ISSN 0030-9885
Coden: PSIRAA 38 (8) 283-332 (1995)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 38, No. 8, August 1995

Published monthly by

Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 38, no. 8, August 1995

RESEARCHES ON CHEMICAL, MINERALOGICAL AND BACTERIAL ANALYSIS OF BHOLARI SAND

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(Received September 16, 1993 ; revised March 7, 1995)

Bholari is a small village situated near Kotri, in province Sindh of Pakistan. It contains huge deposits of SiO_2 sand which are extensively utilized in sand moulding, both for ferrous and non-ferrous castings (specially at T & T Foundry, Kotri). Earlier no proper work is carried out on moulding properties of Bholari sands. Authors have collected the samples from the site and have studied the moulding properties, analysis and bacterial hazards, both alone and mixture with molasses, a common binder of moulding sands. It is concluded that although this sand can not be recommended as natural bonded sand because it contains very little amount of clay (< 0.5%) but it can be used as moulding material after addition of 5-8% clay, 1.5% water and an adequate quantity of additives e.g. molasses. The bacteria - culture investigation carried out at Veterinary Research Institute, Lahore shows no growth in the sand and its mixture with molasses, hence, the foundrymen working with this sand remain free pollution created by gases and SiO_2 dust evolved during moulding, from any bacterial hazard.

Key words: General moulding sand, Bholari sand, Bacterial hazards.

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BULK COPOLYMERIZATION OF ACRYLAMIDE AND MALEIC ANHYDRIDE UNDER UV RADIATION

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(Received April 4, 1994 ; revised March 16, 1995)

Bulk copolymerization of acrylamide and maleic anhydride in the presence or absence of benzoyl peroxide was accomplished under UV radiation at a temperature 48± 1°C below the melting points of monomers. The results indicate that the rate of formation of copolymers increases with increasing concentration of acrylamide and benzoyl peroxide enhances the rate of copolymerization appreciably. Monomer reactivity ratios were determined experimentally using the rearranged form of copolymer composition equation. Molecular weight of the product show that the copolymer prepared under uv-irradiation carry small chain ($\overline{Mn}$ = 480 - 3555). All copolymer samples are light yellow solid substances that become light brown at 200°C.

Key words: Viscosity, Jone-Dole parameters, Root equation.

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STUDIES ON GRAFT COPOLYMERIZATION OF METHYLMETH-ACRYLATE ONTO CASEIN

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(Received September 18, 1994 ; revised May 25, 1995)

The graft copolymerization of polymethylmeth-acrylate onto casein has been investigated using potassium persulfate initiator in aqueous medium. The effects of monomer, backbone and ascorbic acid (as activator) have been discussed in the light of percent grafting (GR), grafting efficiency (GE)and rates of Rg, Rp, Rh. The proof of grafting has also been established.

Key words: Graft copolymerization, Methylmeth-acrylate, Potassium persulfate, Activator.

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EFFECT OF CALCIUM CHLORIDE IN VAPOUR LIQUID EQUILIBRIA OF THE SYSTEM 1,4 DIOXANE-WATER

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(Received July 5, 1993)

A precise knowledge of vapour liquid equilibrium data is required in the design of distillation columns. In the present study an attempt is made to find out the effect of calcium chloride on the vapour liquid equilibrium of the system 1,4 dioxane-water at atmospheric pressure of 760 ± 1 mm Hg. It was observed that the calcium chloride is helpful in shifting the azeotropic concentration. Linear relationships were developed between the relative volatilities and concentrations of calcium chloride.

Key words: Salt effect, Vapour liquid, Equilibria, Extractive distillation.

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A STUDY OF POTENTIAL LABELS FOR FLUORESCENT DERIVATISATION REACTIONS WITH PROTEINS

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(Received September 16, 1992, revised July 10, 1995)

The suitability of the newly synthesised polycylic aromatic dialdehydes as labels to form fluorescent derivatives has been examined. The fluorescence properties of the derivatives such as the reaction time, stability, antigen-antibody reaction and inner filter effect have been investigated. The change in fluorescence properties of the labelled protein forms the basis of a fluorescence method for the determination of biotin.

Key words: Fluorescent derivatives, Potential labels, Polycyclic aromatic dialdehydes.

Biological Sciences Section

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STUDIES ON BIODEGRADABLE ORGANIC FERTILIZING POTS AND CROP ESTABLISHMENT

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(Received March 18, 1993; revised April 23, 1995)

Uniform and healthy growth in seedlings is a critical step. Mortalities and growth set-back due to transplantation failure is a common phenomenon. Availability of farmyard manure and agro-wastes in abundance has been taken into consideration for making different categories of biodegradable organic pots. Pots trials were conducted to determine the effect of different ratios of farmyard manure and agrowastes on the growth of plants. A histogram has also been provided to show the comparative growth of plants after six months set and biodegradation in the soil. The best result was achieved in 40% farmyard manure pots as compared to 35 and 30% farmyard manure pots. These pots yielded the greatest number of seedlings. The C/N ratio in 40% composition was found favourable as it represented the balanced pH and organic matter. In control set the growth of plants was stunted, under nourished and chlorotic.

Key words: Biodegradable organic pots, Crop establishment, *Casuarina equisetifolia*.

