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Physical Sciences Section

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STUDY OF PARAMAGNETISM IN PYRROLE BASED CONDUCTING POLYMERS USING ESR MEASUREMENTS AT LOW TEMPERATURES AND PRESSURES

M S Kiani^a, F J Davis^b and G R Mitchell^b*

^aDepartment of Physics, Government College, Rawalakot, Azad Kashmir

^bPolymer Science Centre, University of Reading, Whiteknights, Reading RG6 2AF, UK

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A series of ESR experiments were carried out at atmospheric as well as low pressures in order to find any relationship between paramagnetic species and the charge carriers in pyrrole based electrically conducting polymers. ESR spectra recorded for a range of polymer samples having electrical conductivities spread over four orders of magnitude suggest that apparently there is no link between the paramagnetic centres and bipolarons which serve as the major charge carriers in these materials. A series of ESR measurements at low temperatures for pyrrole based polymers show that most of the polymers obey Curie-Weiss law in terms of increase in spin populations. Difference in behaviour of various polymers in terms of changes in spin populations, line shape and line width is attributed to the difference in molecular structure and morphology.

Key words: Paramagnetic defects, Radical cation, Spin concentration, Deuterated and protonated polypyrrole, Polarons and bipolarons.

IMPACT OF SUBSYNCHRONOUS RESONANCE ON SYSTEM DYNAMIC STABILITY

Abdulaziz A El-Sulaiman

*Electrical Engineering Department, College of Engineering, King Saud University, P O Box 800,
Riyadh 11421, Saudi Arabia*

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Experimental and theoretical studies of subsynchronous resonance phenomena are carried out on a power system composed of a small rating motor-generator set connected to an infinite bus by a series capacitor-compensated transmission line. Complete representation of the electromechanical system is adopted. The eigenvalue method of analysis is used to study the interaction between mechanical and electrical network dynamic behaviour to identify the various conditions under which the system would be subjected to torsional interaction. The impact of subsynchronous resonance on dynamic stability is also explored.

Key words: Subsynchronous resonance, Power systems, Dynamic stability.

VEHICULAR CONTRIBUTION TO ROAD TRAFFIC NOISE IN KARACHI CITY, PART-II. CONTRIBUTION BY CARS, TRUCKS AND HORNS

G H Shaikh

Applied Acoustics Group, PCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

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Earlier study on the measurement of level of noise emitted from freely flowing individual motorcycles, buses and rickshaws has been extended and noise emission data for cars, trucks and motor vehicle horns collected to assess their contribution to road traffic noise in Karachi city. The data collected has been analyzed for L_{v90} , L_{v50} and L_{v10} and the results are discussed with reference to maximum permissible noise emission limits for motor vehicles as allowed by Pakistani and other national standards.

Key words: Noise pollution, Traffic noise, Motor vehicle noise.

KINETIC STUDIES AND REACTOR DESIGNING FOR THE PRODUCTION OF LIGHT WEIGHT MAGNESIUM CARBONATE

Nayeemuddin, S Naeem Mahmood, S Burhanuddin Abdali, M Habib and Mohsin Ali*

PCSIR Laboratories Complex, Karachi-75280, Pakistan

(Received 4 August 1995; accepted 16 May 1998)

Studies have been undertaken to investigate kinetic data for producing light weight magnesium carbonate from magnesium sulphate and commercial soda ash solution. Using factorial planning, series of batch-wise experiments were carried out in a 25 lit capacity stirred tank reactor (S.T.R.) at three concentration levels of the reactants (viz. low, medium and high) and two agitation levels (viz. 280 and 560 r.p.m.). It has been observed that initial concentration of Mg^{++} ions has pronounced effect both on the yield of the desired product and reaction kinetics. Whereas the agitation level/Reynolds number (within range of 6000 to 17000) has insignificant effect on the said parameter. The optimum concentrations of the reactants at which the concentration - time plot is linear are: Mg^{++} ions 20 gl^{-1} and Na_2CO_3 270 gl^{-1} . The data obtained has been applied to design C.S.T.R. which suggests that a single tank reactor (0.6m^3) operating within the range of 30 - 45 r.p.m. would be economically feasible to produce 125 Kg h^{-1} of light weight magnesium carbonate.

Key Words: Kinetic studies, Light weight magnesium carbonate, Design of reactor, Material balance, Order of reaction.

Biological Sciences Section

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CONSUMPTIVE USE OF WATER AND NP DOSES ON GRAIN YIELD OF MAIZE

M A Sethar, U A Buriro, Q I Chachar and A S Larik*

Faculty of Crop Production, Sindh Agriculture University, Tandojam, Pakistan

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Three moisture levels viz. 70, 80 and 90% soil moisture depletion (SMD) and two NP levels i.e. 75-50 and 150-75 kg ha⁻¹ were studied for maize crop. Irrigation water was computed by gravimetric measurement and irrigation method applied. The consumptive use of water (551 mm) gave the highest grain yield of 4.66 tons ha⁻¹ when irrigated at 80% SMD with high fertility level i.e. 150-75 kg ha⁻¹. Grain yield was significantly affected by soil moisture and fertility levels. The highest water use efficiency (ECWU) was 8.45 kg mm⁻¹ when crop was irrigated at 80% SMD. The average evapotranspiration per day (E_t day⁻¹) for the whole growing season was 4.93, 4.34 and 3.87 mm at 70, 80 and 90% SMD, respectively.

