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SHORT COMMUNICATIONS

TECHNOLOGY

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STUDIES ON SOME ELECTRICAL PROPERTIES OF POLYCRYSTALLINE CALCIUM FLUORIDE AT HIGH TEMPERATURES

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(Received January 01, 2001; accepted April 04, 2003)

The electrical conductivity σ and the dielectric constant ε' were measured at a frequency of 1 KHz on pressed pellet of CaF_2 in the temperature range 373-873°K. The pressure applied for preparing the sample varied from 3 to 5 tons/cm^2 on circular disk of 2.5 cm diameter and 0.45 cm thickness by hydraulic press. In the temperature range investigated the conductivity data exhibited to activate regions yielding activation energies of 0.532 ev and 0.42 ev. The region I called intrinsic region and region II is extrinsic region. The effect of temperature and the hydrostatic pressure on the real and imaginary part of the dielectric constant for this sample has been studied. The dielectric constant curve shows a slow increase of dielectric constant up to temperature 473°K and above this temperature, a fast increase in ε', which may be attributed to lattice expansion and polarizability of constituent ions. At high temperature in the dielectric, two points of phase transition are attained. In the present study, it has been found that within the reported temperature range the dielectric constant and dielectric loss are predominately determined by the motion of the defects. The activation energy deduced from the dielectric studies is in good agreement with that obtained from the present electrical conductivity data.

***Key words*:** Ionic conductivity, Dielectric constant, Phase, Activation energy.

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 96 - 98*

STUDIES OF REACTION MECHANISM AND PHYSICAL NATURE OF LIGHT-WEIGHT BASIC MAGNESIUM CARBONATE

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(Received March 20, 2003; accepted August 23, 2003)

The reaction mechanism of light - weight magnesium carbonate has been studied and concluded that it is based upon formation of colloidal magnesium hydroxide and adsorption of HCO_3^- ions on magnesium hydroxide surface under optimum conditions. Precipitation, carried out in the presence of sodium bicarbonate over a concentration range of 1M to 0.01M, is a continuous function of the carbon dioxide remaining in the solution. Temperature between 70°C and 80°C, stirring speed of 900 rpm, gradual addition of magnesium sulfate solution and mass ratio of soda ash to sodium bicarbonate (3:2) were found to be the optimum conditions for obtaining light - weight magnesium carbonate.

***Key words*:** Reaction mechanism, Light - weight magnesium carbonate, Effect of sodium bicarbonate.

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 99 - 103*

HIGH FIELD ^{13}C - NMR SPECTROSCOPIC ANALYSIS OF THE TRIACYLGLYCEROLS OF *ADENOPUS BREVIFLORUS* SEEDS OIL

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(Received February 25, 2003; accepted January 14, 2004)

High resolution carbon - 13 NMR (gated decoupled) spectra of the carbonyl, saturated and olefinic carbons in *Adenopus breviflorus* seeds oil have been used for direct determination of the acyl composition and acyl positional distribution on the glycerol backbone. The spectra revealed the presence of saturated, oleic and linoleic fatty acids. Semi quantitative analysis using the integrals of the allylic carbons signals gave the percentage composition of the oil as saturated 25.00%, oleic 14.00% and linoleic 60.90%. These percentage compositions were confirmed by gas chromatography. The spectra further revealed that while the saturated fatty acids are distributed between the 1,3 (α) and 2 (β) glyceridic positions, oleic acid is attached only at the (α) glyceridic position while linoleic acid is attached mostly at the (β) glyceridic position.

***Key words*:** ^{13}C-NMR, *Adenopus breviflorus*, Linoleic fatty acids, Gas chromotography, Triacylglycerols.

Short Communication

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 104 - 106*

ELECTROLYTIC OXIDATION OF TETRAHYDROCARBAZOLE

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(Received June 6, 2002; accepted January 1, 2004)

Electro-oxidation of THC in a strong base, potassium methoxide in methanol, produces a series of dehyrodimers having interesting stereochemistry and ^{13}C dynamic N.M.R. properties (Bobbitt *et al* 1986a). Electro-oxidation of 1-carbomethoxy THC yields its 1- methoxy derivative in 44% yield (Bobbitt 1989). In aqueous acetonitrile containing $LiClO_4$, THC can be oxidized to a dehydrodimer in 60 - 90% yield. A two compartment cell at + 0.7 V vs. SCE having graphite anode is used (Bobbitt *et al* 1986b). Preparative anodic hydroxylation of 1- carbomethoxy THC and its 7- methoxy derivative have been reported (Rusling *et al* 1984). Related mechanistic investigations were also carried out (Rusling *et al* 1986). Characteristics of anodic normal pulse voltammograms for the monomeric indole alkaloids such as catharanthine, vindoline, THC, its N- methyl derivative, aniline, *p* - chloroaniline, and *m* - dimethylaminoanisidine, were described (Haque 1990).

