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Physical Sciences Section

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REACTION GAS-CHROMATOGRAPHY OF FISCHER-TROPSCH SYNTHESIS PRODUCTS INCLUDING THE OXYGEN CONTAINING COMPOUNDS

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(Received February 2, 1977)

Abstract. The *n*- and *iso*-alcohols are separated completely as Boresters in B_2O_3 pre-column. Various test mixtures of different compositions of Fischer-Tropsch synthesis products have been examined here. The method gave for the simple test samples an error limit of 1.5–2.5%.

For the complicated test mixtures and Fischer-Tropsch products (organic and watery phases), the error limits are between 3.0–5.0%. The accuracy of the method is dependent on the mixture substance and especially the selectivity of the capillary column.

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**ANALYSIS OF ENERGY TERMS AFFECTING THE GEOMETRY OF THE BERYLLIUM
HYDRIDE MOLECULE CALCULATED THROUGH THE FLOATING SPHERICAL
GAUSSIAN ORBITAL MODEL OF MOLECULAR STRUCTURE**

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(Received November 1, 1976; revised February 16, 1977)

Abstract. The energy terms arising in the floating spherical gaussian orbital (FSGO) model calculation of BeH_2 molecule have been analysed as a function of the bond angle using symmetric orthogonalized orbitals. This helps exclude three — and four orbital electron repulsion terms making the results interpretable in terms of some well known electron pair repulsion models.

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A NOTE ON THE INFRARED SPECTROPHOTOMETRIC ASSAY OF PHOSALONE ALONE OR IN COMBINATION WITH DDT

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(Received February 3, 1976; revised December 10, 1976)

Abstract. An infrared spectroscopic method for the estimation of phosalone alone, in formulation or in combination with DDT has been developed. In its emulsifiable formulation, phosalone is assayed directed by dissolving in chloroform and scanning in the region of $5.0-6.5 \mu$ with its main peak at 5.6μ , due to the carbonyl group present in its molecule. In case of an emulsifiable formulation of phosalone in combination with DDT, a column cleanup was necessary to separate DDT before IR estimation of phosalone could be made.

Biological Sciences Section

EXTERNAL MORPHOLOGY OF *CHRYSOCORIS STOCKERUS* (LINN.) (PENTATOMOIDEA : SCUTELLERIDAE) WITH COMPARATIVE ACCOUNTS ON FOURTEEN RELATED SPECIES FROM PAKISTAN, AZAD KASHMIR AND BANGLADESH AND THEIR BEARING ON CLASSIFICATION

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(Received September 26, 1975; Revised April 14, 1977)

Abstract. The external morphology of *Chrysocoris stockerus* (Linn.) (Scutelleridae) is carried out to understand and evaluate the significance of more reliable characters specially those of metathoracic scent gland ostioles and male and female genitalia and in this light fourteen other scutellerids from Pakistan, Azad Kashmir and Bangladesh representing nine genera, five tribes and four subfamilies are studied. The results are compared with the data available in the existing literature and already existing phylogenetic schemes are briefly reviewed.

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**DI-PHENOLOXIDASE ACTIVITY IN THE HEMOLYMPH AND CUTICLE
OF CALLIPHORA VICINA (R&D) LARVAE AND PREPUPAE**

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(Received October 24, 1975)

Abstract. The development of diphenoloxidase activity in hemolymph and cuticle of *Calliphora vicina* (R & D) separately and in combination is studied in order to find the extent and role of cuticular activator.

MARINE FISH NEMATODES OF PAKISTAN VI

Dujardinascaris Sciaenae sp. n. (Heterocheillidae, Ralliet et-Henry, 1915)

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(Received November 5, 1975; revised February 26, 1977)

Abstract. A new species *Dujardinascaris sciaenae* is described from the fish *Pseudosciaena diacanthus* (Lacep) of Karachi coast. *D. sciaenae* is characterised by possessing long and stout body, with narrow anterior region, spicules subequal to 5.2—5.3 mm and 5.4—5.5 mm in length, no gubernaculum, 23 pairs of caudal papillae of which 19 pairs are preanal including 12 pairs pedunculate and 7 sessile, 1 pair adanal and 3 pairs post anal, vulva at a distance of 8.9—10.0 mm from the anterior end, eggs thick-shelled, rounded and 0.024—0.040 mm in diameter. This is the third species of the genus from Pakistani marine fishes.

