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Physical Sciences

Pak J Sci Ind Res **42** *(5) 211-214*

TRACE ELEMENT STUDIES IN UROLITHIASIS; PRELIMINARY INVESTIGATION ON MIXED CALCIUM OXALATE-STRUVITE URINARY CALCULI

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In this study, the levels of the trace elements copper, zinc, lead, iron, aluminium, nickel, chromium along with magnesium, sodium and potassium were estimated in fifteen mixed calcium oxalate-struvite (CaOx/STR) urinary stones. The mean values of the combined results were, copper 4.24, zinc 1302.10, lead 23.25, iron 36.48, aluminium 28.83, nickel 0.69, chromium 1.93, magnesium 4530441, sodium 54.13 and potassium 5.93 ng mg^{-1}. It was observed that zinc, aluminium and potassium levels were higher than in calcium oxalate (CaOx) calculi $0.05 > P > 0.02$ and potassium levels were higher than in mixed calcium oxalate-hydroxy apatite (CaOx/APA) calculi, $P < 0.01$. A combination of all the results was also compared with similar data from South Africa, Turkey, Austria, India, U.S.A. and Japan.

Key words: Trace elements, Urinary calculi, Urolithiasis.

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MINERALOGICAL CHARACTERIZATION OF THE GLAUCONITIC SANDSTONE FROM CHICHALI FORMATION OF SURGHAR RANGE

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(Received 11 December 1994; accepted 30 January 1999)

Detailed mineralogical characteristics of the Chichali Formation glauconitic sandstone, as a possible source of K for crop production, were determined. It contained 66.8% sand (+50 µm), 19.6% silt (2-50 µm), 9.8% clay (<2 µm) size fractions. The sand and silt fractions were composed of dominantly quartz and mica. As determined by the total K analysis, the sand had 31% mica and the silt had 55%. Mica in the clay was about 52% as indicated by total K content. Also, the clay had 4% vermiculite and 11% smectite. Most clay particles were platy with difused boundaries. The interlayer space had a repeat distance of 10.2 Å as seen under the TEM at high resolution. The study suggests that clay fraction is a disordered glauconite. The presence of about 25% kaolinite indicates the K-deficient geo-chemical environment toward end of the glauconitization process.

Key words: Glauconitic sand stone, Minerological characterization, K content.

Pak J Sci Ind Res 1999 42 (5) 220-222

STUDY ON PHYSICAL PROPERTIES OF URINE-OXALIC ACID MIXTURE

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(Received 15 April 1993; accepted 19 February 1999)

Physical properties namely density, viscosity, surface tension and pH of oxalic acid-urine system have been Determined. The results may be summarized as (i) Density decreases with increase in concentration of oxalic acid in urine-oxalic acid mixture (ii) Surface tension first increases and then decreases with increase of oxalic acid (iii) Viscosity of urine-oxalic acid mixture increases and then decreases with increase in concentration of oxalic acid but viscosity of urine-oxalic acid mixture is lower than that of urine (iv) pH decreases with increase of concentration of oxalic acid in urine. (v) Temperature of mixing increases with increase of concentration of oxalic acid in urine. Since oxalic acid is well known for its stone forming tendency, its occurrence in urine in different proportions bears special significance. In view of these, physical properties measurements have been used to explain unusual behaviour of urine-oxalic acid system and intraction of urine with bladder interface.

Key words: Urine-oxalic acid, Physical properties, Density, Viscosity.

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CHEMICAL INVESTIGATION AND ELICITOR ACTIVITY OF POLYSACCHARIDE OF RED ALGAE *HYPNEA MUSCIFORMIS* AND *BOTRYOCLADIA LEPTOPODA*

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(Received 12 September 1995; accepted 6 March 1999)

Hypnea musciformis and *Botryocladia leptopoda* (red algae), collected from Karachi coast were studied for chemical investigation and elicitor activity. Ash content of *H.musciformis* was bit high (40%). Yields of High Molecular Weight Crude Elicitor Preparations HM.WCEP "Polysaccharides" of two algal genus were high (14-49%) in NaOH extracts. These HMWCEP were chemically analysed for total sugar protein, SO_4 group and uronic acid contents. Simple profile of monosaccharide consisting of galactose, glucose, fucose, mannose and galactoronic acid were detected in acid and aqueous extracts of *H. musciformis* and *B. leptopoda* respectively as compared to its alkaline extracts. Elicitor activity of HMWCEP was determined in terms of induced browning in *Cicer arietinum* (chick pea) tissues. A pronounced browning was produced by the samples treated with various extracts of *H. musciformis*. The response was low in the samples treated with various preparations of *B. leptopoda*.

