ISSN 0030-9885
Coden: PSIRAA 37 (1-2) 1-70 (1994)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 37, Nos. 1-2, January-February 1994

Published monthly by

Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 37, nos. 1-2, Jan.-Feb. 1994

HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC AND POLAROGRAPHIC METHODS FOR THE QUANTITATION OF NICARDIPINE HYDROCHLORIDE IN CAPSULES

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(Received April 17, 1993; revised October 11, 1993)

Nicardipine hydrochloride in bulk and in capsule dosage form has been assayed by two proposed independent analytical methods; (i) isocratic reverse-phase high-performance liquid chromatography (RP-HPLC) and (ii) differential pulse polarography (DPP). The RP-HPLC involves employment of μ-Bondapak-C_{18} column of 300 x 3.9mm i.d. dimensions and mobile phase composed of 80% v/v CH_3CN + 20% v/v (0.01M) CH_3COONa buffer adjusted to pH 3.5 with glacial CH_3COOH. The flow rate of the eluent was maintained at 1.5 ml/min. In the polarographic method, nicardipine produces a distinct reduction wave and a diffusion-controlled current which is linearly related to concentration of nicardipine HCl over the range 10-100 μg/ml. The RP-HPLC and DPP methods yielded comparable results when applied for the assay of nicardipine HCl in capsules (Pycarden®/30mg). However, the sensitivity and selectivity of the RP-HPLC can be improved substantially if the detection is carried out amperometrically.

Key words :Nicardipine, Capsules, Quantitation.

Pak. j. sci. ind. res., vol. 37, nos. 1-2, Jan.-Feb. 1994

SYNTHESIS OF SOME HETROCYCLES FROM DEHYDRO-L-ASCORBIC ACID AND THEIR BIOLOGICAL ACTIVITY

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(Received January 22, 1992; revised September 28, 1993)

Sythesis of some hetrocyclic compouds from dehydro-L-ascorbic acid, monoaryl hydrazone and their biological activities are described.

Key words: Nitrogenhetrocycles, Dehydro-L-ascorbic acid, Biological activity.

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THERMODYNAMIC PARAMETERS AND STABILITIES OF SOME RARE-EARTH METAL ION CHELATES OF α-VALINE

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(Received March 7, 1993; revised September 22, 1993)

Solution equilibria for some rare-earth metal ions with valine have been studied potentiometrically in aqueous medium at temperatures from 25 to 55° and ionic strengths (I) from 0.1 to 1.0 mol dm^{-3} $NaClO_4$. The thermodynamic parameters $\Delta H^{\ddagger}$, $\Delta S^{\ddagger}$ and $\Delta G^{\ddagger}$ for the formation processes were evaluated in terms of temperature, ionic strength and nature of metal ion present. The stability of the complexes was found to be : La(III) < Nd(III) < Gd(III) < Eu(III) < Yb(III) < Lu (III).

Key words: Formation constant, Thermodynamic parameters, Rare-earths.

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OPTIMAL FLOWRATE OF A GAS IN SEMI-BATCH GAS-LIQUID REACTORS

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(Received April 2, 1991; revised September 9, 1993)

The present work deals with the optimisation of the models for slow and fast kinetic regimes in semi-batch gas-liquid reactors. The control variable is taken to be the inlet gas flowrate, the objective is to minimise the gas consumption when gas is passed continuously through a liquid reactant held within the reactor. The main optimisation techniques used for this purpose were Pontryagin's Maximum Principle and Dynamic Programming. The main conclusion which can be drawn is that savings in gas consumption for slow regimes model are much more significant than for the fast regimes model.

Key words: Optimisation, Gas flow-rate, Gas consumption.