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 20, No. 1, February 1977.

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

Part V. *Carum Roxburghianum* (Bal-Ajowan) Seed Oil

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(Received July 14, 1976; revised April 28, 1977)

Abstract. The chemical composition of the essential oil of the fresh and mature seed of *Carum roxburghianum* has been determined for the first time and compared with that of the one-year-old premature seed commonly sold in the market. The respective oils obtained in 3.8% and 2.5% yields are composed of α -pinene (0.66, 0.42%), myrcene (0.56, 0.88%), Δ^3 -carene (0.33, 0.60%), limonene (15.06, 20.77%), γ -terpinene (1.92, 2.56%), *p*-cymene (1.92, 0.77%), *l*-cadinene (23.28, 29.0%), unidentified esters (5.60, 5.0%), fenchone (1.80, 2.0%), an acid (25.0, 18.50%), thymol (2.0, 1.6%), linalool (1.3, 1.2%), *dl*-piperitone (1.2, 1.3%), seselin (13.1, 10.2%), α -terpineol (1.4, 1.2%), piperitol (traces, traces), bergaptene (0.5, 0.1%) and *iso*-pimpinellin (0.8, 0.5%). The acid appears to be new on the basis of its IR, NMR and chemical studies. The amount of coumarins in the oils varies from 3.1-3.4%. The composition of the oil varies depending on the age and the degree of ripeness of the seed.

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

Part VI. *Anethum Graveolens* (Dill, Sowa) Seed Oil

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(Received July 14, 1976; revised April 28, 1977)

Abstract. The essential oil of the Pakistani *Anethum graveolens* seed, has been studied for the first time with respect to its yield, physico-chemical characteristics and chemical composition. The yield of the oil when distilled from fresh seed is 2.5%. The oil is composed of 15.82% hydrocarbons and 84.18% oxygenated components, the former being limonene (9.34%) and phellandrene (6.48 %) and the latter carvone (52.25%) and dillapiole (28.28 %) of the total oil. The content and quality of the oil are of International standard and qualify it as a valuable raw material of the country.

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

Part VII. *Psammogeton Canescens* (Khushbui) Seed Oil

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(Received July 14, 1976; revised April 28, 1977)

Abstract. An essential oil has been obtained in 5.8% yields by steam distillation of the seeds of *Psammogeton canescens* which is a wild growing Umbellifer of Pakistan. It is a new oil and its composition has been worked out to α -pinene (0.45%), camphene (0.73%), myrcene (0.37%), Δ^3 carene 0.36%), α -phellanderene (0.92%), limonane (58.10%), γ -terpinene (2.6%), *p*-cymene (traces), myristicin (13.2%), dillapiole (1.4%), verateraldehyde (2.0%), methyl isoeugenol (5.5%) and elimicin (11.8%). These investigations lead us to the conclusion that the oil can find application in soap, perfume and cosmetic industry.

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A NEW ACID BASE INDICATOR

Its pK_a and pT Values

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(Received October 24, 1975; revised January 13, 1977)

Abstract. 2-nitroresorcinol has been used as an acid-base indicator. In acid it is yellow while in basic form it changes to red colour. The pH range of the indicator is 5.4 to 7.4. The pK_{in} is 6.4 ± 0.1 and pT value is 6.2. As pK_{in} 6.4 is reasonably near to 7.0, which is the equivalence point pH of strong acids versus strong bases, therefore, it is more suitable than the commonly employed indicators, phenolphthalein and methyl orange which have pK_{in} 8.3 and 4.2 respectively.

Short Communications

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SEPARATION OF MAGNESIUM, CALCIUM, STRONTIUM AND BARIUM BY CIRCULAR THIN LAYER CHROMATOGRAPHY

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(Received June 6, 1975; revised February 12, 1977)

There has always been need for separation and identification of alkaline earth metals from a mixture of metal ions, hence attempts were made for the identification of Be, Mg and Ba in alkaline earths on TLC¹.

A method has been worked out for the separation and identification of alkaline earth metals such as Mg, Ca, Sr and Ba using circular TLC technique.^{2,3}