Key words: Seaweed, Elicitor, Phytoalexin, Browning.

Pak J Sci Ind Res 1999 42 (5) 227-229

DISTRIBUTION OF SORBIC ACID IN OIL-WATER AND OIL-WATER-SURFACTANT OF DODECYL TRIMETHYL AMMONIUM-BROMIDE (DoTAB) SYSTEMS

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The influence of synthetic surfactant or emulsifier dodecyltrimethyl ammonium-bromide (DoTAB 0.4M) on the distribution of sorbic acid (2.5-40 mM) was studied in oil (non-aqueous phase) and water (aqueous phase). The study was conducted in two model systems, oil-water, and oil-water-DoTAB (pH 2, temp 25°C). in oil water maximum solubility of sorbic acid in water was 22-28%, while in oil water-DoTAB the distribution in the aqueous phase was increased to 74-80% due to the presence of surfactant micelles. Foods are multiphase system, where microorganisms exist in the aqueous phase and a large part of sorbic acid is distribute in non-aqueous phase. This investigation suggests that the presence of food emulsifiers in food can increase the distribution of sorbic acid in aqueous phase.

Key Words: Sorbic acid, Oil water surfactant, Dodecyltrimethyl ammonium bromide (DoTAB)

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STUDIES ON LYARI RIVER EFFLUENT

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The study was aimed at determining the physical (TS, TSS, TDS, TVS) and chemical (Cl, SO_4, NH_3, BOD_5, COD, DO) characteristics as well as heavy metals present in the Lyari river effluent so as to identify the extent of pollution. The average results of each parameter of twelve different sites were compared with that of the National Environmental Quality Standards (NEQS). BOD_5 and COD levels were well above the NEQS while the NH_3-N concentration was low. Concentrations of Cd and Zn were within the range while that of Pb, Cr, Ni and Cu were higher than the NEQS at times. This indicates that heavy pollution load is entering into the Arabian Sea creating tremendous harm especially to marine life.

Key words: Pollution, Waste water, Lyari river.

Pak J Sci Ind Res **42** *1999 (5) 236-241*

MIXED MONOTONICITY THEOREMS FOR A SYSTEM OF ABSTRACT MEASURE DELAY INTEGRO-DIFFERENTIAL EQUATIONS

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In this paper the existence of extremal solutions of a system of nonlinear abstract measure delay integro-differential equations is established using the fixed point theorem of Tarski. Two basic integro-differential inequalities are obtained which are further applied to prove the boundedness and uniqueness of the solution of related abstract measure delay integro-differential equations.

Key words: Monotonicity theorems, Integro differential equations, Fixed point theorem.

Pak J Sci Ind Res 1999 **42** *(5) 242-243*

COMMON FIXED POINT THEOREMS IN 2-METRIC SPACE

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The object of this paper is to prove a fixed point theorem of Singh and Meade type (1977) in 2-metric space.

Key words: Fixed point theorems, Housdroffmetric, 2-Metric space.

Biological Sciences

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AN INTEGRATED APPROACH FOR GUAVA WILT CONTROL

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(Received 2 November 1997; accepted 5 April 1999)

Four varieties of guava (*Psidium guajava*) plants were treated against wilting. Integrated cultural practices and chemical measures for control of wilting were comparatively evaluated. Manuring with N, P, K and $ZnSO_4$, pruning of wilted twigs, bandaging wounds with Ridomil paste and drenching of rhizosphere soils with nematicide were found to be the best among the treatments given. Continuous treatments at 15 days interval helped in survival of the plants, which shot new leaves and shoots after 8-9 months. Deshipeyara were well protected with these treatments than vars. viz. Kazipeyara, Sarupkatti and Mukundhupuri. Integrated method of control arrested the wilting of young guava plants.

Key words: Guava wilt, Integrated control.

