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Physical Sciences Section

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DETECTION OF WIND DRIVEN INERTIAL OSCILLATIONS IN THE EASTERN IRISH SEA

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(Received January 23, 1979; revised April 3, 1979)

Abstract. Inertial oscillations are essentially anticyclonic in the northern hemisphere. If the tidal ellipses are cyclonic, the current velocity spectrum can be resolved into its clockwise and anticlockwise components. The presence of the inertial currents is marked by a peak in the clockwise spectrum corresponding to the inertial frequency 'f'. In the present study, as no such peak was observed in the spectrum, it was concluded that no inertial oscillations were present during the period of observations. This was expected on theoretical grounds in addition to the lack of a suitable wind stress needed to initiate such currents. In the relatively shallow waters of the Eastern Irish sea bottom friction is likely to be felt over an appreciable fraction of the total depth and so inertial oscillations are unlikely to exist.

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FITTING OF THE TIDAL CONSTITUENTS TO THE CURRENT METER RECORDS REPRESENTING VELOCITY, PRESSURE AND THE CALCULATION OF SEMI-MAJOR AND SEMI-MINOR AXES OF THE TIDAL CURRENT ELLIPSES FOR M_2 CONSTITUENT

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(Received January 23, 1979; revised April 3, 19)

Abstract. The tidal constituents O_1, K_1, M_2, S_2; M_4 and M_6 were fitted to the current meter records representing velocity and pressure at two stations in the Irish sea. Comparison of the amplitudes and phases of the u component of velocity (for dominant constituents M_2 and S_2) at different levels show that the phase of the tidal current was earlier at the bottom as expected and its amplitudes decreased from surface to bottom. The phase of the v component of velocity decreased, but the amplitude increased from surface to bottom. The calculated amplitudes and phases of the M_2 constituent for these positions are in reasonable agreement with the predicted values. The calculated semi-major and semi-minor axes are in fair agreement with the values deduced from Heaps model at position A but vary a lot at position B. This disagreement at position B may probably be due to the proximity to the coastal boundary of the model.

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SOME REACTIONS WITH 3, 4-DICHLORO-β-BENZOYL-N-PHENYLACRYLAMIDE AND 3,4-DICHLORO-β-BENZOYL-ACRYLOYL CHLORIDE

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(Received October 28, 1976; revised February 24, 1979)

Abstract. The reaction of 3,4-Dichloro-β-benzoyl-N-phynylacrylamide (I) with active methylene groups under Michael conditions has been investigated. The reactions of I with Grignard reagents, amines, thiourea, hydrazines and hydroxylamine hydrochloride has been described. The Friedel Crafts alkylation of the aromatic hydrocarbons with 3,4-dichloro- β -benzoylacryloyl chloride (XI) and the reaction of it with anthranilic acid have been extended and explored.

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AN INFRARED STUDY OF THE ADSORPTION OF CARBON DIOXIDE ON TIN

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(Received November 26, 1978; revised February 25, 1979)

Abstract. The interaction of carbon dioxide with tin has been investigated spectrophotometrically. Evidence has been found for physicosorption and chemisorption of carbon dioxide on tin together with partial dissociation of carbon dioxide molecules into carbon monoxide and oxygen. This is accompanied by the successive formation of two different types of carboxylates (1580, 1405 cm^{-1}) and (1815 cm^{-1}) which is assigned to carboxylate, linear type (polar adsorption of carbon dioxide), or to the dissociative adsorption of carbon dioxide; oxide (650,418cm^{-1}); bridged (1840 cm^{-1}), linear (i.e. II-bonded to tin) carbonyl (1895 cm^{-1}); and terminal carbonyl (2050 cm^{-1}). An increase of time of contact of carbon dioxide gas with tin sample to two hr led to the disappearance of the 1815 cm^{-1} band with the simultaneous appearance of 1645, 1470, and 1240 cm^{-1} bands in addition to the 3620 cm^{-1} band characteristic of a bicarbonate species. Heating the sample at a temperature of 150° in carbon dioxide for three hours led to the disappearance of the previously mentioned species and the appearance of absorption bands characteristic of a bridged carbonate species (1810, 1195, 785 cm^{-1}). The relationship between these different species has been explained.

