ISSN 0030-9885
Coden: PSIRAA 32(8)507-578(1989)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 32, No. 8, August 1989

Published monthly by

Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 32, no. 8, August 1989

DISSOCIATION ASPECT IN SOLVENT EXTRACTION OF METALS

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(Received October 8, 1986; revised October 24, 1988)

The extraction of a single component (copper) from the aqueous solution with calcium salt of di-(2-ethylhexyl) phosphoric acid diluted in kerosene has been investigated. The equilibrium studies showed that the distribution of metals in conjugate phases is dependent not only on their distribution constants but it also dependent on their dissociation constants. A theoretical model has been proposed to predict the effect of various metal ions concentration on the solvent extraction process.

Key words: Dissociation constant, Electrical neutrality, Reflux action.

Introduction

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SYNTHESIS AND BIOLOGICAL TESTING OF 2,3-DIHYDRO-3-ARYLHYDRAZONO-4-METHYL-1H-1,5-BENZODIAZEPIN-2-ONES, AS POTENTIAL PSYCHOSEDATIVE AND ANXIOLYTIC AGENTS

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(Received April 17, 1989; revised August 27, 1989)

Condensation of (o) phenylenediamine with different ethyl α-arylhydrazono-β-oxobutyrates under neutral, acidic or basic condition is described. A series of 2,3-dihydro-3-arylhydrazono-4-methyl-1H-1,5-benzodiazepin-2-ones was synthesized. The IR and ^1H NMR of some selected compounds are reported. The preliminary biological testing showed that some of the prepared benzodiazepinones possess promising CNS depressant activity.

Key words: 1,5-Benzodiazepin-2-ones, 2-Methylbenzimidazole, CNS depressants.

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THE DETERMINATION OF MAJOR, MINOR AND TRACE ELEMENTS IN TEA, TEA LIQUOR, INSTANT COFFEE AND COCOA SAMPLES

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(Received September 15, 1988; revised March 22, 1989)

Tea, coffee and cocoa samples used as common beverages were analysed for major and micro elemental constituents using inductively coupled plasma emission spectrometer. The possible uptake of certain elements by the human body from tea infusion has also been determined. The reliability of the analytical results was ascertained by comparing the analytical results for the NBS Standard Reference Material Orchard leaves (SRM No. 1571) with the values given by the NBS.

Key words: Tea, Trace elements, Spectrometry.

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SYNTHESIS OF SOME BENZOXAZOLONE GLYCOSIDES

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(Received April 17, 1989; revised July 17, 1989)

Benzoxazolone glycosides, containing ribofuranosyl 2'-deoxyribofuranosyl, galactopyranosyl and glucopyranosyl moities have been synthesised by condensation of silylated benzoxazolones with appropriately substituted sugars using stannic chloride in dichloroethane. The structures and anomeric configurations of these new glycosides have been assigned using ^{1}H-NMR spectroscopy.

Key words: Benzoxazolone, Glycosides, NMR

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INVESTIGATIONS ON BUILDING MATERIALS
Part II. Evaluation of Quality of Red Bricks Available in Lahore Region

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(Received December 31, ; revised July 1, 1989)

Red bricks available in the Lahore region were evaluated for their suitability in construction through determination of properties such as dimentions, crushing strength, porosity, bulk density, water absorption and soluble salts. Most of the bricks available are sub-standard in dimentsions by 24%. 80-90% of them are below the minimum limit of compressive strength and hence load-bearing capacity 65% of them have been found to contain soluble salts in excess of the tolerable limits. The porosity, bulk density and water absorption data also suggest that only 10-15% samples conform to specifications. The substandard quality is attributed to lack of control on raw material, labour and preparation procedures.

Key words: Building materials, Bricks, Clay loam, Soil.

