ISSN 0030-9885

Coden: PSIRAA 46(3)145-224 (2003)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 46, No.3

May - June 2003

Published bimonthly by
Scientific Information Centre
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
Karachi

Physical Sciences

Pak. J. Sci. Ind. Res. 2003 46 (3) 145-147

Chemical Compositions and Phytochemical Screening of the Seeds of *Garcinia kola* (Bitter kola)

M F Asaolu

Department of Biochemistry, University of Ado-Ekiti, Ekiti State, Nigeria

(Received 22 September 2001; accepted 22 May 2002)

Chemical compositions and phytochemical screening of the fresh seeds of *Garcinia kola* (wet weight) have been determined. The results showed that the samples contained high moisture content 75.50% while the ash content was found to be 5.90%. Carbohydrate was 10.85%, crude fat was 14.50% and crude protein was found to be very low 4.25%. The results obtained revealed that the most abundant mineral in the seeds of *Garcinia kola* is sodium (215.10ppm). The seeds of *Garcinia kola* also contain Mg, Cd, Zn, K and Fe, however, Mn, Pb, Cu, Cd and Co were not detected. Preliminary phytochemical screening indicated the presence of phytate, tannin, oxalate, cyanate, saponins and anthraquinones with cyanate having the highest value.

Key words: Phytochemical screening, Minerals, *Garcinia kola*.

Pak. J. Sci. Ind. Res. 2003 46 (3) 148-150

PLANETARY ORBITS IN AXISYMMETRIC VACUUM GRAVITATIONAL FIELDS

Muhammad J Iqbal [a]* ***and Jawaid Quamar*** [b]

[a]*Department of Mathematics, University of Karachi, Karachi 75270, Pakistan*

[b]*Institute of Space and Planetary Astrophysics, University of Karachi, Karachi 75270, Pakistan*

(Received 11 November 1999; accepted 14 June 2002)

An exact axisymmetric asymptotically flat field, is determined by Einstein equations, possessing a quadrupole moment due to a static mass, may be treated as a perturbation on Schwarzschild field. Exploiting this, planetary equations under the influence of the mentioned gravitational field has been worked out. The results exhibit features that shed new light on issues in relativistic celestial mechanics and models of planetary motion.

Key words: Planetary orbits, Vacuum, Gravitational field.

Pak. J. Sci. Ind. Res. 2003 46 (3)151-155

Effect of Lithium Chloride and Sodium Chloride on Ionic Interaction of Dilute Solution in Aqueous Butanol

A Rasheed Khan,[a] Fahim Uddin[b] and Rehana Saeed[b]*

[a]*PCSIR, Scientific Information Centre, Karachi-74400, Pakistan*

[b]*Department of Chemistry, University of Karachi, Karachi-75270, Pakistan*

(Received 19 May 2001; accepted 26 July 2002)

Pak. J. Sci. Ind. Res. 2003 46(3)156-160

HEAVY METALS IN WATER AND SEDIMENT OF THE LOWER IKPOBA RIVER, BENIN CITY, NIGERIA

F A Oguzie

Department of Fisheries, University of Benin, Benin City, Nigeria

(Received 26th June 2001; accepted 26th July 2002)

Heavy metals concentrations in the water and sediment at four zones on the lower Ikpoba river in Benin City, Nigeria were investigated by using the flame atomic absorption spectrophotometry technique. Mean concentrations (µg/l) were as Cd (0.73), Cr (0.40), Cu (1.30), Fe (4.00), Pb (0.90), Mn (3.10), Ni (2.05) and Zn (1.20). Mean metal concentrations (µg/g dry wt.) in the sediment samples were as follows: Cd (1.50), Cr (0.90), Cu (1.90), Fe (7.90), Pb (3.30), Mn (4.60), Ni (3.95) and Zn (4.70). Concentrations were of Cd and Pb water exceeded the limits recommended by WHO for portable drinking water. The metal concentrations in the river water were higher during the dry seasons in all the zones when water was used in greater demand by the urban population, there was no significant difference ($P>0.05$) between the concentrations of metals in the river water during the dry and rainy season in the months of sampling.