Biological Sciences

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 107 - 111*

Cultivation of Prawn in Polyculture with some Species of Indian and Chinese Major Carps

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(Received March 15, 2002; accepted November 01, 2002)

The freshwater prawn *Macrobrachium rosenbergii* (de Man) was cultivated in polyculture with Indian and Chinese major carps for two successive years. The densities of prawn were 6000,8000 and 10,000 juveniles / ha with a constant fish density of 5,000 fish fingerlings / ha. The fish species were silver carp (35%), catla (15%), mrigal (20%) in the first year and in the second year silver carp, catla, rohu, mrigal, grass carp and black carp in the ratio of 30:15:34:5:15:1, respectively. Highest production of prawn and fish were 122 kg / ha and 4200 kg / ha / yr in the first year and 96 kg / ha and 3945 kg / ha / yr in the second year. The low production of prawn might be hampered by the low temperature. However, cultivation of prawn with Indian and Chinese major carps should be made in overwintering season and low prawn density should be maintained in polyculture system of *M. rosenbergii* with fish.

Key words: *Macrobrachium rosenbergii*, Polyculture, Production and culture system.

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 112 - 117*

ARTIFICIAL GROUND FREEZING METHOD FOR SHAFT CONSTRUCTION IN MADDHAPARA HARDROCK MINE, BANGLADESH: MINIMIZATION OF ITS COST

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(Received October 23, 2002; accepted November 17, 2003)

The Korea South-South Cooperation Corporation (NAMNAM) used Artificial Ground Freezing (AGF) during 160 m depth shafts (cage and skip) construction in the Maddhapara Hardrock Mining Project (MHMP). The freezing design calculation for AGF operation showed that freezing wall thickness was satisfactory for both kaolin and sand layer at existing vertical ground pressure. But after AGF operation freezing status revealed that the ice wall thickness in skip shaft attained as per design, but in cage shaft the achieved thickness was more than the expected due to deviation from original design for freezing hole by NAMNAM i.e., drilling of 31 freezing holes instead of 32 for cage shaft. The ice-wall bonding had affected the whole rock mass of the inner diameter of cage shaft that became hard like rock, but this effect was not so intensive for the skip shaft towards the inner portion and did not create any severe problem. As a result the cage shaft was excavated with explosive (drilling blasting) involving additional time (3 months) and cost (US$1,51,866), which NAMNAM could avoid by sinking an additional 160 m deep freezing hole during cage shaft construction with a cost of US$18,045 and thus saving a total of US$1,33,820 for the whole operation in MHMP.

***Key words*:** Artificial Ground Freezing, Maddhapara Hardrock Mine, Cost effectiveness.

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NATURAL PROTEIN FORTIFICATION OF CASSAVA (*MANIHOT ESCULENTA*, CRANTZ) PRODUCTS (FLOUR & GARI) USING BAKER'S YEAST SOLID MEDIA FERMENTATION

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(Received 22 March 2001; accepted 17 December 2002)

In an attempt to enhance the nutritional quality of cassava products (flour & gari), Baker's yeast was used in the fermentation (solid media) of cassava pulp. The mash obtained was subsequently processed into flour and gari (the forms in which cassava products are popularly consumed in Nigeria) and analyzed. The protein (flour, 10.90%; gari, 6.30%) and fat (flour, 4.50%; gari, 3.00%) contents of the products were high. Conversely, the tannin (flour, 0.2%; gari, 0.1%) and cyanide (flour, 9.5mg / kg; gari, 9.1mg / kg) contents were low, though, the cassava flour had higher protein, fat, tannin and cyanide contents than gari. The results indicated that Baker's yeast, a cheap and non-pathogenic saprophyte, could be used in enhancing the nutritional potentials of cassava products by increasing nutrients (protein and fat) and decreasing antinutrient contents (tannin and cyanide). However, nutrient increase was higher in cassava flour while the antinutrient decrease was higher in gari.