Biological Sciences Section

Pak. j. sci. ind. res. vol. 32, no. 8, August 1989

PRESENCE OF AFLATOXIN B_1 IN THE SHELLED PEANUTS IN KARACHI

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(Received March 29, 1989; revised July 30, 1989)

A preliminary survey conducted for the presence of aflatoxin in peanuts available in the city of Karachi, during 1977-1986, revealed that out of 512 samples analysed 158 (31%), were contaminated with aflatoxin B_1. Most of the samples contained high amounts of aflatoxin B_1 (above 100 µg/kg) and, therefore, can be hazardous for human health. The highest amount detected was 723 µg/kg.

Key words. Aflatoxin B_1, Peanuts, *Aspergillus flavus*.

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ON THE EFFECT OF AFLATOXIN ON LIPID METABOLISM IN THREE STRAINS OF BROILER CHICKEN

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(Received October 10,1988; revised July 31, 1989)

Presence of 250 ug aflatoxin B_1 /kg feed caused a decrease in the liver weight of all the three strains of broiler chicken by the end of the first week. During the second week however, the liver weight started increasing and by the end of the third week, the increase in weight became more pronounced as compared to the controls. Reverse was the case with serum lipid and serum cholesterol. Possible reasons for these changes are discussed.

Key words: Aflatoxin, Chicken serum lipids, Serum cholesterol, Liver weight.

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COMPARATIVE STUDY OF VARIOUS TREATMENTS TO MINIMIZE THE EFFECT OF AFLATOXINS IN BROILER FEEDS

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(Received March 15, 1989; revised June 8, 1989)

An investigation was undertaken to compare various nutritional and preventive treatments to minimize the effect of aflatoxin (B_1) on the performance of broiler chicks. Ration A without aflatoxin served as control while toxin infested maize grains (16 ppm) were used in 5 other rations. Rousselet vitamin-mineral premix (250g/100kg), $CuSO_4$ (40g/100kg) and Altic (100g/100kg) were used in C, D and E rations to combat the effect of aflatoxin. Another ration F had high plan of nutrition i.e. high protein and high energy besides infested grains. Significantly higher weight gain was observed in the group of birds fed control ration, compared with aflatoxin infested rations. There was no difference between ration A and F in respect of feed consumption while they differed significantly from other rations. No significant difference among various rations was observed in respect of feed efficiency values.

Key words: Aflatoxin, Broilers, Nutrition.

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SCREENING OF BACTERIAL ISOLATES PRODUCING PENICILLIN G ACYLASES

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(Received April 6, 1989; revised August 5, 1989)

The stream water, soil and plant organs, leaves and petals were screened to obtain bacterial isolates that may produce good to excellent amount of penicillin G acylase. Stream water and soil proved promising sources in providing *Escherichia coli* strains that produced fair to good amount of penicillin G acylase, however; each of these strains also produced betalactamase together with penicillin G acylase. The bacterial isolates from plant habitats, leaves and petals; were found poor in producing penicillin G acylase but were quite good in producing betalactamase activity. Penicillin G acylase producing isolates were not so wide spread as betalactamase bioactivity.

Key words: Penicillin G acylase, Bacterial isolates.

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MICRO-NUTRIENT FORMULATIONS FOR AGRICULTURE
Part I. Copper and Chromium Preparations

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(Received December 31, 1988; revised July 10, 1989)

Production of micronutrient carriers and their evaluation by controlled leaching of trace elements is described. Three sets of formulations have been prepared by mounting copper and chromium oxides separately on sintered, fritted and nonfritted compositions. They have been subjected to extraction with ammonium citrate solution and the release of metal monitored by using an atomic absorption spectrograph. The results show that released of copper can be controlled in the range of 2.45-5.74 and 18.75-19.60 ppm while that of chromium can be limited to 0.068-0.43 and 0.247-2.09 ppm by using fritted, sintered and non-fritted compositions respectively, large and instantaneous quantities of the two metals can be obtained by using nonfritted compositions. In both cases, the released of chromium is much smaller than that of copper.