Key words: Heavy metals, Water sediments, Ikpoba river, Flame atomic absorption spectrophotometry.

Pak. J. Sci. Ind. Res. 2003 46(3) 161-163

LOW TEMPERATURE AUTOCATALYTIC NICKEL DEPOSITION

I H Khan, Shahid Tufail Sheikh*, Chowdhry Athar Amin, Khalid Javed

MMRC, PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received 7 July 2001; accepted 17 August 2002)

Autocatalytic nickel deposition was first patented in 1955. This work was carried out to develop an autocatalytic nickel deposition process at lower temperatures. This process was based on same electrolytes and reducing agents viz; hypophosphite but it worked at lower temperature and contained sodium fluoride. Plating rate was good and the deposits contained less phosphorous content. It was also observed that the deposits have good adhesion and was comparable with electrodeposited nickel in corrosion resistance and relatively easy in the practical application of deposition.

Key words: Low temperature, Nickel plating, Autocatalytic, Nickel deposition, Reducing agents, Hypophosphite.

Pak J. Sci. Ind. Res. 2003 46 (3) 164-166

STUDIES ON THE CONSTITUENTS OF *HIBISCUS ROSA-SINENSIS*

M Amzad Hossain* and S A Tarafdar

Chemistry Division, Atomic Energy Centre, Ramna, Dhaka-1000, Bangladesh

(Received 1 August 2000; accepted 3 October 2002)

A new flavone derivative, furanoflavone **(1)** was isolated along with ovalichalcone **(2)** from the leaves and stems of *Hibiscus rosa-sinensis* (Malvaceae). The structure of furanoflavone **(1)** was identified as 5-methoxy-3′-methyl-3′,4′-methylenedioxyfurano[2″, 3″: 7,8]flavone by spectroscopic and chemical analysis.

Key words : *Hibiscus rosa-sinensis,* Isolation, Characterization, Chalcone, Flavone.

Pak. J. Sci. Ind. Res. 2003 46(3) 167-170

THE GLYCERIDES STRUCTURE OF *CITRULLUS COLOCYNTHIS*

M A Javed*[a], T Kausar [b], M Saleem [b], G R Khan [b]

[a]*Biotechnology and Food Research Centre, PCSIR Laboratories Complex, Shahrah-e-Jalaluddin Roomi, Lahore-54600, Pakistan*

[b]*Applied Chemistry Research Centre,PCSIR Laboratories Complex, Shahrah-e-Jalaluddin Roomi, Lahore-54600, Pakistan*

(Received 25 January 2002; accepted 3 January 2003)

The triacylglycerols separated from *Citrullus colocynthis* seed oil were fractionated by silver nitrate impregnated thin layer chromatography into six fractions with respect to their degree of unsaturation. The composition and nature of the fatty acids at their 1,3- and 2-positions were determined by the use of pancreatic lipase and gas chromatography. The unsaturated C_{18} acids occupy the 2-position depending upon the comparatively higher percentage of the respective acid.

Key words: *Citrullus colocynthis* , Fatty acids, Triacylglycerols, Thin layer chromatography.

Short Communication

Pak. J. Sci. Ind. Res. 2003 46 (3) 171-173

BIOLOGICAL ACTIVITY OF 2,3-DI (QUINOLYL-2)-6-METHYL QUINOXALINE

Nasir Ansar[a], Seniz Kaban[b] and R Ahmed [c]*

[a]*Adamjee Government Science College, Department of Chemistry, Karachi, Pakistan.*

[b]*Yildiz Technical University, Department of Chemistry, Istanbul, Turkey*

[c]*Department of Chemistry, University of Karachi, Pakistan*

(Received 2 April 2002; accepted 31 August 2002)

Key words: Biological activity, Methyl quinoxalines heterocyclic compounds.

