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Physical Sciences Section

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THE SUBSIDIARY ALKALOIDS OF *RAUWOLFIA VOMITORIA* AFZUELIA

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(Received March 10, 1979)

Apart from the isolation of ajmaline, reserpine and tetraphyllicine, the occurrence of N-methyl ajmaline, ajmalidine, ajmalinine and neoajmaline has been established for the first time in *Rauwolfia vomitoria*.

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A NEW TRITERPENOID FROM *EUPHORBIA TIRUCALLI*

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(Received April 30, 1979)

A new tetracyclic triterpenoid has been isolated from the fresh latex of *Euphorbia tirucalli* and provisionally named as euphorbinol. The chemical and spectral evidence provided its structure as 13 α , 14 β , 17 α -lanost-8, 25-diene-3 β -ol, 24 methyl.

**INFLUENCE OF IONIC STRENGTH ON THE SPECIFIC RATE CONSTANT,
ENERGY OF ACTIVATION, AND CHANGE OF ENTHALPY OF ACTIVATION
OF PERSULPHATE – IODIDE REACTION**

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(Received December 3, 1978; revised February 13, 1979)

The influence of ionic strength on the specific rate constant of the reaction between per-sulphate and iodide ions was studied. It was observed that the reaction proceeded more rapidly as the ionic strength was increased, although the concentration of the reacting ions remained the same. The change in ionic strength was brought about by the addition of KCl, an inert electrolyte. This proved the Debye – Huckel – Bronsted equation, and a straight-line relation was recorded to exist if square root of ionic strength, i.e. $\sqrt{\mu}$ is plotted against logarithm of specific rate constant ($\log k$).

The effect of ionic strength on the energy of activation was also studied. It was observed that an increase in ionic strength of the reaction mixture decreased the apparent activation energy (E). A straight-line relation was found to exist if $\sqrt{\mu}$ is plotted against E . The apparent change of enthalpy of activation ($\Delta H^\ddagger$) were calculated from the apparent activation energy values corresponding to the values of ionic strengths. A straight-line was again found to exist if $\sqrt{\mu}$ is plotted against $\Delta H^\ddagger$.

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FRAGMENTATION PATTERN OF POLYFUNCTION ANTHRAQUINONES UNDER ELECTRON IMPACT

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(Received October 8, 1978)

The mass spectra of some anthraquinone derivatives having functional groups as substituents were examined. The pathway of fragmentation was found to be different from the known pattern of anthraquinone compounds. A mechanism for such fragmentation was suggested.

Biological Sciences Section

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BIOLOGY AND ECOLOGY OF *ZYGINA BINOTATA* (DISTANT) (TYPHLOCYBINAE: CICADELLIDAE) A PEST OF KACHNAR, BAUHINIA VARIEGATA IN PAKISTAN*

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(Received April 6, 1978; revised November 16, 1978)

Recently a number of typhlocybine leafhoppers have been discovered to infest the plant life of Pakistan. *Zygina binotata* (Distant) is a pest of kachnar, *Bauhinia variegata* Linn. throughout Pakistan. The present investigations on the biology, life history, and ecology of *Z. binotata* on kachnar have been made in Karachi. The leafhopper on average lives for 13.2 days, lays 26.22 eggs and completes its life cycle in 23.24 days at 29° – 33.5°. The leafhopper is common from April to December, but its peak infestation is from August to October.

SEASONAL CHANGES IN PLASMA LIPID DISTRIBUTION OF A HIBERNATING LIZARD (*UROMASTIX HARDWICKII*)

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(Received August 1, 1978; revised December 30, 1978)

Plasma lipid concentrations were studied in the hibernating lizard *Uromastix hardwickii* during hibernation, arousal and activity. The highest concentration of esterified fatty acids was only noted during prehibernation period. Plasma free fatty acid concentration was significantly increased upon arousal from hibernation suggesting an intensive lipolysis for thermogenesis. Both plasma cholesterol and phospholipid concentrations were lowest during prehibernation as compared to the other phases of the hibernating cycle. Except for cholesteryl ester there were more saturated fatty acids during all three phases of lizard's life cycle.

Technology Section

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DENSITOMETRIC METHOD FOR THE DETERMINATION OF 2-METHYL-4-AMINO-5-AMINOMETHYL PYRIMIDINE

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(Received February 1, 1978; revised February 25, 1979)

A thin layer densitometric method was used for the estimation of 2-methyl-4-aminomethyl pyrimidine in the irradiated mixture of thiamine hydrochloride. The method is based on the chromatographic separation of pyrimidine by using a thin layer of silica gel HF₂₅₄ and the solvent mixture chloroform – methanol – ammonia 30% (70:30:1). No interference from other photodecomposition products was observed. The standard deviation for the method was 0.33. Using this method, preliminary kinetic studies for the formation of pyrimidine during the irradiation of thiamine hydrochloride were also carried out.