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FATTY ACID AND LIPID COMPOSITION OF GERMINATED SEEDS OF *CITRULLUS COLOCYNTHIS*

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The seeds of *Citrullus colocynthis* were germinated in the dark at 30°C and the variations in the lipid class and fatty acid composition of primary roots and the respective cotyledons at 5 mm to 30 mm root length were studied. During germination the relative amounts of triacylglycerols decreased while free fatty acids increased continuously in significant amounts. Polar lipids also increased with the increase of root length. Saturated fatty acids increased (except lauric acid) whereas the unsaturated fatty acids decreased gradually during the course of germination.

Key words. *Citrullus colocynthis,* Germinated seeds, Fatty acids, Lipid classes.

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Effect of Sowing Date on the Yield and Yield Components of Short Duration Pigeonpea

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(Received 3 November 1996; accepted 22 June 1999)

In a 2-year field trial conducted at Ishurdi, short duration pigeonpea (*Cajanus cajan* L. Milisp.) responded to the sowing date (15 March, 15 April, 15 May, 15 June, 15 July, 15 August, 15 September, 15 October, 15 November and 15 December). The highest yield was obtained from 15 September sowing, which also produced the highest number of pods per plant and 1000 seed weight. Conpared with the sowing date of 15 September, other dates reduced the yield by 22.8 to 207.3%. Days to flowering, days to maturity and plant height declined almost linearly with the progress of sowing dates. September was the optimum time of sowing.

Key words : Sowing date, Yield components, Pigeonpea, *Cajanus cajan.*

Pak J Sci Ind Res 1999 42 (5) 260-272

EFFECTS OF NaCl AND $CaCl_2$ ON CALLUS TISSUE OF *GOSSYPIUM HIRSUTUM* L. CV. ACALA SJ2

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The interactive effect of NaCl and $CaCl_2$ on the leaf and petiole-derived calli of Acala SJ2 *(Gossypium hirsutum. L.)*grown on Murashige and Skoog (1962) tissue culture medium was studied. Relative growth rate was used to assess the tolerance. NaCl reduced growth rate while calcium partially ameliorated the effects of NaCl. Water content of the callus decreased significantly with increasing salinity levels in the culture medium while reverse was true at high calcium level. NaCl resulted in higher Na^+ and lower K^+ and Mg^{+2}. The reverse was true for calcium up to 30 mol m^{-3}. C^{+2} concentration decreased with increasing salinity but increased at higher calcium levels. Cl^- contents increased with increasing salinity and calcium levels in the medium. NO^-_3, SO_4^{-2} and PO_4^{-3} were unaffected by salinity. In both kinds of callus, the highest calcium (up to 60 mol m^{-3}) and salinity (200 mol m^{-3}) levels increased proline accumulation. The correlation between relative growth rate and proline concentration was -0.98 (leaf callus) and -0.97 (petiole callus). The results suggested that salinity reduced the callus growth while calcium ameliorated its toxic effects. Proline acted as a compatible solute. The callus cultures from different explant sources of the same genotype behaved differently *in vitro*.

Key words : Salinity, Calcium nutrition, Callus tissue, *Gossypium hirsutum.*

Pak J Sci Ind Res 1999 42 (5) 273-275

EFFECT OF WEEDING ON THE YIELD OF WHEAT

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(Received 28 October 1996; accepted 29 June 1998)

A 2 year field experiment was conducted at the Regional Agricultural Research Station of BARI, Ishurdi during November to March 1991-92 & 1992-93 with eight weeding treatments such as continuous weeding (control), weed free upto 20, 30 and 40 days after emergence of crop, no weeding, weeding after 20,30 and 40 days after emergence of crop. The main infesting species of weed was *Cyperus rotundus*. The grain yield and yield components were significantly influenced by weed competition treatments. The greater the weed competition period, the greater was the crop loss. The critical period of weed competition ranged from 20 to 30 days after emergence. The grain yield losses due to unrestricted weed growth throughout the crop cycle was 25.7%.

Key words: Weeding, Yield, Wheat.

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EFFECT OF CCC SEED TREATMENT ON THE GROWTH OF RICE AND WHEAT

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Effects of CCC seed treatment on the growth of rice and wheat seedlings were assessed in controlled conditions. Seeds were soaked for 24 h in 0, 10, 25, 50, 100 and 200 ppm CCC solutions. The growth of rice seedling, particularly the number of axes was enhanced significantly by CCC, maximum enhancements being caused by higher concentrations of 100 and 200 ppm. The number of laterals and total root length of rice seedlings was also increased considerably. In contrast, shoot as well as root growth of wheat was suppressed by the CCC treatment. With an increase in CCC concentration, a corresponding and highly significant retardation in shoot height and shoot and root dry weight of wheat seedlings was observed.