Pak. J. Sci. Ind. Res. 2003 46 (3) 174-176

Comparative Analysis and Nutiritional Composition of Mulberry Fruit *Morus alba* Plus Seabuckthorn *(Hippophae)* and their Products

Mohammad Nisar Alizai*[a], Shamsur Rehman [a] and Wazir Hussain Shah[b]

[a]*PCSIR Laboratories Jamrud Road, P O Peshawar University, Peshawar-25120, Pakistan*

[b]*PCSIR Laboratories Complex, Ferozepur Road, Lahore-54600, Pakistan*

(Received 7 July 2001; accepted 29 August 2002)

The fruits of mulberry produced in Northern Pakistan were subjected to hot air dehydration to preserve without losing its natural flavour and nutrients. The dehydrated mulberry powder which is called mulberry beverage base (MBB) yielded good fruit tasty drink when mixed with suitable amount of water. Shelf-life assessment was also conducted. The fresh fruit extract and the dehydrated mulberry beverage base (MBB) were analysed for juice/pulp, MBB, moisture, acidity as citric acid, total soluble solids, sugars, ascorbic acid and ash minerals like calcium, potassium, phosphorous, sodium and iron in fresh fruit extract was also determined. Mulberry pulp was mixed with seabuckthorn pulp prior to dehydration. Dehydrated product was found better in taste, colour and flavour.

Key words: Mulberry composition, Minerals, Seabuckthorn *(Hippophae)*, Beverage base.

Pak. J. Sci. Ind. Res. 2003 46(3) 177-179

THE GENETIC EFFECTS OF COMBINING ABILITIES ON OIL AND PROTEIN CONTENTS IN *GOSSYPIUM HIRSUTUM* L. SEED

Faqir Muhammad Azhar and Asif Ali Khan*

Department of Plant Breeding and Genetics, University of Agriculture, Faisalabad-38040, Pakistan

(Received 17 October 2001; accepted 4 September 2002)

An eight parent diallel cross data was analysed by following Griffing's method of genetic analysis, to examine genetic effects of general and specific combining abilities of the parents on cotton seed oil and protein contents. The higher gca:sca mean squares showed, that genes showing additive properties had predominant influence on the inheritance of the characters. The parents having better general combining ability (gca) for the characters, appeared to result in better specific combinations. The nature of the gene's action suggests that further improvement in oil and protein contents may be achieved by making single plant selections from the F_2 population.

Key words: Additive genes, Cotton, General combining ability, Oil and Protein, Specific combining ability.

Pak. J. Sci. Ind. Res. 2003 46(3) 180-187

BREEDING BIOLOGY OF THE FRESHWATER COPEPODA, *HELIODIAPTOMUS VIDUUS* (GURNEY) AND ITS PROSPECTS AS LIVEFOOD ORGANISM

K Altaff

Unit of Reproductive Biology and Live Feed Culture,P G and Research Department of Zoology,The New College,Chennai-600 014, India

(Received 24 May 2000, accepted 14 October 2002)

The tropical freshwater copepoda, *Heliodiaptomus viduus* occur commonly in the peninsular India. This species is comparatively bigger (total mean length of female and male is 2.05 ± 0.09mm and 1.7 ± 0.04mm respectively) than other freshwater diaptomids. Aspects of reproductive biology such as sexual dimorphism, organisation of female and male reproductive system, oogenesis, spermatogenesis and spermatophore formation are described for the first time. Details pertaining to fertilization, embryonic and post embryonic development of this specie is reported. Studies on live span and reproductive potential of this specie indicate continuous breeding with short interclutch period. Importance of the livefood in aquahatcheries and prospects of *H.viduus* as alternate livefood to *Artemia* nauplii is discussed.

Key words: Tropical copepoda, Breeding biology, Livefood, *Heliodiaptomus viduus.*

Pak. J. Sci. Ind. Res. 2003 46(3) 188-192

EFFECT OF ARECA NUT EXTRACTS ON SOME DIGESTIVE ENZYMES *IN VITRO*

T A Kumosani

Biochemistry Department, Faculty of Science, P O Box 80203, King Abdulaziz University, Jeddah 21589, Saudi Arabia

(Received 30 January 2001; accepted 25 September 2002)

The Areca nut extracts (*n*-hexane and methanol) were used on three important digestive enzymes (α-amylase, α-chymotrypsin and lipase) *in vitro*. The result showed significant reduction of α-amylase activity (between 47-64% inhibition). Whereas, both extracts of *Areca* produced significant increase in lipase activity (54% and 27%, respectively). Significant increase in α-chymotrypsin activity (78%) with *n*-hexane extract and a reduction of (18%) with methanol extract were seen.