Short Communication

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SELECTIVE MICRODETERMINATION OF PHOSPHATE BY A NEW AMPLIFICATION METHOD

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(Received April 22, 1979)

another drop or two of dilute ammonia, stir as before, etc., and so continue to complete precipitation. Cool in ice for 1 hr. Filter off on sintered-glass funnel (G4) and wash the precipitate with 10-15 ml of cold 1% ammonium nitrate solution. Dissolve the precipitate in 15 ml of 30% nitric acid, add 0.2 – 0.3 g of AR sodium bismuthate and stir the mixture for 2-3 min. Filter as before and wash the residue with 50 ml of 3% nitric acid, collecting the filtrate and washings in a clean 250-ml Buchner flask. Run in slowly 0.05N ferrous ammonium sulphate solution from a burette until a slight excess is present, and titrate immediately with 0.03N potassium permanganate solution.

Run a blank by mixing an equal volume of the ferrous solution used with 50 ml of 3% nitric acid and a little of sodium bismuthate, and titrating against the

Short Communication

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A NEW METHOD FOR THE CONVERSION OF U(VI) TO U(IV)

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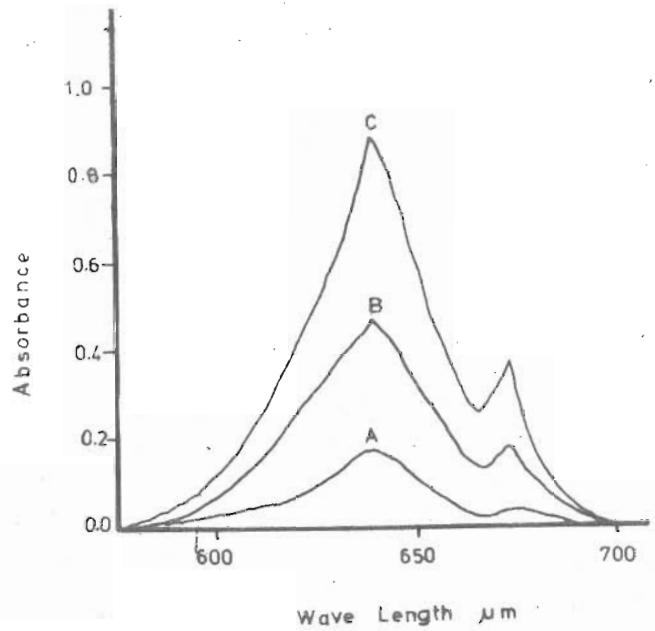
(Received October 15, 1978; revised February 24, 1979)

A new method for the conversion of U(VI) solutions to U(IV) solutions has been developed. The method presented can be preferred over the conventional electrolytic reduction methods[1-3] or zinc amalgam reduction method[4] due to number of advantages.



Biological Sciences Section

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EFFECT OF BORON ON THE YIELD AND CRUDE PROTEIN CONTENT OF WHEAT (Triticum aestivum L.)

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(Received September 4, 1978; revised March 29, 1979)

Abstract. The effect of boron on 1000 kernel weight, yield of grain and crude protein content of wheat (cultivar' Tarnab-70') was studied on clay loam soil of pH 8.1 at Peshawar during the two year period of 1975-77. It was found that all the three parameters were significantly affected by boron application. Two kg of boron per hactare resulted in maximum grain yield and crude protein per unit area.

Short Communication

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NEW HOSTS FOR HENDERSONULA TORULOIDEA

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hot, sunny conditions prevailing during spring, summer and fall in Mosul may result in causing cracks in the branches. The causal pathogen forms millions of airborne spores at that period. These factors would provide the most favourable conditions for the fungus to invade large number of trees. Sunburning was reported[10,12] to be essential for field infection of walnut and this would hold true for other trees.

