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Physical Sciences. Pages 155-180

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Physical Sciences Section

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STUDY OF THE EFFECTS OF DIELECTRIC CONSTANTS ON THE SPECIFIC RATE CONSTANT OF BROMIDE-BROMATE REACTION

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(Received September 25, 1978. revised October 28, 1978)

The reaction between potassium bromide and potassium bromate is a fourth order reaction. However, in presence of large excess of sulphuric acid it behaves as a pseudo-second order reaction. The reaction was studied in a series of water - ethanol mixtures at various dielectric constants (ϵ) at 25°. From the linear plots of $\log k_0$, i.e., logarithm of specific rate constant at zero ionic strength against the reciprocal of the dielectric constant ($1/\epsilon$), the values of $r^\ddagger$ and r_{AB} , the radii of the activated complex for single and double sphere models respectively were calculated. A comparison of the theoretical and experimental values of the radii, i.e. $r^\ddagger$ and r_{AB} for single and double sphere models has indicated that the shape of the activated complex is more similar to Laidler-Eyring's approach of single sphere activated complex in this particular reaction.

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**STUDIES IN THE STEROIDAL CONSTITUENTS OF THE SEEDS OF
ABRUS PRECATORIUS LINN. (SCARLET VARIETY)**

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(Received September 20, 1978)

Exhaustive chromatography of the unsaponifiable fraction of the fatty constituents of Abrus seeds have led to the isolation of two new steroids named as abricin and abridin. Cycloartenol, β -amyirin, campesterol, cholesterol, stigmasterol, β -sitosterol and an oily hydrocarbon β -squalene have also been isolated and identified, which were spotted earlier.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

STUDIES OF A CARBOHYDRATE-CONTAINING POLYMER FROM *CORDIA MYXA*

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(Received March 7, 1978; revised October 15, 1978)

A carbohydrate-containing polymer has been isolated from the mucilage of *Cordia myxa* and purified by gel filtration and ion exchange chromatography. The polymer has been shown to contain xylose, glucose, galactose, mannose and N-acetylglucosamine in addition to small amounts of amino acids. Hemagglutination inhibition studies and compositional analysis of this material suggest that the polymer is of the glycoprotein type.

LOW FREQUENCY DIELECTRIC PROPERTIES OF KAIL WOOD**S.M.A. Tirmizi and M. Ashraf Chaudhry***Department of Physics, University of Karachi, Karachi 32***M.A. Shah***Centre of Solid State Physics, Punjab University, Lahore*

(Received May 30, 1978; revised October 2, 1978)

Dielectric properties of kail wood in the frequency range 0.5 – 100 kHz are measured. Assuming disc-shaped pores randomly distributed throughout the sample, application of three component mixture theory gives values of dielectric constant (relative permittivity) very close to those obtained experimentally. Conductivity loss is dominant at low frequencies. At high frequencies the loss is mainly due to cellulose dipoles.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

LOW FREQUENCY DIELECTRIC PROPERTIES OF MARBLE

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(Received May 30, 1978; revised October 2, 1978)

Dielectric properties of some varieties of marble have been measured in the frequency range 0.5 – 100 kHz. The coloured varieties are found to have higher values of dielectric constant and dissipation factor as compared to white marble. The results are consistent with previously published data.

Short Communication

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, Oct - Dec 1978

STUDIES ON 3-CARBETHOXY-5,6-BENZO-COUMARIN

**Part I. Action of Grignard reagents, Ureas,
Thioureas and Thiophenols**

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(Received May 17, 1978)

Short Communication

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**MICHAEL CONDENSATION OF
3-CARBETHOXY-5, 6-BENZOCOUMARIN WITH
ETHYL ACETOACETATE, ETHYL
BENZOYLACETATE, ETHYL CYANOACETATE
AND ACETYLACETONE**

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(Received May 17, 1978)

Biological Sciences Section

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A NEW SPECIES AND A NEW RECORD OF EYSARCORINI (HETEROPTERA: PENTATOMIDAE) FROM BANGLADESH AND PAKISTAN*

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(Received July 17, 1978)

Hermolaus qadrii is described as a new species from Ishurdi, Bangladesh, and *Carbula biguttata* (Fabr.) is newly recorded from Islamabad, Pakistan, and is redescribed with special reference to some of its unknown characters like metathoracic scent gland ostioles and genitalia.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

**A NEW GENUS AND TWO NEW SPECIES OF CARPOCORINI (HETEROPTERA:
PENTATOMIDAE) FROM PAKISTAN***

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(Received July 17, 1978)

A new genus to accommodate a new species from Manor, Gilgit in northern areas and a new species of the genus *Mormidella* Horvath from the above locality and Baluchistan are described with special reference to their metathoracic scent gland ostioles and male and female genitalia. This is the first record of the genus *Mormidella* from Pakistan.

STUDIES ON THE RATIONALE OF AFRICAN TRADITIONAL MEDICINE
Part II. Preliminary Screening of Medicinal Plants for Anti-Gonococcal Activity

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(Received February 28, 1978; revised August 24, 1978)

Crude extracts of medicinal plants traditionally used to treat gonorrhoea in Tanzania were tested for *in vitro* antigonococcal activity by filter-paper disc assay method. Of the 30 extracts tested, 9 (30%) inhibited the growth of *Neisseria gonorrhoeae*. The bark of *Acacia nilotica* Del. which is a popular remedy for gonorrhoea, had the highest antigonococcal activity. Among another batch of 58 medicinal plants used for ailments other than gonorrhoea, 14 (24%) had significant antigonococcal activity. Eighteen of the 22 (82%) extracts found active against gonococcus, also inhibited the growth of *Staphylococcus aureus* (Oxford strain).