Key words: Micro-nutrient, Agriculture, Copper, Chromium.

Pak. j. sci. ind. res., vol. 32, no. 8, August 1989

EFFECTS OF CEMENT DUST ON THE CHLOROPHYLL CONTENTS, STOMATAL CLOGGING, AND BIOMASS OF SOME SELECTED PLANTS

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(Received March 12, 1987; revised June 6, 1989)

Effects of cement dust emaniting from an adjacent cement factory on anatomical and physiological aspects of *Citrus medica, Mangifera indica, Ficus religiosa, Eriobotrya japonica, Albizia lebbeck, Psidium guagava, Jasminum grandiflorum, Ligustrums lucidum. Ipomoea carnea, Canabis sativa* and *Malva sylvestris* were investigated during March, 1985. In polluted plants leaf area and biomass was lower. Chlorophyll "a" was effected, chlorophyll "b" was higher while stomata were clogged and moisture content were lower. The plants in the polluted environment apparently looked unhealthy.

Key words: Cement dust, Stomatal clogging, Biomass, Pollutions on selected plants.

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NUTRITIONAL QUALITY OF MUSTARD PROTEIN CONCENTRATE

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(Received March 28, 1989; revised August 1, 1989)

Enzymic treatment followed by steeping in 4% NaCl solution at pH 5 reduced the glucosinolate content to traces and eliminated 85.7% of phytic acid content of mustard meal. Low fibre, low phytate, glucosinolate free mustard protein concentrate (MPC) contained 53.5% protein, 6.1% crude fibre, 5.8% ash and 0.4% phytic acid. The nutritional quality of protein in MPC was assessed by rat bioassay. PER (2.4), NPU (68.5%), TD (87.0%) and BV (78.4%) of the mustard protein was found comparable to casein. The results suggest that MPC could be incorporated in foodstuffs.

Key words: Glucosinolates, Phytic acid, Protein.

Introduction rats (Sprague Dawley strain) weighing 30-32 g each. The

Short Communication
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CALLUS FORMATION FROM THE MESOCARP TISSUE OF *PISTACIA VERA* L.

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(Received January 12, 1989; revised August 7, 1989)

Technology Section

Pak. j. sci. ind. res., vol. 32,no. 8, August 1989

UPGRADATION OF KALABAGH IRON ORE BY HEAVY LIQUID AND FLOTATION TECHNIQUES

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(Received June 25, 1987)

The possibility of the beneficiation of Kalabagh iron ore was indicated by heavy liquid separation tests. The maximum grades of 51.7- 61.0% Fe with 4.5-13.0% SiO_2 was potentially obtainable from different horizons of the ore seams in Chichali area. Fatty acid flotation with sodium silicate and aluminium chloride as depressant produced in concentrate with 38.1% Fe and 6.1% SiO_2. The concentrate on pelletization and in duration at 1350° gave a concentrate with 55% Fe, 8.8% SiO_2 3.4% CaO and 2.4% MgO.

Key words: Kalabagh iron ore, Concentration, Flotation techniques.

Pak. j. sci. ind. res., vol. 32, no. 8, August 1989

BENCH SCALE AND PILOT PLANT BENEFICIATION OF CHICHALI IRON ORE

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(Received August 4, 1987, revised August 10, 1989)

The Chichali iron bearing material contains 32 percent Fe, 22.4% SiO_2, 5.8% Al_2O_3, 3.0% CaO, 3.2% MgO, 2.34% K_2O, 1.58% S and 0.34% P. The ore tends to disintegrate on wet grinding producing excessive amount of slime. The material has bond work index of 11 to 14. Controlled grinding of the ore in a rod mill in close circuit with a hydrocyclone produced 20 percent slime (-20 micron) and 27-29 percent fine (-250 mesh) fraction. Desliming was effectively carried out in a hydroclassifier using 200 g/t sodium silicate as dispersant and 250 g/t sodium hexametaphosphate as depressant for silicates. The deslimed sand was floated in bench flotation cell (Denver D 12) and in a sub pilot plant (a bank of 4 cells, Denver No. 12).