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EFFECT OF POLYMERS ON GERMINATION, PLANT HEIGHT AND PERMANENT WILTING POINT OF MAIZE (*ZEA MAYS* L) AND SOYBEAN (*GLYCINE*) *MAX*

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(Received August 30, 1993 ; revised July 18, 1995)

The study was conducted on sand and clay loam soils in the laboratory to evaluate the influence of soil conditioners on crop characteristics. Organic manure (farm yard manure), aquasorb and terrasorb were tested at 0.5 and 1% lvels. Maize (*Zea mays* L) and soybean (*Glycine max*) crops were grown. The highest germination of maize and soybean was in 1% treated sand. The response of maize seed germination in clay loam was lower compared to that of sand. Emergence of maize was more compared with that of soybean on clay loam. The height of maize plants was greatest in 1% aquasorb-treated clay loam soil whereas height of soybean plants was greatest in 1% terresorb treatment. The polymer treatment gave a significatnly greater height of plants on clay loam than on sand. Longest duration of maize plants survival was in 1% aquasorb-treated clay laom (16.3 days). Soybean seedlings survived for a maximum period of 30 days and 39 days in 1% aquasorb-treated sand and 1% aquasorb-treated clay loam soils, respectively. In summary, the polymers had a marked influence on increasing germination, plant height and survival of both maize and soybean on sand and clay loam soils.

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EXTRACTION BEHAVIOUR OF COPPER LIGNOCAINE COMPLEX.

Application for Determination of Lignocaine

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(Received October 12, 1993 ; revised March 7, 1995)

The extraction behaviour of coloured copper lignocaine complex was investigated. An organic solvent with medium dielectric constant (n-butanol) was chosen to extract the complex. A new procedure was suggested for the determination of lignocaine. It is based on the formation of coloured complex in alkaline medium (pH 10) followed by its extraction with n-butanol. The absorbance of organic layer is measured at 570 nm. Alternatively, determination of copper content of n-butanol extract via atomic absorption spectroscopy provides an indirect method for the determination of lignocaine. Both methods were applied to the analysis of pharmaceutical preparations with fair accuracy.

Key words: Solvent extraction of Cu-lignocaine complex, Spectrophotometry, Atomic absorption spectrophotometry (AAS).

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COMPARATIVE ELEMENTAL CONTENTS (Cu, Ca, Zn, K, Mg, Ni, Fe AND Cd) OF SEVEN VARIOUS EDIBLE TUBERS IN NIGERIA

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(Received October 23, 1993; revised June 19, 1995)

Seven different types of popular tubers consumed in Nigeria have been analysed for their elemental composition. Metals that were investigated include Ca, Cu, Zn, K, Mg, Na, Ni, Fe, and Cd. Results obtained showed that samples contain high amount of potassium and sodium; moderately low amount of magnesium and calcium, while zinc, iron, nickel and cadmium were present at trace levels. Amount of zinc in most samples was found to be about 34 times higher than the amount of cadmium. This was found to be an advantage in masking Cd-induced hypertension in some mammals.

Key words: Edible tubers, Nigeria, Elemental contents, Atomic absorption spectrophotometer.

Pak. j. sci. ind. res., vol. 38, no. 8, August 1995

DATURA METEL L. A PLANT WITH NEMATICIDAL POTENTIAL

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(Received October 31, 1993 ; revised May 31, 1995)

Nematicidal activities of *Datura metel* L. leaves extracted in various solvents were tested. A sample of total alkaloids content and a sample of hyoscine extracted from *D. metel* leaves were also assayed for their nematicidal action. *Hoplolaimus indicus* (Sher, 1963), *Helicotylenchus multicinctus* (Cobb, 1893; Golden, 1956) and *Meloidogyne incognita* (Kofoid and White 1919; Chitwood, 1949) were selected as test nematodes. It has been observed that total alkaloids showed 90-100% mortality for all the test nematodes, whereas hyoscine was effective only against *Hoplolimus indicus*, showing 90% mortality.

Key words: *Datura metel* L., Total alkaloids, Nematodes.

Technology Section

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MANUFACTURING OF FISH SAUCE BY PROTEOLYTIC ENZYMES

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(Received August 11, 1993; revised January 19, 1995)

Different fish samples : sardine, macaroni, bourri, bolti and shark were used for the preparation of fish sauce. The applied proteolytic enzymes were: papain, trypsin, ficin and bromelain. Ripening periods were extended for 180 days at 37°. Changes in pH values, total soluble nitrogen (TSN), amino nitrogen (AN), volatile basic nitrogen (VBN), volatile organic acids (VOA) and in the free amino acid during fermentation period were considered in sardine; while the other fish samples were analyzed only before and by the end of fermentation period. The statistial analyses were used for comparing between the obtained results. the available data assured in the production of fish sauce rather than the other investigated enzymes. Such conclusion was based on regression analysis from which the added enzymes could be ascendingly ordered with respect to amino nitrogen of sardine sauce as follows: papain, R^2=0.725; trypsin, R^2 = 0.7629; bromelain, R^2=0.8219 and ficin, R^2=0.8975.

Key words: Fish sauce, Proteolytic enzyme, Sardine.

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PRODUCTION OF MARINE CHEMICALS IN PAKISTAN
Part IV. Optimization of Parameters for the Production of Light Weight Magnesium Carbonate from Sea Bittern

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(Received September 23, 1993 ; revised April 5, 1995)

Sea bittern can serve as a basic raw material for the production of light weight magnesium carbonate. Experiments have been carried out to optimize various parameters which affect the bulk density of the product. It has been observed that the rate of agitation and the concentration of reactants are the controlling factors. Choosing as suitable combination of the rate of agitation (280/560 rpm) and the concentration of reactants (Mg^{++} 20-25 gml^{-1}), (Na_2CO_3 250-265 gml^{-1}), light weight magnesium carbonate of bulk density 0.1-0.125 gml^{-1} can be prepared which is in demand in the local market.

Key words: Sea bittern, Magnesium carbonate, Parameters.

Short Com

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Analytical Studies on Biologically Active Compounds. *Part II.* Separation and quantitation of mixtures of isatin derivatives for application to metabolism studies

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(Received November 22, 1993; revised June 5, 1995)