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NUTRITIONAL CHANGES IN MILK DURING HEAT TREATMENT (CHANGES IN CARBOHYDRATES AND LYSINE CAUSED BY HEATING MILK)

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(Received December 8, 1991; revised October 21, 1992)

Degradation of lactose and lysin in milk during heating at various temparatures (90-150°) for different intervals of time was investigated. Reduction in lactose and available lysine contents alongwith the formation of lactulose, galactose and hydroxymethyl furfural (HMF) was observed due to heat treatment. The concentration of lactose and lysine was reduced from 4.81-3.52% and 21.0-18.63 m. mole respectively when milk was heated at 150° for 10 mins. Maximum concentration of lactulose, glactose and HMF in 150°-10 mins. heated milk were 791.5, 178.1 mg% and 166.21 μ M. The energy of activation of the reduction in lactose and available lysine contents was 102.32 and 50.87 KJ/mole respectively. However, the energy of activtion was 101.57 KJ/mole for the formation of lactulose, 60.68 KJ/mole for galactose and 122.21 KJ/mole for HMF in heated milk.

Key words: Milk, Heat treatment, Lactose, Lysine.

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CLAISEN REARRANGEMENT OF 2'- HYDROXY - 4 - METHOXY- 4' - PRENYLOXYCHALCONE

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(Received December 6, 1992; revised October 30, 1993)

Claisen rearrangement of 2'-hydroxy-4-methoxy-4'-prenyloxychalcone (II) using acetic anhydride in dimethylaniline gave five compounds and several other minor fractions. The five compounds isolated were *viz*. 2'-hydroxy-4-methoxy-4",4",5"-trimethyldihydro furano (2",3":4',3') chalcone (III), 2'-hydroxy-4'-acetoxy-4-methoxy-3'-(α,α-dimethylallyl) chalcone (IV), 2'-hydroxy-4'-acetoxy-4-methoxy-5'-(α,α-dimethylallyl) chalcone (V), 2'-acetoxy-4-methoxy-4'-prenyloxychalcone (VI) and 2'-hydroxy-4'-acetoxy-4-methoxy chalcone (VII). Mild alkaline hydrolysis of IV gave 2',4'-dihydroxy-4-methoxy-3'-(α,α-dimethylallyl) chalcone (VIII). The products have been characterized by their spectral analysis.

Key words: Claisen rearrangement, Chalcone and derivatives.

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DETERMINATION OF HEAVY AND TOXIC METALS Zn, Cd, Pb AND Cu IN VEGETABLES BY VOLTAMETRY

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(Received November 3, 1991; revised September 25, 1993)

A simple and reliable voltametric procedure has been developed for trace metal analysis in vegetables. Different varieties of vegetables were analyzed for the contents of Zn,Cd, Pb and Cu and results are reported. Comparison between different vegetables showed that leafy vegetables have higher concentrations of metals as compared to other vegetables. Peels of vegetables have higher contents of metals. Distribution patterns of metals in soil, stem and leaves of vegetables are discussed.

Key words: Vegetables, Voltametry, Analysis of Cd, Pb, Cu and Zn.

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POLYMETALLIC COMPLEXES
Part-XLV. Complexes of Co (II), Ni (II), Cu (II), Zn (II), Cd (II) and Hg (II) with Bis-Bidentate Chelating Diazo Dye Ligands

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(Received December 16, 1992; revised October 13, 1993)

Bis-bidentate ligands 1-(2-carboxyphenyl-azo)-2,4-dihydroxy-benzene and 4,4'-*bis* (2,4-dihydroxyphenyl-1-azo-3,3'-dimethyl)-diphenyl having  and  potential donor atoms respectively form polynulear complexes with some divalent transitional and non-transitional metal ions. The nickel (II) complex with former ligand is found to be square-planar whereas the other cobalt (II), nickel (II) and copper (II) complexes are either octahedral or distorted octahedral. The complexes with zinc (II), cadmium (II) and mercury (II) are assigned to have tetrahedral stereochemistry around the metal ions. The characterisation of the complex compounds has been made basing upon analytical, conductance, magnetic susceptibility measurement, thermal i.r., electronic spectra, n.m.r and e.s.r spectral data.

