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Physical Sciences Section

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THE NONALKALOIDAL CONSTITUENTS OF *RAUWOLFIA VOMITORIA* AFZUELIA

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Sterolic constituents and fatty acids of *Rauwolfia vomitoria* have been isolated and identified. The chemical and spectral studies on serposterol provided evidence for the structure: 28-hydroxy stigmasterol.

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INFRARED SPECTROSCOPIC CHARACTERISATION OF DONOR-ACCEPTOR COMPLEXES OF DINITROBENZENES WITH *N*-SUBSTITUTED ANILINES

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(Received May 16, 1979; revised May 10, 1980)

The donor-acceptor complexes of eight *N*-substituted anilines with five dinitrobenzenes are prepared and their IR spectra are recorded in the solid state as KBr discs. Based on the spectral shifts due to complex formation, four types of charge transfer interactions are pointed out. The spectral characterisation of each class is given.

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IRON-SORBITOL, DEXTRIN AND CITRIC ACID COMPLEX

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Preparation containing complex of iron, sorbitol, dextrin and citric acid is described. Complex formation with sorbitol alone or in conjunction with citric acid is not satisfactory and dextrin is an essential component for its stability.

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FRAGMENTATION OF NAPHTHOXAZOLES UNDER ELECTRON IMPACT

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(Received January 24, 1979)

The mass spectra of seven naphthoxazole derivatives were examined. Of these compounds, only phenylnaphthoxazole and 2-*p*-(aminophenyl) naphthoxazole were characterised by a prominent molecular ion (often responsible for the base peak) and also the presence of doubly charged ions with high relative abundance. One of the main features of decomposition of the parent naphthoxazole is the elimination of carbon monoxide and hydrogen cyanide. A mechanism for these fragmentations has been proposed.

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PHOTOMETRIC DETERMINATION OF INDOLE COMPOUNDS IN THE FORM OF CHARGE TRANSFER COMPLEX

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A photometric method is developed for the quantitative analysis of indole nucleus compounds with 2,6-dichloroquinone-4-chlorimide in the form of charge transfer complex (CTC). The method is simple and suited for routine quantitative analysis of indole compounds. Each determination can be performed approximately in 60 min.

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STOBBE CONDENSATION ON 1-ACETYL-2-METHOXY NAPHTHALENE

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(Received September 30, 1979; revised May 7, 1980)

1-Acetyl-2-methoxy naphthalene was condensed with diethyl succinate in the presence of $(\text{CH}_3)_3\text{COK}$ it gave two stereoisomeric half esters (I) and (II). The structures of these isomers were proved by chemical reactions.

ACTION OF AMINES, HYDRAZINES AND HYDROXYLAMINE HYDROCHLORIDE ON 3-BENZYLIDENE-5-(2-METHYL-1-NAPHTHYL)-2 (3H) FURANONE

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3-(2-Methyl-1-naphthoyl) propionic acid (I) reacted with benzaldehyde, benzyl methyl ketone, $\text{Br}_2/\text{POCl}_3/\text{CHCl}_3$, $\text{NH}_2\text{OH.HCl}$ and semicarbazide to give furanone, pyrrolidinone, acrylic acid, oxazinone or semicarbazone derivatives. The reaction of furanone (II) with amines, ammonium acetate, hydrazines and $\text{NH}_2\text{OH.HCl}$ has been investigated.

Biological Sciences Section

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IDENTIFICATION OF FISH AND SHRIMP BY POLYACRYLAMIDE GEL ELECTROPHORESIS

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(Received January 1, 1980; revised April 29, 1980)

Muscle extracts of fifteen fish and shell fish varieties belonging to different genera were examined by acrylamide gel electrophoresis in tris-glycine and tris-HCl buffers of pH 8.9 and 8.1 respectively. The electrophorogram of each fish examined had characteristic details making it possible to identify fish by means of an electrophoretic analysis of muscle extract made in prescribed conditions.

EFFECT OF NITROGENOUS, PHOSPHATIC AND POTASSIC FERTILIZERS ON THE YIELD AND CHEMICAL COMPOSITION OF MAIZE

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(Received February 16, 1980; revised July 10, 1980)

The effect of N, P and K fertilizers on yield and chemical composition of maize was studied in the field. The application of 53.52 kg N/ha alongwith 26.76 kg P/ha gave the maximum and economical yield of maize grain, whereas the further upper levels of these fertilizers reduced the grain yield. Moreover, the application of 58.14 kg K/ha did not show any response towards yield increase. This may be due to the sufficient level of potassium already in the soil. The moisture content of maize grain increased with the application of various N, P and K fertilizers. Crude protein of the grain increased significantly with the application of various N fertilizer treatments. The mineral matter, calcium and phosphorus contents of the maize grain increased significantly by the application of the fertilizers as alone or in various combinations. The combined application of the upper levels of N, P and K fertilizers showed the maximum content of mineral matter, calcium and phosphorus.