Key words: Irrigation, Fertilizer, Maize,

PHARMACOLOGICAL EVALUATION OF THE ANTIEMETIC ACTION OF *NELUMBium SPECIOSUM* - WILD SEEDS

Zahra Yaqeen, Maryam Mirza*, Yaqeenuddin, Kaneez Fatima Ahmad and Yasmeen Badar

Pharmaceutical and Fine Chemical Research Centre, PCSIR Laboratories Complex, Off University Road Karachi-75280, Pakistan

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The antiemetic property of *Nelumbium speciosum*-wild was investigated in this study. The crude alcoholic and aqueous extracts of the decorticated seeds were found effective in controlling centrally induced emesis by apomorphine in dogs. A dose of 90 mg kg⁻¹ body weight of the alcoholic extract given orally causes antiemetic effect in 3 h. However, the administration of a dose of 9000 mg kg⁻¹ body weight of aqueous extract reduces the frequency of vomiting to only once in 3 h. The efficacy of *Nelumbium speciosum* wild extract, though in high doses, was found comparable with chlorpromazine (Largactil) and metoclopramide (Maxolon).

Key words: *Nelumbium speciosum*-wild, Emesis, Apomorphine.

Introduction

The antiemetic action of *Nelumbium speciosum*-wild was investigated under the programme aimed at developing safe

and skin diseases. The seeds are also considered as demulcent and nutrient and are used as antidote for poisons (Kirtikar et al 1933). The seeds have resins, glucose, metacresol, tannin,

GRAIN YIELD AND YIELD ATTRIBUTES OF BORO RICE AS AFFECTED BY CULTIVAR AND WEEDING REGIME IN HAOR AREA

S M Shaheen Anwar ^a, A A Mamun ^b, M. Nasim ^{c*} and H M Babar ^d

^aBSFIC, Dhaka, Bangladesh

^bDepartment of Agronomy, Bangladesh Agricultural University, Mymensingh, Bangladesh

^cRice Farming System Division, Bangladesh Rice Research Institute, Gazipur-1701, Bangladesh

^dCrop Diversification Programme, Khamar Bari, Farm Gate, Dhaka, Bangladesh

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An experiment was conducted in the farmers' field in the haor of Jawar village of Kishoreganj district, Bangladesh during the period November 1987 to April 1988. Three adjacent fields from three different farmers were taken for the experiment and each field was considered as a replication. Two factors included in the experiment were cultivar and weeding regime. The experiment was laid out in a split plot design where cultivars were assigned in the main plot and weeding regime in the sub plot. Results showed that BR3 produced the highest and Ketchli boro the lowest yield. Other five varieties commonly cultivated in the area yielded in between them and four of them had statistically similar yield. Cultivar and weeding regime interaction indicated that BR3 and Hazisail produced the highest yield under weed-free situation. Farmers' common weeding practice has the scope of further improvement.

Key words: Boro rice, Haor, Cultivar, Weeding regime.

INHIBITION OF NITRIFICATION IN SOIL BY BAYTHROID AND ITS COMPARISON WITH N-SERVE

Asma Lodhi^a, N N Malik^b and F Azam^{a*}

^aSoil Biology Division, Nuclear Institute for Agriculture and Biology, Faisalabad, Pakistan

^bInstitute of Chemistry, University of Punjab, Lahore, Pakistan

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In laboratory experiments, Baythroid (an insecticide produced by Bayer, West Germany) was compared with N-Serve (a well-known nitrification inhibitor) for its effect on the process of nitrification in soil. In one experiment, soil samples were incubated for 7 weeks at 30°C after treatment with Baythroid (0.4, 1.6, or 6.4 $\mu\text{g g}^{-1}$ soil) or with N-Serve (1.1, 4.4, and 17.6 $\mu\text{g g}^{-1}$ soil); 200 $\mu\text{g g}^{-1}$ soil N as ammonium sulphate was applied in all cases. Soil samples analyzed at different incubation intervals revealed significant inhibition of nitrification and accumulation of $\text{NH}_4\text{-N}$ due to both the chemicals and the effects increased with the rate of application. At lower levels of inhibitors, the effect was short-lived, while at higher levels limited amounts of $\text{NO}_3\text{-N}$ were observed after 7 weeks of incubation. N-Serve was found to be more inhibitory to nitrification as compared with Baythroid. In another experiment where soil samples treated with Baythroid (at 0.4, 0.8, 1.6, 3.2, or 6.4 $\mu\text{g g}^{-1}$ soil) and N-Serve (1.1, 2.2, 4.4, 8.8, or 17.6 $\mu\text{g g}^{-1}$ soil) were incubated for 10, 20 and 30 days prior to addition of N (200 $\mu\text{g g}^{-1}$ soil as ammonium sulphate), N-Serve was found to be more persistent in inhibiting nitrification as compared with Baythroid. It is proposed that some microbial processes, nitrification in the present case, could be used as an indicator of persistence of some xenobiotics.

Key words: Nitrogen, Soil, Nitrification inhibitor