STUDIES ON THE RATIONALE OF AFRICAN TRADITIONAL MEDICINE**Part III. Preliminary Screening of Medicinal Plants for
Antifungal Activity**

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(Received March 9, 1978)

Seven of the 18 (39 %) plants traditionally used as remedies for skin diseases in East Africa were found to inhibit the growth of *Trichophyton mentagrophytes* and *Candida albicans* *in vitro*. *Harrisonia abyssinica* and *Solanum incanum* were most active plants in this category. High level of *in vitro* anti-fungal activity was observed in some of the medicinal plants used for treatment of other miscellaneous diseases, e.g. *Emilia sagittata*, *Bonamia mossambicensis*, *Securinega virosa*, *Sida serratifolia* and *Citrus aurantifolia*. The antibacterial and antimycotic activity of the plant extracts tested did not exhibit any clear-cut interrelationship. Most of the extracts having high levels of activity against *T. mentagrophytes* and *C. albicans* had no activity against *Staphylococcus aureus*.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

ANTIBIOTIC ACTION OF CONSTITUENTS OF ROOT BARK OF *EUCLEA NATALENSIS* A.DC.

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Petroleum ether and then chloroform extracts of *Euclea natalensis* root bark showed marked anti-biotic activity against *Staphylococcus aureus*, 7-Methyljuglone, mamegakinone and diospyrin were isolated from it and found active against a number of pathogenic organisms including *Neisseria gonorrhoeae* and *Shigella Spp.* A triterpenoid lupeol isolated from *E. natalensis* was found to be inactive against *Staphylococcus aureus*.

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

EFFECT OF METHOD AND TIME OF APPLICATION ON P UPTAKE IN COTTON FROM P^{32} -LABELLED SUPERPHOSPHATE

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(Received July 1, 1978, revised September 27, 1978)

The effect of method and time of applying P on cotton yield and P uptake by cotton plant from P^{32} -labelled superphosphate was studied in the field. Superphosphate (24 kg P/ha) was applied on the surface along the plant row or banded on either side of the row (9 cm deep, 25 cm to the side) at seeding, 30, 45 and 60 days after seeding. Phosphorus applied at seeding was most productive for seed cotton yield. The percentage of P and A-value data indicated that surface applied P was superior to banding at all growth stages of cotton and P applied at seeding was utilized better than the post emergence applications.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

TREATMENT OF COPPER LEACH SOLUTIONS BY ION EXCHANGE RESINS

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(Received August 16, 1978; revised October 9, 1978)

The paper deals with the treatment of copper leach solutions with ion exchange resins. Four Duolite resins have been used to study the concentration of these solutions and an attempt has been made to study the separation of copper from the iron present in leach solutions as an impurity. It has been observed that only strong sulphonic acid type resin may be used for concentration and separation purposes.

PREPARATION AND NUTRITIONAL EVALUATION OF A DOMESTIC LEVEL VEGETABLE PROTEIN MIXTURE AND SOME COMMON MEALS BASED ON IT

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(Received July 10, 1978; revised October 8, 1978)

A study was made of a previously formulated domestic level vegetable protein mixture using it in three traditional Pakistani dishes: (1) Chappati-curry, (2) Dahi baray, and (3) Khichri. Through preference tests acceptable products were produced. The cooked dishes were then assayed for protein nutritional value. It was observed that the basic mixture and the diets Nos.1-3. Yielded the following values respectively:

N.P.U. op%	= 50.0, 60.1, 57.9, 56.5
N.P.U. st%	= 73.8, 77.1, 80.8, 82.2
(protein score)	
NDp cal%	= 10.0, 9.6, 10.9, 11.4

The NDp cal% were higher than the minimum value laid down for feeding infants. Other vulnerable groups of the population could also be benefitted by using it as a supplementary food. Possibilities for commercial production have also been indicated.

COMPARISON OF FOUR EXTRACTION METHODS FOR THE ESTIMATION OF AVAILABLE Cu FOR FLOODED RICE AND WHEAT

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(Received November 12, 1977; revised October 11, 1978)

The response of rice (*Oryza sativa* L.) and wheat (*Triticum aestivum* L.) to the application of CuSO_4 on several alkaline calcareous soils was investigated in the glass-house. The amounts of Cu extracted from the soils by four chemical methods were correlated with that taken up by the plants.

None of the four methods used could predict Cu availability for rice plants. The amount of Cu extracted by DTPA (diethylenetriamine pentaacetic acid) and NH_4OAc had little positive correlation either with concentration or total contents of Cu in plants. The HCl and EDTA methods significantly correlated soil-extractable Cu with plant Cu but the correlation coefficient (r) was small and, therefore, not useful as a soil test for Cu. None of these methods could distinguish Cu deficient from nondeficient soils.

The DTPA and NH_4OAc procedures adequately predicted Cu availability to wheat plants. The r value of both the methods with total Cu contents in plants was 0.70. The value improved to 0.84 when Cu concentration in plants was considered. The critical concentration of available soil Cu by the two methods is about 0.8 and 0.4 ppm respectively.

The chemical changes associated with flooding of rice soils which strongly affect Cu absorption by plants seem to be responsible for poor relationship between Cu extracted by various methods from dry soils and that taken up by submerged rice plants.

Pakistan J. Sci. Ind. Res., Vol. 21, Nos. 5-6, October - December 1978

DEVELOPMENT OF BONE-CHINA FROM INDIGENOUS RAW MATERIALS

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(Received January 29, 1977; revised September 20, 1978)

Bone-china has been developed from indigenous raw materials. The results are encouraging. Major difficulties encountered have been discussed and their remedies are suggested.

Short Communication

**A SIMPLE PRECAUTION TO PREVENT
BREAKAGE OF CENTRIFUGE TUBES
DURING OPERATION**

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