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Physical Sciences Section

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ISOLATION AND STRUCTURE OF CYCLOEUPHORNOL, A NEW TRITERPENE FROM *EUPHORBIA TIRUCALLI*

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Apart from lanosterol, a new triterpene has been isolated from the fresh latex of *Euphorbia tirucalli* and provisionally named as cycloeuphornol. Chemical and spectral studies have provided evidence for its structure as 9:19-cyclolanost - 9 β .20(22),25-diene-3 β -ol, 24 methyl-[20(22)-dehydro cyclolaudenol].

STUDY OF THE EFFECT OF IONIC STRENGTH ON THE SPECIFIC RATE
CONSTANT, ACTIVATION ENERGY AND CHANGE OF ENTHALPY OF
ACTIVATION OF BROMIDE-BROMATE REACTION

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(Received February 25, 1979; revised April 21, 1979)

The reaction between potassium bromide and potassium bromate is of fourth order. In the presence of large excess of sulphuric acid it, however, behaves as *pseudo* second order. This reaction was studied in order to find out the dependence of the specific rate constant on the ionic strength of the medium. The change in ionic strength was brought about by the addition of potassium chloride, an inert electrolyte. 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. A straight-line relation was found to exist if logarithm of specific rate constant ($\log k$) is plotted against the square root of ionic strength, i.e. $\sqrt{\mu}$.

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

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

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The reduction of a bromate ion by an iodide ion is a fourth order reaction. However, in the presence of large excess of sulphuric acid it behaves as *pseudo* second order. The effect of the ionic strength on the specific rate constant was studied. It was observed that as the ionic strength was increased, the reaction proceeded more rapidly, although the concentration of the reacting ion was the same. Potassium chloride, an inert electrolyte, was added for the variation of ionic strength. A straight-line relation was seen to exist if logarithm of the specific rate constant ($\log k$) is plotted against the square root of ionic strength ($\sqrt{\mu}$).

The effect of ionic strength of the reaction mixture on the energy of activation (E) of the reaction was also studied. It was seen that as the ionic strength was increased, the apparent energy of activation decreased. A plot of square root of the ionic strength against the apparent energy of activation resulted in a fairly good straight line. Using the data for apparent energy of activation corresponding to the values of ionic strength, the apparent change of enthalpy of activation ($\Delta H^\ddagger$) was calculated. A straight-line relation was again found to exist when $\Delta H^\ddagger$ is plotted against $\sqrt{\mu}$.

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ACTION OF GRIGNARD REAGENTS ON 3-ANILINO-4-ARYLHYDRAZONO-2-PYRAZOLIN-5-ONES

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A series of 3-anilino-4-arylhydrazono-2-pyrazolin-5-ones (IIa-e) were prepared by the coupling reaction of aryldiazonium salts with 3-anilino-2-pyrazolin-5-one (I). These pyrazolones underwent 1, 2-addition of Grignard reagents to the exocyclic C = N group followed by the loss of one molecule of hydrogen to yield 4-aryl-hydrazono-3-anilino-3-alkyl or aryl-1-pyrazolin-5-ones Va-e. The reaction sequence was confirmed by treatment of compound Ve with acetic anhydride afforded the monoacetyl VI. While similar treatment of IIb gave the diacetyl VII. The stability of the carbonyl group in II toward the action of Grignard reagents has been discussed.

Short Communication

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OXIDATION OF 2-(4-HYDROXYPHENYL)-3-METHYLINDOLE WITH HYDROGEN PEROXIDE

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I, when $X = -OH$, $Y = -H$; II $X = -H$, $Y = -OH$, respectively.

EXPERIMENTAL

M. ps. were recorded on a Kofler hot stage apparatus, UV spectrum in ethanolic solution (95%) on a Perkin-Elmer model 137 spectrophotometer, and mass spectrum with an A.E.I. MS-12 spectrometer. Solutions, were dried over anhydrous magnesium sulphate and evaporations were carried out under reduced pressure (water pump). Solid analytical sample was dried over phosphorus pentoxide at $80^{\circ}/0.1$ mm for 4 hr.

