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Physical Sciences Section

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FLOW LIGHT SCATTERING

Part I. Theoretical Principles of the Effect and Apparatus for its Measurement

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(Received April 17, 1979)

A brief introduction is given into the theory of radiation scattering by rigid spheroids dispersed or dissolved in a liquid medium subjected to flow at well-defined velocity gradient. The theory is limited to spheroids whose largest dimension does not exceed $1/3$ of the wavelength of the incident radiation. It is shown that the radiation scattering increment produced by flow makes it possible to determine not only the axial ratio as obtainable by streaming birefringence, but also the numerical values of semimajor and semiminor axis of a spheroid provided two orthogonal components of incident linearly polarized light are used. Essentials of the construction and operation of an apparatus designed for the study of hydrodynamic radiation scattering are described.

**REACTION MECHANISMS OF DEHYDROBROMINATION OF
1,1,2-TRIBROMOBENZOCYCLOBUTENE AND TETRAHALO-*o*-XYLENE AND
THAT OF DEBROMINATION OF 1,1,2,2-TETRABROMOBENZOCYCLOBUTENE**

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(Received February 16, 1980; revised April 24, 1980)

The dehydrobromination of 1,1,2-tribromobenzocyclobutene and debromination of 1,1,2,2-tetrabromobenzocyclobutene leads to the formation of 5,6-dibromobenzo-(a)-biphenylene, together with smaller amounts of 5,10-dibromobenzo-(b)-biphenylene and 3,4,7,8-tetrabromobenzocyclooctatetraene. The mechanisms of the above-mentioned two reactions and that of $\alpha,\alpha,\alpha',\alpha'$ -tetrabromo-*o*-xylene is discussed in the light of these observations and Woodward-Hoffman orbital symmetry rule.

PREPARATION AND MECHANISM OF FORMATION OF ARYL OXAZOLES AND IMIDAZOLES FROM NITROESTERS

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(Received January 24, 1979; revised March 20, 1980)

Acidic reduction of *ortho*-nitroesters leads to either oxazoles or amidophenols according to the reducing conditions. The mechanism of this reduction was studied in detail. Imidazoles were prepared similarly by acidic reduction of *ortho*-nitroanilides.

Reduction of *ortho*-nitrosoesters gave only the corresponding aminophenols and carboxylic acids.

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STUDIES ON SOME α,β -UNSATURATED NITRILES

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(Received October 15, 1978)

UTILIZATION OF LIMONENE FRACTION OF THE CITRUS ESSENTIAL OILS

Part I. Production of Carvacrol from Orange Oil

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(Received March 12, 1980)

Limonene — a predominant component of the citrus essential oils has been utilised to produce carvacrol. The synthesis involves the preparation of limonene nitrosochloride and carvoxime which are obtained in 90 and 92% yields respectively. Overall yield of carvacrol, starting from limonene was up to 60%.

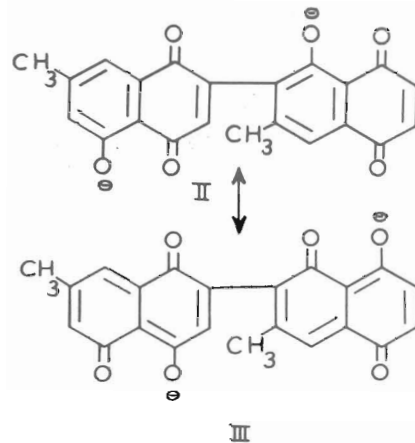
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DIOSPYRIN: A NEW NARROW RANGE ACID-BASE INDICATOR

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Biological Sciences Section

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ALLELOPATHIC EFFECTS OF *PANICUM ANTIDOTALE* RETZ.

