in many organic solvents. The softening range of the copolymer is $120-125^\circ$ and it decomposes at $155-160^\circ$.

PREPARATION AND NUTRITIONAL EVALUATION OF PALATABLE "DAL" AND "BARRIAN" FROM SOYBEAN

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Dehulled split pulses are made from major pulses in Pakistan and called *dal*. Attempts have been made to prepare a trypsin inhibitor-free *dal* from soybean. Nutritive values were highly improved and the cooking time of the processed *soydal* was cut down to the minimum. *Soydal* is similar in texture, flavour and appearance to indigenous chick pea *dal*. *Barrian* were prepared from the processed soybean.

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SPECTROPHOTOMETRIC DETERMINATION OF STRYCHNINE IN THE PRESENCE OF BRUCINE

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(Received May 5, 1984; revised February 7, 1985)

A spectrophotometric method for the determination of strychnine in the presence of brucine has been developed. The determination of strychnine has also been carried out from tincture *Nux vomica*. The above mentioned compounds when treated with *N*-bromosuccinimide in the presence of 40-65% sulphuric acid give a pink colour which has an absorption maximum between 510-520 nm. A separation procedure for strychnine and brucine has also been described. The method is convenient, accurate, and precise. The maximum error was 4% when 500 μ g strychnine was determined in the presence of same amount of brucine.