N-(2-Acetophenyl-4-hydroxybenzamide) (III)

2-(4-Hydroxyphenyl)-3-methylindole (II) (0.50 g) was added to hydrogen peroxide solution (6%, 25 ml) and the

Biological Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 22, No. 4, August 1979

LABORATORY EVALUATION OF SUBSTITUTED ARYL ISOTHIOCYANATES AGAINST *Aedes Aegypti* (L)

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The compounds tested were phenyl, *p*, *m*-chlorophenyl, *p,m*-bromophenyl, *p*, *o*-methoxyphenyl and *o*, *m*, *p*-tolyl isothiocyanates. They proved moderately toxic to the 4th instar larvae of *Aedes aegypti* (L). Examination for the structure - activity relationship showed that the compounds substituted in *para* - position were slightly more toxic, while *ortho* - substituents gave minimum kill. Larvae were more susceptible to test chemicals than pupae. The LC_{50} ranged from 1.5 to 4 ppm for the larvae while the pupal mortality was 75 - 100% at 10 ppm concentration.

The longer exposure of the pupae not only induced mortality but also caused the abnormal emergence patterns. The emerging adults lacked vigour and most of them could not emerge completely at higher doses and died as feeble adults.

ALLELOPATHIC EFFECTS OF *DICHANTHIUM ANNULATUM* (FORSK) STAFF
ON SOME CULTIVATED PLANTS

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(Received September 4, 1978; revised February 14, 1979)

Dichanthium annulatum, a range grass, is a weed in the moist lowland and plains of Pakistan. Experiments revealed that shoot extracts, root exudates and soil under the grass cover contained growth and germination inhibitors. The aqueous extracts from shoot and soil taken from grassed areas inhibited the growth and germination of *Pennisetum typhoideum*, *Setaria italica*, *Lactuca sativa* and *Brassica campestris*. The extracts retarded the seedling water absorption and reduced the plant moisture contents. However, the extract toxicity depended upon the amount of material used, soaking duration and the susceptibility of the test species. Therefore, during weeding the litter of this grass should be removed from the fields due to its allelopathic affects.

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 22, No. 4, August 1979

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

Part. XXVI. *Ferula oopoda*, Boiss Buhse (Chir) oil from the Seeds, Stalks and Roots

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(Received November 25, 1978)

The essential oils from the various parts of the plant of *Ferula oopoda* have been studied for their physicochemical properties and chemical composition. The oil obtained from the mature seed (3.7%), immature seed collected on two dates (2.3, 5.0%), leaves and stalks (1.32%) and roots (1.15%) have shown to respectively contain α -pinene (1.2, 0.5, 0.3, traces, 0.1%), β -pinene (0.4, 0.2, 0.1, traces, 0.1%), myrcene (30.3, 34.4, 31.5, 0.1, 1.3%), limonene (28.8, 22.3, 26.3, 0.2, 2.1%) *p*-cymene (3.9, 5.2, 6.5, 0.1, 0.4%), β -elemene (1.3, traces, traces, 0.4, 0.7%), an unknown sesquiterpene (1.2, traces, 0.9, 0.3, 0.5%), β -caryophyllene (3.7, 3.2, 3.3, 0.3, 3.6%), humulene (2.7, 2.0, 2.4, 0.6, 2.0%), β -selinene (3.3, 4.2, 2.8, 0.8, 0.8, 2.2%), methyl thymol (5.2, 2.6, 3.3, 0.9, 41.2%), a mixture of unknown compounds (1.3, 1.2, 2.4, 8.8, 0.4%), myristicin (4.4, 1.7, 2.2, 0.8, 11.2%), fenchone and α -terpineol (0.0, 2.6, 3.1, 0.6, 3.4%), α -terpineol and geraniol (5.0, 2.6, 4.0, 0.0, 0.0%) and a crystalline lactone compound (2.4, 9.6, 2.9, 61.0, 23.3%).

The plant has been investigated for the first time in respect of its essential oil which is present in all parts of the species and of which the highest amounts have been distilled from the immature seed. However, the oil of the various parts of the plant is pleasant to smell.

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

Part. XXVII. *Sium latijugum* C.B. Clarke (Theem) Seed Oil

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(Received November 25, 1978)

The physicochemical characteristics and chemical composition of the essential oil, steam distilled from the mature seeds, of *Sium latijugum* have been studied for the first time so far as Pakistani species is concerned. The composition of the oil (yield 2.87%) by GLC is α -thujene (0.16%), α -pinene (0.73%), camphene (5.48%), β -pinene (0.07%), sabinene (22.14%), myrcene (11.07%), unknown monoterpene (0.71%), α -phellandrene (0.21%), γ -terpinene (0.50%), limonene (31.82%), *m*-menth-1(6)8-diene (0.24%), Δ^3 -carene (6.5%), 1,8-cineole (0.10%), Δ^4 -carene (0.20%), 4-cyclohexyl-butan-2-one (0.18%), ethyl benzoate (0.35%), unknown (0.35%), an oxy compound (0.12%), benzyl alcohol (0.85%), epoxy-campholenic aldehyde (0.46%), dipenten oxide (0.07%), 1-undecene (0.07%), pinocamphone (0.62%), terpinen-4-ol (0.57%), 2,2-diallyl-cyclohexan-*cis*-1,3-diol (0.03%), myrtenal (1.78%), 1-*p*-menthen-9-al (0.27%), methyl thymol ether (0.14%), carvone (1.34%), perillaldehyde (0.71%), cuminaldehyde (4.40%), thymol (1.34%), unknown oxygenated compounds (0.08%), β -caryophyllene (0.30%), β -bergamoten (0.10%), *trans*- β -farnesene (1.28%), unidentified sesquiterpene (0.07%), alloaromadendrene (0.89%), 9-cycloheptadecanone (0.27%), farnesol (0.96%), cedrol (0.05%) and unidentified sesquiterpenic alcohols and coumarins (2.49%).