Tall oil fatty acid at 500 g/t was found to be an effective collector for the iron minerals. The rougher concentrate after cleaning was passed through a high intensity wet magnetic separator (ERIEZ). The cleaner concentrate containing 40.67 percent Fe and 6.82% SiO_2 corresponding to 51.68 and 12.57 percent recovery of Fe and SiO_2 respectively. The concentrate on pelletization and induration yielded 56.5 percent Fe, 8.5% SiO_2, 3.4% CaO, 2.4% MgO, 0.16% P and 0.12% S.

Key words: Beneficiation, Chichali, Iron Ore.

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DEVELOPMENT OF A PROCESS FOR THE PREPARATION OF SOY CURD (TOFU)

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(Received January 4, 1988; revised July 20, 1989)

Various conditions for the preparation of soymilk from soybean such as bean water ratio, total soluble solids have been worked out. Effect of concentration, coagulation temperature and nature of coagulant used have been optimised. The coagulant used were calcium sulphate, Magnesium sulphate, calcium chloride, citric acid, lactic acid and acetic acid. The product prepared by coagulation with calcium sulphate gave maximum yield of protein 32.1% and fat 7.9% (dry basis). All the products were subjected to analytical and organoleptic evaluations. The product prepared by calcium sulphate coagulation method was highly acceptable.

Key words: Processed soy products.

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UTILIZATION OF ORANGE WASTE IN POULTRY FEED

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(Received May 2, 1989; revised August 2, 1989)

Sun dried orange waste (O.W.) contained 10.78% protein, 22.34% neutral detergent fibre (NDF) and 44.38% total soluble nutrient (TSN). Upto 12% of the dried material replaced rice polishing from the control feed on protein-caloric equivalent basis. Weight gain of broiler chicken was improved by replacement of dietary rice polishing by dried orange waste. However no significant difference was observed in case of feed intake, feed efficiency and dressing percentage.

Key words: Orange waste, Rice polishing, Poultry feed.

Pak. j. sci. ind. res., vol. 32, no. 8, August 1989

UTILISATION OF YELLOW NUTSEDGE TUBER FOR COMPOSITE FLOUR

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(Received November 2, 1988; revised June 16, 1989)

Composite flour made up of yellow nutsedge tuber, wheat, and soybean has been employed in the baking of cake and biscuit samples. These confectionery products were subjected to quality tests and taste panel evaluation. Results obtained showed that acceptable cake and biscuit could be baked from a recipe containing up to 50% yellow nutsedge tuber flour, 40% wheat flour and 10% soybean flour. Considerable interest was generated by the chocolate appearance and cake quality of 100% yellow nutsedge flour from the taste panelists, even though, the 100% yellow nutsedge flour cake ranked lowest in the average task panel scores. Cake and biscuits samples baked from up to 20% and 40% substitution with yellow nutsedge flour were preferred and ranked superior among others. Availability of yellow nutsedge tuber in its areas of distribution and factors which might work against its utilisation for confectionery products is discussed.

Key words: Cyperus esculentus, Yellow nutsedge and Composite flour.

Pak. j. sci. ind. res., vol. 32, no. 8, August 1989

STUDIES ON THE PREPARATION AND STORAGE STABILITY OF COMMINUTED KINNOW FRUIT BEVERAGE BASE

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(Received December 9, 1988; revised May 8, 1989)

An investigation was made to study the physico-chemical and organoleptic changes occuring during 120 days storage of comminuted Kinnow fruit beverage base kept at ambient temperature. The comminuted beverages were found to be not only more nutritious but also superior to the conventional squashes in colour, aroma and cloudiness. Furthermore these types of beverages were better protected against oxidative deterioration during extended period of storage.

Key words: Comminution, Blanching, Base.