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Technology Section

Pakistan J. Sci. Ind. Res., Vol. 22, No. 5, October 1979

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

Part XXIX. *Ducrosia anethifolia* (DC) Boiss. (Kamyan) Seed Oil

MUHAMMAD ASHRAF, AMNA KARIM, BUSHRA ASGHAR and MUHAMMAD KHURSHID BHATTY

PSCIR Laboratories, Lahore

(Received March 20, 1979)

Abstract. The physico-chemical characteristics and chemical composition of the essential oils, steam distilled from the mature seed of *Ducrosia anethifolia* collected from Quetta and Nushki (yield 1.5%, 1.0%) and immature seed from Nushki (yield 2.1%), have been determined for the first time. The three oils respectively contain α -thujene (0.08, 0.05, 0.05%), α-pinene (1.10, 0.72, 0.66%), camphene (0.24, 0.15, 0.14%), myrcene (0.59, 0.39, 0.35%), limonene (0.82, 0.53, 0.49%), γ -terpinene (0.15, 0.10, 0.09%), *p*-cymene (0.41, 0.27, 0.24%), 1-methyl-4-isopropenyl benzene (0.08, 0.05, 0.05%), α -cederene (0.18, 0.12, 0.10%), an unknown sesquiterpene (1.28, 0.83, 0.76%), β -caryophyllene (0.32, 0.21, 0.20%), β-elemene (0.23, 0.15, 0.14%), α -farnesene (0.13, 0.08, 0.08%), δ -cadinene (0.85, 0.56, 0.50%), β -selinene (1.14, 0.75, 0.68%), unknown sesquiterpenes (0.90, 0.57, 0.51%), β -bisabolene (0.10, 0.07, 0.06%), *cis*-chrysanthenyl acetate (58.50, 61.30, 52.30%), boronyl acetate and chrysanthenone (3.0, 4.20, 0.60%), citronellyl acetate (13.40, 10.70, 25.30%) and a mixture of an ester and a hydroxy compound (15.20, 15.70, 15.00%).

A noteworthy feature of this composition is that the occurrence of *cis*-chrysanthenyl acetate in the *Umbelliferae* species is quite novel.

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

Part XXX. *Ammi majus* Seed Oil

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(Received March 20, 1979)

Abstract. The essential oil of the *Ammi majus* seed cultivated in Pakistan has been examined for its quality and chemical composition for the first time. The percentage composition of the oil is: high boiling hydrocarbons (1.34%), *dl*-piperitone (10%), an unsaturated cyclic terpenic alcohol (15%) and a mixture of furocoumarins (60%). The furocoumarins fraction is composed of xanthotoxin, bergaptene, imperatorin, *iso*imperatorin and *iso*pimpinellin of which xanthotoxin is the major component. The species is quite valuable for the treatment of leucoderma.

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

Part XXXI. Wild *Daucus carota* (Carrot) Seed Oil

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(Received March 20, 1979)

Abstract. The essential oil steam distilled from the seeds of *Daucus carota*, grown wild in Pakistan, has been studied with respect to its physico-chemical values and chemical composition. The oil obtained in 0.8% yield has been shown to contain α-thujene (0.31%), α-pinene (0.31%), camphene (4.43%), β-pinene (1.11%), β-phellandrene (4.42%), limonene (0.66%), β-caryophyllene (0.59%), β-bisabolene (0.95%), unknown sesquiterpene (4.67%), geranyl acetate (6.63%), terpinyl acetate (18.65%), bornyl acetate (5.65%), carotol (36.34%), daucol (13.40%) and a mixture of coumarins with tarry material (1.58%). Although the major components of the oil, under discussion, are essentially the same as those of the cultivated species of *Daucus carota* yet the presence of esters, particularly terpinyl acetate in such a large amount in the former is interesting new finding.