NUTRITIONAL STUDIES FOR DRY MATTER YIELD AND MINERAL CONCENTRATION OF CROPS

Part I. Effect of Nutrients on Rice (*Oryza stiva*)

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(Received September 29, 1979; revised June 1, 1980)

The results of a fertilizer experiment conducted in a calcareous soil revealed that the rice crop responded well to the addition of nitrogen, phosphorus, copper and zinc. The effect of nitrogen was more pronounced than phosphorus in macronutrients and copper was more effective among micronutrients, in raising the dry matter yield of the crop. Treatments like NPCuZn, NPCu, NPCuMn, NPZn, NPCuZnMn and NPZnMn were comparatively more suitable than other combinations. A tendency called antagonism, among nitrogen, phosphorus, copper, zinc and manganese is observed in mineral concentrations of the crop. The antagonistic trend was more clear in copper, zinc and manganese than other nutrients.

NUTRITIONAL STUDIES FOR DRY MATTER YIELD AND MINERAL CONCENTRATION OF CROPS

Part II, Effect of Nutrients on Sorghum (*Sorghum vulgare*)

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(Received September 29, 1979; revised June 1, 1980)

The sorghum crop when grown in a calcareous sandy-loam soil (pH 8.2), responded well to the application of nitrogen, phosphorus, copper, zinc and manganese. The results were more favourable in case of combined treatments than with single applications. Thus, such combinations like, NPCuZn, NPCu, NPCuMn, NPZn were comparatively more efficient to increase the dry matter yield of the crop. The analysis of the crop for mineral concentration revealed that the addition of any one of the element among nitrogen, phosphorus, copper, zinc and manganese strongly decreased the concentration of other elements in plants. In this respect single treatment, i.e. NCu, NZn, NMn, NPCu, NPZn and NPMn were more effective than full combinations like NCuZnMn and NPCuZnMn, NPCuZn, NPZnMn and NPCuMn in depressing the mineral concentrations.

LABORATORY FUMIGATION TESTS OF PHENYL ISOTHIOCYANATE AGAINST FOUR LABORATORY-REARED INSECTS

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(Received January 1, 1980; revised May 20, 1980)

The knockdown effectiveness of phenyl isothiocyanate individually and in combination with propylene oxide, terpentine, 100-octane and CCl_4 was tested on *Musca domestica* (L). In order to obtain the same KD_{50} in a range of 8–17 min, the required quantity of phenyl isothiocyanate was approximately 73, 38 and 31 times lower than propylene oxide, terpentine and 100-octane respectively.

The addition of the above-mentioned fumigants decreased the knockdown value of phenyl isothiocyanate.

The order of fumigation toxicity for *Tribolium confusum* (Duv) at lethal level is DDVP > phenyl isothiocyanate > *o*-xylene > methanol. *Tribolium confusum* (Duv) seemed to be more susceptible to the vapours of phenyl isothiocyanate than *Bruchus chinensis* (L). The mustard compound (phenyl isothiocyanate) proved to be extremely toxic to *Schistocerca gregaria* (Forskal) nymphs at 1 mg/l dose; producing complete kill after 5-hr exposure.

Technology Section

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THE IN-VITRO STUDY OF SUSTAINED RELEASE ASPIRIN TABLET WITH POLYETHYLENE RESIN AS INSOLUBLE MATRIX

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(Received May 30, 1979; revised August 7, 1980)

A method for sustained release aspirin tablet was developed by using polyethylene resin as insoluble matrix and ethylcellulose as a binding agent. The effect of pressure and binding agent such as ethylcellulose on release rate of aspirin was determined. The degradation of aspirin in sustained release tablets was also studied.

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UTILIZATION OF ALMOND SEED CAKE

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(Received April 5, 1980; revised June 21, 1980)

Almond seed cake syrup was prepared and the material left after water extraction was used in the preparation of biscuits. The syrup contained 1.4% protein and was organoleptically acceptable up to storage of 60 days. 10% addition of the extracted cake to normal formula constituents of biscuits increased protein content of the biscuits considerably without affecting the acceptability of the product. The storage of biscuits up to 60 days did not affect their organoleptic acceptability.

Review

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CHROMITE ORES OF PAKISTAN AND THEIR BENEFICIATION – A CASE STUDY*

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This case study describes the present position of chromite ores of Pakistan with special reference to the Zhob valley and Malakand areas. The study touches upon the general geology, mining, grade, beneficiation and exports. A review on the work previously done on the concentration of Muslimbagh chromite has been included. Work done in the PCSIR on upgradation of low grade chromites of Zhob valley and Malakand on bench as well as on pilot-plant scale has also been described.