Key words: Areca nut, Hexane, Methanol, α-Amylase, α-Chymotrypsin, Lipase.

Pak. J. Sci. Ind. Res. 2003 46(3) 193-202

POPULATION DYNAMICS AND THE MANAGEMENT OF THE COMMERCIAL SHRIMP *PENAEUS SEMISULCATUS* FROM THE BAY OF BENGAL

M G Mustafa [a] and Shahadat Ali [b]*

[a]*Bangladesh Fisheries Research Institute, Marine Fisheries & Technology Station, Cox's Bazar, Bangladesh*

[b]*Department of Zoology, Dhaka University, Dhaka, Bangladesh*

(Received 21 February 2001; accepted 10 October 2002)

FiSAT programme was used to estimate population parameters of *Penaeus semisulcatus* from length frequency data-based computer programme. L∞ and K for male and female were found to be 23.5 cm and 27.0 cm; and 0.8 year^{-1} and 0.9 year^{-1} respectively. The estimate provided by Wetherall plot for L∞ was 23.224 cm and 27.258 cm for male and female respectively. An additional estimate of Z/K was 4.688 for male and 5.373 for female. The growth performance index was 2.654 and 2.817 for male and female respectively. The annual rate of natural and fishing mortality were estimated as 1.73, 3.47 for male and 1.72, 2.98 for female respectively. The exploitation rates were 0.67 and 0.63 for male and female respectively. The selection pattern Lc for male was 15.88 cm and for female 18.869 cm. Recruitment pattern suggestive was one even seasonal pulse during June, July and August. Peak recruitment appeared in July. Yield-per-recruit analysis suggested that the investigated stocks are overexploited. Yield-per-recruit isopleths suggested that length at first capture was 12.0 cm (male) and 13.52 cm (female) without depletion of spawning stock. The relationship between total length and body weight were found to be $W = 0.01167\ TL^{2.8956}$ for male and $W = 0.011028\ TL^{2.9218}$ for female. Highest exploitation was observed between length class 15.0 to 19.0 cm for male and between 18.0 to 23.0 cm for female. Yield and Stock Prediction analysis suggested that the highest yield and price could be achieved by simultaneously decreasing the fishing mortality to 1.5 coefficient rate.

Key words: Asymptotic, Isopleths, *Penaeus semisulcatus*.

Pak. J. Sci. Ind. Res. 2003 46(3) 203-206

STABILITY OF CHLOROQUINE PHOSPHATE TABLETS INOCULATED WITH BACTERIAL SPECIES

I F Obuekwe[a], M U Iwuagu[b] and C A Orhe[a]*

[a]*Department of Pharmaceutical Microbiology, Faculty of Pharmacy, University of Benin, Benin City, Nigeria*

[b]*Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmacy, University of Benin, Benin, Nigeria*

(Received 12 September 2000; accepted 25 October 2002)

Pak. J. Sci. Ind. Res. 2003 46 (3) 207-210

Effect of Supplementation of Detoxified Matri Flour with Wheat Flour on the Quality of Pan Bread

Salman Ahmad Lodhi, Salim-ur-Rehman and Nuzhat Huma*

Department of Food and Technology, University of Agriculture, Faisalabad, Pakistan

(Received 18 April 2001; accepted 16 November 2002)

Breads were prepared from wheat flour supplemented with 5, 10, 15, 20 and 25% of detoxified matri flour and evaluated for sensory acceptability, i.e. bread taste, aroma, texture, crumb colour, grain, loaf volume, crust colour, symmetry of form, character of crust and evenness of bake. Brabender farinograph, mixograph and viscoamylograph characteristics of flour were also studied. Farinograph water absorption, arrival time and dough development time increased and dough stability decreased and amylograph peak viscosities, mixograph peak height and mixing time decreased as level of supplementation with matri flour increased. The quantities of crude protein, crude fibre, crude fat and ash increased with the increase of matri flour in wheat flour. Increasing levels of legume substitution decreased many sensory parameters of wheat bread. Results indicate that detoxified matri flour can successfully be substituted for wheat flour in breads at levels up to 10% . Legume substitution tended to increase the protein level in the finished product.