EFFECT OF SOIL pH ON THE GROWTH AND MINERAL CONTENTS OF OATS

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(Received April 26, 1978; revised February 1, 1979)

A glasshouse experiment was set up to study the growth of oats in the organic and eluvial horizons of a podzol. A standard dressing of N, P and K fertilizers was applied and three lime treatments including an unlimed one were examined.

Leaf tip burn on older leaves appeared in oats in the unlimed soils. The younger leaves were normal green but were short and narrow. The roots of the plant were stunted, thick and spotted brown.

The growth of oats in unlimed soils was poorer than when lime was applied, although there was no clear difference between the growth of plants in limed soils. Growth of oats at each lime treatment was better in the organic soil than in the eluvial soil. This was possibly due to differences in soil physical condition affecting water relations.

The concentration of P and K in tops was reduced in unlimed soils compared with limed ones, whilst the contents of Fe, Mn, Zn and Cu were similar or greater than the contents in both limed treatments. The plant experiment indicates the key importance of Al in the productivity of unlimed Welsh hill soils.

RESPONSE OF RICE TO ZINC AND COPPER IN THE FIELD*

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(Received August 22, 1978; revised December 14, 1978)

Response of Basmati-370 rice to Zn and Cu on 9 soils deficient in Zn and Cu was studied in the field. Grain yield response to Zn or Cu application was obtained though it was irregular.

Zinc concentration in plants generally decreased towards maturity and showed little correlation with Zn applied to the soils. Copper concentration did not change with the age of plants. Efforts made to delineate Zn and Cu deficient soils on the basis of Zn or Cu extractable by DTPA, HCl and NH_4OAc and the yield response met little success.

MICRONUTRIENT STATUS OF PAKISTAN SOILS**M.A. Kausar, S.M. Alam, M. Sharif and M. Iqbal Pervaz****Nuclear Institute for Agriculture and Biology, Faisalabad*

(Received August 1, 1978)

One hundred and fifty-two surface soil samples representing different soil series of the four provinces were collected and analysed for their available micronutrients (Zn, Cu, Fe, Mn) by atomic absorption spectrophotometry after extraction with DTPA (diethylenetriaminepentaacetic acid). Zinc appeared to be the most limiting micronutrient element in these soils, as 85% of the samples contained marginal to deficient concentrations of available Zn; the deficiencies were in the order: Baluchistan (69%), N.W.F.P. (55%), Punjab (45%) and Sind (17%). Copper deficiency was less in magnitude as only 28, 15, 5 and 14% samples in the respective provinces contained deficient concentrations. However, sufficient concentrations of Fe and Mn were detected in all the soils.

Soil pH, organic matter and CaCO_3 contents were correlated with available micronutrients. Organic matter showed positive correlation with Zn in N.W.F.P. (r 0.77**) and Sind (r 0.82**) soils. In N.W.F.P. soils it also correlated with Cu (r 0.63**), Fe (r 0.89**) and Mn (r 0.44**). Soil pH gave negative correlation with Zn in the Punjab (r -0.78**) and N.W.F.P. (r -0.72**). Similarly, negative correlation was also found with Cu (r -0.46**) and Fe (r -0.83**) in N.W.F.P. soils. Calcium carbonate content was negatively correlated with Cu (r -0.85**) and Fe (r -0.44*) in Sind soils.

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IMPROVEMENT IN BLEACHING AND NONUNIFORMITY OF DYEING OF PAKISTANI INDIGENOUS WOOL

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(Received October 19, 1978; revised January 22, 1979)

Dyeing of medullated keratins such as Pakistan's indigenous wools may lead to nonuniformity on account of several factors. Studies have been carried out on overcoming this drawback by subjecting the wool to several pretreatments with such chemicals as bleaching agents. Thus, in addition to certain effective measures for overcoming the nonuniformity of dyeing, bleaching characteristics of these wools have also been studied.

POTASSIUM RELEASE CHARACTERISTICS OF COAL MINES SPOILS*

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(Received July 1, 1978; revised September 12, 1978)

Potassium release characteristics of four coal mine spoils and one unmined soil from the western part of North Dakota (U.S.A.), was studied in a growth chamber (25° day and 15° night temperature, 12 hr of fluorescent light daily with 50% relative humidity) by exhaustive cropping with barley. Five successive generations were grown. The exchangeable K was determined by leaching with neutral ammonium acetate and total K by boiling with 1N HNO₃.

The spoil materials contained a large reservoir of exchangeable (313 – 679 kg/ha) and total (1205 – 1763 kg/ha) K, with the exception of spoil from Centre. The release of K from nonexchangeable sources varied from 745 to 1478 kg/ha.. Mobilization of nonexchangeable K was closely related to the amounts of K extracted by barley. Nonexchangeable K accounted for 58% of total K utilized by plants. The results suggest that most of the spoils appear to be well buffered against K depletion.

It is concluded from this study that the total K in the HNO₃ extract and K released from non-exchangeable forms by HNO₃ appeared to serve as better indexes than the initial exchangeable K or Woodruff's energy exchange to K release and removal by intensive cropping with barley.