

Coden: PSIRAA 26 (6) 347-390 (1983)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 26, No. 6, December 1983

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Technology. Pages 382-389



Published bimonthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pakistan. J.Sci.Ind.Res., Vol., 26, No.6, December 1983

INTERACTION OF MHD SHOCKS

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(Received April 17, 1982)

A plane MHD shock wave of arbitrary strength meets a slender body moving at supersonic speed in the opposite direction. The interaction between the given shock wave and the weak shock attached to the slender body is studied for aligned fields for axisymmetrical flow and for both aligned and transverse fields in the two-dimensional case. Formal solutions for the linearized flow in the interaction region are obtained by the use of integral transforms.

TEMPERATURE DEPENDENCE OF DIELECTRIC CONSTANT OF DIVALENT DOPED MgO SINGLE CRYSTALS AT 1 KHz

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(Received October 16, 1982; revised September 25, 1983)

The dielectric constants (ϵ') of MgO single crystals doped with Ni^{2+} , Mn^{2+} or Co^{2+} respectively have been measured at 1 KHz in the temperature range 300 K to 450 K. The values of the temperature dependence, $\left[\frac{1}{(\epsilon' - 1)(\epsilon' + 2)} \right] \cdot \left(\frac{\partial \epsilon'}{\partial T} \right)_p$

, ranged between about $1.2 \times 10^{-5} \text{ K}^{-1}$ for $\text{Ni}^{2+}/\text{MgO}$ (1400 ppm Ni) to $1.5 \times 10^{-5} \text{ K}^{-1}$ for $\text{Co}^{2+}/\text{MgO}$ (8200 ppm Co). The data confirms Bosman and Havinga's postulate that, for materials in which $\epsilon' < 20$ the temperature dependence should be positive.

SOME NEW DERIVATIVES OF UREA SHOWING ANTICONVULSANT AND ANXIOLYTIC PROPERTIES

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(Received December 4, 1982; revised September 7, 1983)

Two new urea derivatives N-carbanoylindane-2-carboxamide(2a) and 1,2,3,4-tetrahydro-2-naphthoyl urea (2 b) have been prepared by the condensation of the appropriate acid chlorides with urea. On pharmacological screening, it was found that these compounds exhibited marked anticonvulsant activity and a low order of tranquillizing activity. Parallel tests on phenobarbitone are also described.

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STUDIES ON PAKISTANI ARTEMISIAS.

Part I. Isolation of a Coumarin from *Artemisia elegantissima*, and its Structure Determination

Yusuf Ahmad, S. Khaqan Hasan and (Miss) Nuzhat K. Sherwani

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(Received September 27, 1983)

A coumarin has been isolated from *Artemisia elegantissima* from Islamabad area in Pakistan. With UV, IR, NMR and Mass spectroscopic studies, its structure is shown to be 6,7-dimethoxycoumarin.

Biological Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 26, No. 6, December 1983

EFFECTS OF COPPER AND PHOSPHORUS ON GROWTH AND NUTRIENT CONTENT OF RICE

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(Received April 17, 1982)

The effects of Cu and P on the dry matter yield and nutrient content of P and Cu were studied under pot house condition on rice plant on an alkaline soil. The application of Cu alone upto 4 ppm increased the straw and grain yield of rice, whereas yield decreased with further increase in Cu levels. Similarly addition of P alone upto 40 ppm increased yield but decrease was observed beyond that level. The application of Cu upto 4 ppm in the presence of P however, increased yields at all P levels. The maximum straw and grain yields were recorded when 4 ppm Cu was supplied with 40 ppm P.

Phosphorus concentration in straw and grain increased with increase in P levels but without Cu. P concentration also increased with Cu addition upto 4 ppm. With further addition of Cu, P content decreased in both parts of the plant. The increased application of Cu increased the Cu content of straw and grain at all P levels. The application of 40 ppm P generally increased Cu concentration in both plant parts. But decrease was observed with further increase in P levels. The low levels of Cu and P were essential for better plant growth and efficient utilization of these nutrients. Antagonistic effect was observed only when one of the nutrients was applied in larger quantities in the growth medium.

EFFECT OF NITROGENOUS BIOFERTILIZERS FOR LEGUMINOUS PLANTS ON NODULATION AND FRUITING

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(Received November 6, 1982; revised September 15, 1983)

In the present paper, the importance of biofertilizers has been stressed. It provides information on the preparation of nitrogenous biofertilizers for leguminous plants. Experiments were conducted on Gram and Cowpea, using biofertilizers prepared in P.C.S.I.R. Laboratories. The results have been found encouraging. In addition to 10-15 days early flowering in both the crops, seeds treated with biofertilizer produced healthier and taller plants, with greener leaves and increased yield as compared to those of control.

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SCREENING OF ISOLATED MICROBES FOR CELLULASE PRODUCTION

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(Received September 21, 1982)

Different microbes were propagated on substrates such as bagasse pith, wheat straw, rice straw and cotton seed hulls for cellulase production. Enzyme produced by these organisms varies from organisms to organism and from substrate to substrate.

Short Communication

Pakistan J. Sci. Ind. Res., Vol. 26, No. 6, December 1983

RACE L-2, A NEW VIRULENCE OF *Tilletia foetida* IN PAKISTAN

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(Received June 25, 1981)

Technology Section

Pakistan J. Sci. Ind. Res., Vol. 26, No. 6, December 1983

IMPROVEMENT IN THE DIGESTIBILITY OF COTTON AND MUSTARD STALKS

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(Received March 27, 1982)

The Dry matter digestibility of untreated mustard and cotton stalks was 29.54 and 18.85 percent respectively. It increased to 64.90 and 36.41 % when mustard and cotton stalks were first treated with 0.5 % calcium hydroxide and subsequently with 5 % ammonia. A three fold increase in non-protein nitrogen was also observed.

REDUCTION OF AFLATOXIN β_1 IN AMMONIATED CORN

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(Received July 3, 1982)

Detoxification studies of corn were carried out to determine the extent of decontamination at various levels of temperature, moisture and added ammonia. Non-detectable levels of aflatoxin were obtained in 7 days at 30° and 18 % moisture with 1.5 % ammonia added. At 40° and 18 % moisture with 1.5 % ammonia added, the non-detectable levels were reached in three days, initial contamination being 500 $\mu\text{g/kg}$. Similarly with 100 $\mu\text{g/kg}$ initial aflatoxin contamination level, non-detectable levels were achieved in 3 days at 40° 18 % moisture and 1.5 % ammonia added.

STORAGE BEHAVIOUR OF SWEET ORANGE JUICE CONCENTRATE

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(Received July 7, 1982)

The techniques of juice concentration has been shown to effect the quality of the concentrate. Frozen orange juice concentrate samples were found richer in aroma and maintained better colour, taste and flavour when stored at 0°F., than those kept at 32°F., for a period of six months. The frozen concentrates apparently showed no symptoms of gelation and clarification during storage at low temperatures.

The storage period had a significant effect on the retention of ascorbic acid content of frozen and sugared concentrate. The length of storage period and temperatures had insignificant effect on other chemical constituents of the concentrates.

42° Brix sugared concentrates stored at 0°F., maintained good organoleptic properties. The sugared concentrate samples were found to clarify immediately on dilution. These concentrate samples were found less stable towards loss of ascorbic acid and aroma compared to frozen concentrates.