Key words: Bread, Detoxified matri flour, Wheat flour.

Short Communication

Pak. J. Sci. Ind. Res. 2003 46(3) 211-212

LOCATION OF FUNGI IN PUMPKIN SEED

Nasreen Sultana

Crop Diseases Research Institute, Pakistan Agricultural Research Council, Karachi University Campus, Karachi-75270, Pakistan

(Received 29 June 2001; accepted 11 July 2002)

Key words: Pumpkin seeds, Fungi, Location.

Pumpkin (*Cucurbita pepo* L.) is an important and widely cultivated cucurbitaceous vegetable crop in Pakistan. Over forty-five seed-borne fungi have been reported to be associated with pumpkin seeds in Pakistan (Yunis & Kauser, 1966; Sheikh 1990; Sultana *et al* 1992; Ahmed *et al* 1993). *Macrophomina phaseolina*, *Botryodiplodia theobromae*, *Fusarium equiseti*, *F. semitectum*, *F. solani* and *F. oxysporum* were found in high frequencies in cucurbits seed (Maholay

Short Communication

Pak. J. Sci. Ind. Res. 2003 46(3) 213-214

FATTY ACID AND LIPID COMPOSITION OF *PLANTAGO OVATA*

Muhammad Akhtar Javed*, Shahid Mahmud, Sakhawat Ali and Tehsin Aman

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received 19 May 2001; accepted 25 September 2002)

Key words: *Plantago ovata*, Fatty acid, Lipids.

Plantago ovata (Ispaghula, Vern, Isbaghul) belongs to the

Technology

Pak. J. Sci. Ind. Res. 2003 46(3) 215-218

Modification and Development in Electrolytic Analyzer Instrument

Naseer Ahmad*, Shakeel Ahmad, Muhammad Arif and Ahmad Saghir

PCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

(Received 6 March 2002; accepted 21 December 2002)

Electrolytic analyzer is an analytical instrument that is modified and improved by replacing the electro-mechanical components with the electronic control circuit that drives the inductive load by a phase control triggering technique. This circuit is slightly complex as compared to the other available circuits and this gives the benefits of linear output voltage with a resolution of 0.001 volts, over-voltage protection and provides the stable AC voltage to the trigger circuit.

Along with the modification in electronics, the output terminals of the instrument are also altered and redesigned for clamping the various electrodes as per requirement of the user of electro-gravimetric process of analysis. In the reported paper the design of electronic control circuit and mechanical design of output terminals for clamping various kind of electrodes, are presented.

Key words: Modification in electrolytic analyzer, Electronic control circuit.

Review Article

Pak. J. Sci. Ind. Res. 2003 46(3) 219-224

ROAD TRAFFIC NOISE IN PAKISTAN - A REVIEW

G H Shaikh

Applied Acoustics Group, PCSIR Laboratories Complex, Karachi-75280, Pakistan

(Received 28 September 2001; accepted 14 October 2002)

Road traffic noise is one of the major environmental problems in urban areas of Pakistan. Due to rapid increase in traffic density on the roads, traffic noise levels have gone much above the comfortable limits and roadside dwellers and traders are constantly exposed to high-level noise for long periods. This paper reviews the results of traffic noise surveys reported for some major cities of Pakistan. The condition of traffic noise in Pakistan is discussed with reference to the relevant national standards and community annoyance criteria, as well as the motor vehicle noise emission limits set by the European Economic Community. Some means and ways to limit high-level traffic noise in Pakistan are also discussed.

Key words: Pakistan, Noise pollution, Traffic noise, Motor vehicle noise, Community annoyance criteria.