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(Received March 12, 1979; revised February 28, 1980)

Panicum antidotale Retz, besides reducing its own growth, retarded the growth of *Pennisetum americanum* in mixed root cultures. Cold water extracts from inflorescences, shoots and roots; root exudates and soil underneath it not only inhibited its own germination and growth but also that of *Brassica campestris*, *Cenchrus ciliaris*, *Lolium multiflorum*, *Pennisetum americanum*, *Setaria italica* and *Sorghum alnum* in laboratory bioassays. Shoot extract in addition to causing deaths of *Pennisetum americanum* and *Setaria italica*, reduced fresh and dry biomass of the seedlings. Toxicity depended upon the part assayed, test species used and physiological process involved. The grass would not exhibit its benefits as range grass either in mono- or in mixed cultures with the above-mentioned grasses due to allelopathy.

ALLELOPATHIC POTENTIAL OF COLUMBUS GRASS (*SORGHUM ALMUM*) (PIPER) PARODI

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(Received June 26, 1979; revised March 30, 1980)

Sorghum alnum (Piper) Parodi (Columbus grass), adapted to tropical and subtropical climates on variety of soils is yet to be introduced as a range grass in Pakistan. Besides self-inhibition, it retarded growth of *Pennisetum americanum* and *Setaria italica* by root exudates in mixed cultures. Aqueous extracts from various parts of the plant, root exudates collected in laboratory and soil taken from underneath Columbus grass exhibited phytotoxicity against *Brassica campestris*, *Cenchrus ciliaris*, *Lolium multiflorum*, *Pennisetum americanum*, *Setaria italica*, *Panicum antidotale* and *Sorghum alnum*. Shoot extract reduced germination, fresh and dry biomass, water-contents and survival of the test species. Phytotoxicity depended upon the part assayed, test species used and physiological process involved. The introduction of Columbus grass would be ecologically unsuitable as pure or in mixed cultures with the above-mentioned species due to allelopathy.

BACTERIOLOGICAL STATUS OF FISH AND SHRIMPS AT LANDING ON FISH HARBOUR AND LOCAL RETAIL MARKETS IN KARACHI, PAKISTAN

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(Received August 29, 1979; revised January 21, 1980)

Bacterial counts on two popular varieties of fish (*Cybbium* and *Stromateus* sp.) and shrimps (*Penaeus* sp.) at the time of landing at fish harbour and at local retail markets revealed no seasonable variation during a period of sixteen months. Total numbers of bacteria were found to be remarkably equal both at 20° and 37°. Market samples gave a higher count than harbour samples. Strains of typical psychrophilic organisms of *Flavobacterium*, *Pseudomonas*, *Acinetobacter* and *Morexlla* genera were isolated from harbour samples but never encountered in market samples. Some of the probable factors that determine the number and type of bacteria on these fish are discussed.

GROSS BIOLOGICAL EFFECTS OF ACRIDINE ORANGE ON THE LABORATORY-REARED HOUSEFLY, *MUSCA DOMESTICA* (L)

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The oral administration of acridine orange (AO) seems to disrupt growth and development of the larvae and pupae of laboratory-reared houseflies. Higher doses (0.75 – 1%) proved toxic and most of the larvae died during two days following the treatment. Midrange doses (0.25 – 0.5%) resulted in reduced growth, light weight larvae, delayed pupation, curtailment of normal pigment and darkening of puparia. Temporary depression in the size of gonads with decreased reproduction was also observed at midrange doses. Larvae treated at lower doses (0.0625 – 0.125%) that eventually pupated all failed to show toxic responses and the resulting adults appeared normal.

The morphological changes induced by the chemical at midrange doses are familiar to the symptoms that follow due to nutritional deficiencies. Acridine orange seems to inhibit the protein synthesis.

Short Communication

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SPHAEROPLEA IN PAKISTAN

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(Received February 12, 1980; revised March 24, 1980)

1. Oospore winged *S. soleiroli*
1. Oospore warty *S. wilmani*

1. *S. annulina* (Roth.) Ag., 1824; *Conferva annulina* Roth., 1800; *Sphaeroplea lerleinii* Kg., 1849; *S. trevirani* Kg., 1849; *S. armenica* Kg., 1849; *S. braunii* Kg., 1849; and *S. annulina* I. multiserriate *Randhawa*, 1936.