Key words: Seed treatment, Rice, What, CCC.

Pak J Sci Ind Res 1999 42 (5) 279-281

GENOTYPE-ENVIRONMENT INTERACTION AND STABILITY PARAMETERS FOR PADDY YIELD

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Six rice genotypes were evaluated for paddy yield across five locations during 1993. The differences among rice genotypes and locations were highly significant. Genotype x location interaction was also highly significant. Stability analysis showed that rice genotypes, Super Basmati (4048) and Basmati 385, were stable for paddy yield because of mean yield greater than grand mean yield, regression coefficient near unity and small deviations from regression (S^2d). S^2d was significant for all genotypes except for 4048 and Basmati 385. The rice line 4439 with maximum mean paddy yield (4926 kg ha^{-1}) across locations, was found to be suitable in Nuclear Institute for Agriculture and Biology, Faisalabad (NIAB) and Gujranwala environments.

Key words: Stability analysis, Rice, Yield, Location.

Short Communication

Pak J Sci Ind Res 1999 42 (5) 282-283

SEASONAL VARIATION IN THE COMPOSITION OF ESSENTIAL OIL OF *EUCALYPTUS CAMALDULENSIS* FROM PAKISTAN

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Technology

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POND PRODUCTION OF THE FRESHWATER PRAWN, *MACROBRACHIUM MALCOLMSONII* IN SINDH, PAKISTAN

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(Received 2 October 1996; accepted 6 January 1999)

Freshwater prawn, *Macrobrachium malcolmsonii* (Milne Edwards) was cultured at two sites in Thatta, Sindh. The juvenile prawns were collected randomly from the lower belt of river Indus at Hilaya, were sorted and stocked in two ponds at Mirpur Sakro and two at Chilya after acclimatization. They were fed supplementary feed containing about 19% protein once daily. Hydrological characteristics (Dissolved Oxygen, pH and Temperature) of ponds were recorded regularly. The stocked prawns grew from a mean weight of 3.5, 3.5, 8.0 and 5.0 g to 55, 61, 63 and 30 g in 251, 142, 253 and 147 days respectively, under the conditions described herein. A production level of 765, 658, 754 and 217 kg ha^{-1} respective to each pond was achieved.

Key words: Prawn aquaculture, Ponds, Pakistan.

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COMPUTER AIDED DESIGN OF OVERHEAD CRANE IN HEAVY MECHANICAL COMPLEX

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(Received 26 October 1995; accepted 26 May 1999)

HMC is playing vital role in country-wide proliferation of the technology. It is involved in designing and manufacturing of various plants and heavy machinery. Cranes are also included in the HMC manifold. This paper explains the methodology of converting the conventional design process of overhead cranes to Computer Aided Design (CAD), software engineering approach and the usage of different tools in order to get a computer based solution for the design of overhead cranes. Applications of parametric design and design for manufacturing concepts may also be seen. The main idea is to automate the drafting process by linking it to design and analysis phase.

Key words: CAD, Overhead crane, Customization.

Short Communication

Pak J Sci Ind Res 1999 42 (5) 293-294

EFFECT OF DIFFERENT MODELS OF RING SPINNING FRAMES UPON TENSILE PARAMETERS OF 23'S POLYESTER/ COTTON BLENDED YARN

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Review Article

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AGROECOLOGY OF MAJOR CROPS AND THEIR WEEDS IN BANGLADESH

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(Received 16 October 1997; accepted 9 July 1999)

The climate, soil types, agricultural seasons and the major crops of Bangladesh are briefly introduced. The interaction of crop duration and the climatic factors are graphically presented. Agroecological conditions over which the major crops and their associated weeds are grown have been mentioned. The important weeds of major crops are commented on and a crop-wise list is appended. The species of great importance common to the whole country include *Cyperus rotundus, Cynodon dactylon, Echinochloa crusgalli, Echinochloa colonum, Chenopodium album, Fimbristylis miliacea, Cyperus iria* and *Eicchornia crassipes*. Two parasitic weeds newly introduced in the country, *Striga densiflora* and *Orobanche indica* are causing severe damage to sugarcane and mustard respectively.

Key words: Weed-list, Crops, Agroecology, Bangladesh.