Forty-nine components have been detected in the essential oil of *Sium latijugum*. The oil is mainly composed of hydrocarbons.

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

Part XXVIII *Coriandrum sativum* Linn. (Coriander, Dhania) Oil of the Seeds and the Whole Plant

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The essential oil obtained from the seed and the whole plant of *Coriandrum sativum* has been investigated for its physicochemical properties and chemical composition. The oil from the seed cultivated in these Laboratories (0.5%) and also from the one purchased in the local market (0.3%) consists of α -pinene (1.3, 0.5%), camphene (1.1, 0.8%), myrcene (0.3, 0.2%), Δ^3 -carene (0.6, 0.2%), α -phellandrene (0.5, 0.3%), limonene (3.1, 3.1%), γ -terpinene (7.3, 3.2%), *p*-cymene (2.2, 1.0%), an unknown monoterpene (0.6, 0.7%), linalyl acetate (5.1, 3.2%), geranyl acetate (3.3, 7.9%), an unidentified ester (0.0, 1.2%), linalool (70.0, 68.0%), geraniol (3.1, 9.5%) and borneol (1.5, 0.0%) respectively. The whole plant before the flowering stage and at the flowering stage with 0.001 and 0.002% oil contents respectively, however, contains α -pinene (0.9, 0.8%), camphene (1.2, 2.6%), myrcene (0.8, 0.9), Δ^3 -carene (0.3, 0.9%), α -phellandrene (1.2, 1.4%), limonene (0.9, 0.8%), *p*-cymene (1.0, 0.9%), unidentified monoterpenes (0.2, 1.4%), nonanal (16.2, 20.6%), 2-decanol (18.0, 37.5%), unidentified esters (6.7, 0.0%), an unknown hydroxy compound (10.6, 9.6%), a 5-membered cyclic ketone (38.3, 18.2%) and coumarins (3.5, 4.4%).

Coriandrum sativum is a common cultivated plant in Pakistan and its fruits and leaves are used as a spice. The fruits are also used in digestive ailments and are good bacteriocidal and fungicidal.

Short Communication

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**SURVEY REPORT ON MANGO PESTS AND
FUNGAL COMPLEX IN AND
AROUND KARACHI**

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tributing factors for severe infection.

Besides thorough investigations regarding the causative factors in the field and laboratory, studies were also undertaken to identify the insects and fungi responsible for this disease complex. Based on this survey, the factors for the disease and the failure of the crop are briefly discussed below.

Factors Leading to the Destruction of Mango Trees within the City. (a) Lack of knowledge about the proper time and type of irrigation and manuring among mango growers. (b) Thick plantation leads to increased infestation and shortage of nutrition etc. (c) Presence of alternate hosts for mango pests like Roses, *Nerium*, *Ficus* etc. close

Review

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**LINED CHANNELS — A REVIEW WITH PARTICULAR REFERENCE TO THEIR
APPLICATION IN PAKISTAN**

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Short Communication

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NEMATODES PROBLEM OF BANANA IN SIND

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(Received March 19, 1979)

Tando Allayar, Ghorabari and Diplo. Several plant parasitic nematodes with high pathogenic capability have been recovered from the soil and roots of banana. They include *Pratylenchus zeae*, *Meloidogyne javanica*, *M. incognita*, *Helicotylenchus dihystra*, *H. multicinctus*, *Hoplolaimus columbus*, *H. indicus*, *H. pararobustus*, *Hemicriconemoides mangiferae* and *Paratylenchus* sp. *Radopholus similis* — a most important pathogenic nematode was, however, found only in low frequency. Cultivation of banana in Pakistan started only after independence of the country. As the climate of the lower Sind suits, banana soon spread in this area. There are varying figures about the acreage production of