Filaments 24–80 nm broad, up to 20 times as long as broad; chloroplast annular, 20–30 in number; pyrenoids 2–10 in a band; septa simple, thin or thick; oospores in 1–5 rows, spherical, with blunt conical hollow spines whose bases are connected by a regular polygonal network

Technology Section

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DETERMINATIONS OF PYRIDOXINE HYDROCHLORIDE (VITAMIN B₆) IN MULTIVITAMIN PREPARATIONS

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(Received November 13, 1979; revised April 10, 1980)

Determinations of pyridoxine hydrochloride in multivitamin preparations using colorimetric, spectrophotometric absorbance difference and multicomponent spectrophotometric methods have been carried out. The colorimetric method is found to be more accurate and precise than the other methods. Interference due to decomposition products can be eliminated with TLC separation prior to assay procedures.

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

Part XLIX. *Pimpinella anisum* Linn (Eng. anise, Var. *Roomi Sonf*) Seed Oil

Muhammad Ashraf, M.A. Siddiqui and Muhammad Khurshid Bhatti

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(Received November 22, 1979)

The essential oil obtained from the seed of *Pimpinella anisum* purchased from the local market but cultivated at Madyan (Swat) has been studied with respect to its physicochemical characteristics and chemical composition. The oil with a yield of 1.7% consists of α -pinene (1.8%), camphene (0.7%), phellandrene (2.4%), limonene (2.7%), anethole (84.1%), unidentified alcoholic compounds (3.2%), anisketone (4.3%), and tarry material (0.8%). The oil is sweet smelling and is mainly composed of anethole. The oil has been found to be antibacterial in properties. The species has long been used in the local materia medica. Its medicinal and pharmaceutical values are well-known. The cultivation of the species at Madyan (Swat District) has proved quite successful.

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CHARACTERISTICS OF KENAF (*HIBISCUS CANNABINUS*) FIBRES

Part I. Physical Characteristics

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(Received May 30, 1979; revised April 14, 1980)

Samples of kenaf, varieties vulgaris and viridix, collected at four different stages of maturity, viz pre-flowering, flowering, small pod and seed maturity, were subjected to a number of methods of retting. Fibres were investigated for fineness and length of ultimates and for tenacity at three different levels of R.H. viz. 40, 65 and 100%. Various relationships and trends were examined.

PREPARATION OF SOYMILK FROM SOYBEAN

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Attempts have been made in the present investigation of soymilk free off bitter taste and beany flavour. The conditions have been standardised for obtaining a palatable milk from soybean. Net protein utilization (standardized) of soymilk and skim milk have almost the same value. The NDP calories and PER of soymilk have indicated that soymilk can be substituted for cow's milk and can be used for feeding infants.

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PREPARATION OF DRY SAUSAGE FOR LOCAL TASTE

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and A.F. Md. Ehteshamuddin

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(Received December 5, 1979; revised March 8, 1980)

A process has been developed to produce easy handling meat dry sausage of good quality and stability. The product which has been tailored to local taste can be stored without refrigeration for up to 8 weeks. Seventeen different samples were prepared using various formulations and processing treatments and were subjected to organoleptic and shelf-life evaluation. The best product selected on the basis of the evaluation contained 15% added fat, 6% soya flour binder and remaining as meat proteins, moisture, condiments and spices. (Locally available beef on the shops has been used to indicate that manufacture of dry sausage does not necessarily require prime quality beef).

DISSOLUTION TEST FOR TABLETS: DESIGN AND STUDY OF A ROTATING DISC METHOD

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(Received April 17, 1979; revised March 27, 1980)

A nondisintegrating type rotating disc apparatus for the determination of dissolution rate of tablets is designed and reported, studies on dissolution behaviour of pericyazine tablets (10 mg) are conducted and equation for determining experimental dissolution constant (K_e) is derived.