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

Part XXXII. *Chaerophyllum reflexum*, Lindl (Kangoo) Essential Oil of the Whole Plant

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(Received May 19, 1979)

Abstract. The essential oil steam-distilled from the whole plant of *Chaerophyllum reflexum*, grown wild in Pakistan has been characterised and studies with respect to its physico-chemical properties and chemical composition. The oil with a yield of 0.25% is composed of santene (1.2%), α -pinene (0.7%), camphene (3.9%), β -pinene (2.2%), γ -terpinene (3.1%), α -phellandrene (0.7%), *p*-cyemene (8.6%), an unknown monoterpene (0.5%), myristici.. (17.3%), carvone (0.8%), 1,8-cineole (2.5%), α -terpineol (4.1%) and hydroxy myristic acid (27.4%). The essential oil of the species possesses reasonably good smell. It will be quite interesting to study the medicinal importance of the plant.

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

Part XXXIII. *Peteroselinum crispum*, Miller (Parsley) Seed Oil

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PCSIR Laboratories, Lahore

(Received May 19, 1979)

Abstract. A study on the physico-chemical characteristics and chemical composition of the essential oil obtained from the seeds of *Peteroselinum crispum*, has been made. The oil with an yield 1.93% contains α-thujene (0.26%), α-pinene (24.85%), camphene (0.19%), sabinene (1.04%), β-pinene (20.39%), myrcene (0.52%), *p*-cymene (0.46%), (+) *m*-mentha-1(6)-8-diene (5.64%), myrtenal (0.06%), 1-*p*-menthen-9-al (0.38%), citronellal (0.18%), santenone (0.05%), pinocamphone (0.21%), campherenone (0.27%), piperitone (0.25%), α-terpineol (0.15%), isomyrcenol (0.12%), β-bisabolene (0.53%), β-caryophyllene (0.29%), β-farnesene (1.42%), myristicin (30.12%), elemicin (4.27%), 1-allyl-2,3,4,5-tetramethoxybenzene (0.79%) and apiole (0.39%). The oil is used in high-grade perfumery. Cultivation of such a useful species can provide a valuable commodity for the distillation of its essential oil.

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

Part XXXIV. *Pimpinella diversifolia*, DC (Spinzankai) Seeds and Stalks Oil

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(Received May 19, 1979)

Abstract. The percentage yield, physico-chemical values and the chemical composition of the essential oil of *Pimpinella diversifolia* seed are reported. The essential oil from the seed with a yield of 0.85% consists of santene (25.7%), α-pinene (14.4%), an unidentified monoterpene (0.7%), myrcene (15.3%), a sesquiterpene (4.0%), geranyl acetate (6.9%), carvone and pulegone (7.9%), pulegone (3.1%), α-terpineol and citronellol (2.2%), α-terpineol and terpineolic acid (6.9%) and a mixture of terpineolic acid and coumarins (7.5%). The seeds of the species possess pleasant smell and can be used as a substitute for caraway.

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STUDIES ON THE PREPARATION AND STORAGE STABILITY OF COMMINUTED LIME SQUASH

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(Received January 23, 1979; revised May 5, 1979)

Abstract. The introduction of comminuted beverages is of recent origin. These types of beverages are found to be not only more nutritious but also superior to the conventional squashes in colour, aroma and cloudiness. The comminuted beverages are better protected against oxidative spoilage during extended period of storage. This is one of the first attempt on laboratory scale in respect to preparation techniques and to see the storage stability with a view to find the possibilities of introduction of comminuted lime squash in Pakistan.

Short Communication

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RAPID METHOD FOR THE ESTERIFICATION OF FATTY ACIDS AT ROOM TEMPERATURE

Extension of the Method to Other Fatty Acids

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(Received September 22, 1978; revised April 3, 1979)

previous methods involve refluxing for a period of two to three hours. The present method is much simpler and time saving particuarly for lipid and food analytical laboratories where a large number of samples are esterified daily. The results are compiled in Table 1. It can be seen that the yields are comparable with the usual known methods and the new rapid method of M. Hoshi.[10]

TABLE 1. ESTERIFICATION OF FATTY ACIDS.

Name of the fatty acids	Reaction time (min)	Percentage recovery of the methyl esters	
		This method[10]	Conventional method