Key words: Polymetallic complexes, Azodye complexes, *Bis*-bidentate chelating ligand complexes.

Introduction **Experimental**

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ADSORPTION STUDIES OF TARTARIC ACID FROM AQUEOUS SOLUTIONS ON CHARCOAL

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(Received January 14, 1993; revised October 30, 1993)

The adsorption of tartaric acid from aqueous solutions on the activated charcoal at 30° was studied by titrometric method. The rate of adsorptions of tartaric acid on activated charcoal is higher at higher concentration of acid. Langmuir and Freundlich equations are well obeyed.

Key words: Adsorption, Tartaric acid, Aqueous solutions, Activated charcoal.

Biological Sciences Section

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EFFECT OF AMMONIA AND UREA TREATMENT ON THE *IN VIVO* DIGESTIBILITY OF MUSTARD SEED HULLS

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(Received January 22, 1991; revised October 27, 1993)

Mustard seed hulls (MSH) were treated with 1-5% (w/w) aqueous ammonia or urea and 20% added water for 45 days at ambient temperature confined system. Under these conditions, the maximum reduction in lignin contents (27.0 and 20.0%) and maximum increase in nitrogen contents (49.2 and 65.0%) was observed when MSH was treated with 5% aq. ammonia and 5% urea respectively. Maximum increase in *in vivo* digestibility of dry matter, nitrogen crude fibre, minerals and organic matter was observed when MSH were treated with 2% ammonia or 4% urea. The improvement in digestibility indicated that ammonia or urea treated mustrard seed hulls has a great potential as feed ingredient.

Key words: *In vivo* digestibility, Nutritive feed, lignin.

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NITRATE AND NITRITE CONTENTS IN FOOD OF PLANT ORIGIN IN PAKISTAN

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(Received July 18, 1992; revised September 20, 1993)

Nitrate and nitrite contents of commonly consumed cereals, pulses and vegetables in four provinces of Pakistan indicated highest levels (6490 ppm) in vegetables. Cereals from the NWFP contained more nitrites than those collected from other provinces. The lowest amounts of nitrate and nitrite were detected in the pulses.

Key words: Nitrates, Nitrites, Cereals, Pulses, Vegetables.

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COMPARATIVE SALT TOLERANCE STUDIES ON DIFFERENT PLANT SPECIES (*SESBANIA AEGYPTICA, SESBANIA ACULEATA, ELUSINE CORACANA, SORGHUM BICOLOR* AND *SORGHUM SODANESE*)

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(Received January 15, 1990 ; revised October 23, 1993)

Comparative salt tolerance and cell sap composition for Na, K, Ca and Cl of 4 plant species *Sesbania aegyptica, S. aculeata, Elusine coracana, Sorghum bicolor* and *S. sodanese* was studied using different salinity levels of control, EC 5, 10, 15 and 20 dS m. Results indicate that fresh and dry weights of shoots decreased with increasing salinity. A 50% reduction in the whole plant biomass was observed in dhancha at a much higher salinity level as compared to other plant species. Sodium and chloride concentrations in leaf sap of four plant species increased with increase in salinity while K and Ca decreased significantly.

Key words: Salt tolerance, Cell sap composition for Na, K, Ca and Cl.

Pak. j. sci. ind. res., vol. 37, nos. 1-2, Jan.-Feb. 1994

FACTORS INFLUENCING SEED YIELD IN EARLY INTER-SPECIFIC GENERATIONS OF *VIGNA*

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(Received October 28, 1989 ; revised October 19, 1993)

Correlation and path coefficient analyses were carried out in early generations of inter-specific crosses between greengram (*Vigna radiata* L. Wilczek) and blackgram (*Vigna mungo* L. Hepper). Plant height, pod length, pods per plant, biological yield per plant and harvest index were positively correlated with seed yield per plant. Path coefficient analysis revealed that harvest index, biological yield per plant and pod weight per plant had a direct positive effect on seed yield per plant. Similarly, seed yield per plant and pods per plant had a direct positive influence on harvest index. It is suggested that biological yield per plant, pod weight per plant and harvest index be used as selection indices for the improvement of seed yield in early generations of inter-specific crosses between greengram and blackgram.

Key words. *Vigna radiata, V. mungo*, Yield compound, Inter specific hybridization.

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IRRADIATION OF PINK BOLLWORM LARVAE BY Co-60 AND Cs-137 SOURCES AND THEIR EFFECTS ON VIABILITY, REPRODUCTIVITY AND STERILITY OF SUBSEQUENT P_1 AND F_1 PROGENY

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(Received February 8, 1993 ; revised October 19, 1993)

The irradiation of mature (cut out) larvae at 35 Gy from Co-60 and Cs-137 resulted in reduced and delayed pupation. Co-60 caused significantly more lethality than Cs-137. The fecundity of the females both P_1 and F_1 emerging from irradiated mature larvae was drastically reduced for Co-60 as well as for Cs-137 treatment. The female moths were comparatively more prone to gamma radiation damage than the males. Larval survival and adult emergence were dose dependent following irradiation of mature pink bollworm larvae at 40-65 Gy from Cs-137 alone. The fecundity of mature P_1 and F_1 progeny and percent of males in F_1 generation reduced with the increased doses. Complete sterility was recorded in crosses treated male x treated female (TMxTF) at all doses. The effect of larval irradiation on mature progeny of F_1 adults was also reduced in crosses involving either F_1 males or F_1 females. The doses tested for mature larvae were too high and are not suitable for the control of pink bollworm through F_1 sterility.

Key words: Gamma iradiation, Pink bollworm larave, Radiation sources, Effect on P_1 andF_1 progeny.

Short Communication

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Effect of Dehydration on Storage Stability of Two Varieties of Jamun Fruit

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(Received April 16, 1990; revised August 25, 1993)

Technology Section

Pak. j. sci. indd. res., vol. 37, nos. 1-2, Jan.-Feb. 1994

THE INFLUENCE OF COMPLEXING AGENTS ON BIO-ETHANOL PRODUCTION FROM MOLASSES

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(Received April 21, 1993; revised October 23, 1993)

The influence of complexing agents on bio-ethanol production from molasses has been investigated. The agents are nitrilotriacetic acid (NTA) and 8 - hydroxyquinoline. They were introduced during the inoculation, propagation and fermentation stages.The increase was between 0.5-1.0% v/v ethanol for NTA and 2.9-3.8% v/v ethanol for 8-hydroxyquinoline.These results as well as the mode of action of the agents were discussed.

Key words: Bio-ethanol, Molasses, NTA, 8-Hydroxyquinoline, *Saccharomyces cerevisiae*.

Pak. j. sci. ind. res., vol. 36, nos. 1-2, Jan.-Feb. 1994

STUDIES ON STORAGE OF POTATO TUBERS WITH SPECIAL REFERENCE TO SWEETENING PROCESS

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(Received December 31, 1990; revised June 5, 1993)

Effect of storage temperatures and chemical treatments on accumulation of sugars in potato tubers during storage was studies. At regular intervals throughout the storage period, samples were analysed for reducing and non-reducing sugars. Storage at low temperature (4-5°) resulted in accumulation of more reducing and non-reducing sugars than storage at 12-14°. Whereas reducing sugar increased rapidly during storage at low temperature, rapid increase in reducing sugar was observed after about 2 months in tubers stored at 12-14°. Treatment with sodium acetate solution proved very effective in retarding the sweetening process. Accumulation of sugar in sodium acetate treated tubers was 50% less than in untreated samples. Treatments with sodium meta sulphite, potassium sorbate and hydrogen peroxide were not as effective in reducing the sweetening process.

Key words: Storage, Potato, Sweetening.