Key words: Baker's yeast, Protein, Fat, Tannin, Cyanide, Cassava products.

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ISOLATION, CHARACTERIZATION AND STUDY OF MICROBIAL ACTIVITIES OF THE BRAIN LIPID AND CHEMICAL ANALYSIS OF THE BRAIN OF BAGHDA CHINGRI (*Penaeus monodon*) OF THE BAY OF BENGAL

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(Received December 17, 2002; accepted October 4, 2003)

The brain lipid of Baghda chingri (*Penaeus monodon*) was extracted and characterized with respect to various physical and chemical constants and compared with those of standard oils and fats. Thin layer chromatographic (TLC) and gas liquid chromatographic (GLC) investigation of the lipid showed the presence of myristic, palmitic, stearic, oleic, linoleic, arachidic and some other unidentified fatty acids. The microbial activities of the lipid were investigated. Nitrogen, phosphorus, potassium and calcium contents of the total brain containing the lipid were determined.

Key words: Lipid, Chingri, Polyunsaturatted fatty acid (PUFA), TLC, GLC.

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RESPONSE OF A COTTON CULTIVAR TO SULPHUR FERTILIZATION

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(Received May 24, 2002; accepted November 13, 2003)

Field experiments on sulphur fertilization in cotton cultivar CIM-109 were carried out at Central Cotton Research Institute Multan, Pakistan, in silty loam soils. The treatments consisted of four sulphur doses (0, 7, 14, 28 kg ha^{-1}) and two sulphur sources (gypsum and ammonium sulphate). Sulphur fertilization showed significant increase in seed cotton yield, boll number and boll weight. The addition of 7 kg S ha^{-1} seemed sufficient to overcome deficiency in silty loam soils for optimum cotton production. There were no differences in seed cotton yield due to sulphur sources. The petiole sulphate-sulphur concentration increased with increasing doses of sulphur fertilizer. The concentration of SO_4–S > 2000 ppm seemed sufficient for normal cotton growth and optimum seed cotton yield.

Key words**:** Sulphur fertilization, Fruit production, Petiole NO_3–N, Petiole SO_4–S, Fibre quality, Seed cotton yield.

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ANTIULCER EFFECT OF *ARTEMISIA ABSINTHIUM* L. IN RATS

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(Received October 9, 2002; accepted December 9, 2003)

The extracts of *Artemisia absinthium* induced a significant decrease in volume of gastric juice, acid output and peptic activity but no effect was determined on mucin activity in acetylsalicylic acid (ASA) ulcerated rats. Moreover, they decreased the ulcer index significantly. Phytochemical analysis indicated the presence of saponins and glycosidic sugars in the extract.

Key words**:** *Artemisia absinthium*, Antiulcer activity, Saponins.

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AN ECO - FRIENDLY APPROACH FOR THE MANAGEMENT OF NEMATODES ASSOCIATED WITH CHILLI

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(Received June 17, 2003; accepted December 31, 2003)

This investigation focuses on the effects of three organic amendments namely Fertinemakil and sugarcane bagasse alone or in combination on the population density of three nematode species and yield of chilli. For the purpose of comparison, a chemical nematicide carbofuran was also used. Population densities of *Helicotylenchus indicus*, *Tylenchorhynchus curvus* and *Meloidogyne* spp. (J2) were markedly reduced by the treatments. Yield of chilli was increased significantly over the control by all treatments except sugarcane bagasse alone. However, highest yield was obtained in carbofuran treatment.

Key words: Nematodes, Fertinemakil, Sugarcane bagasse, Control, Chilli, *Capsicum annuum*.

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MICROBIAL SIDE - CHAIN DEGRADATION OF PROGESTERONE II. APPLICATION OF DIFFERENT TECHNIQUES FOR PROGESTERONE CONVERSION BY *FUSARIUM DIMERIUM*

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A local isolate of *Fusarium dimerium,* firstly reported to be able to degrade progesterone side chain to give certain C-19 androgenes derivatives, proved to perform this important conversion more efficiently adopting the cell immobilization technique. Thus, relatively more amounts of Androst - 4 - ene - 3, 17 - dione (AD), Testololactone (TL) (major products) as well as, Testosterone (T), Androsta - 1,4 - diene 3, 17 - dione (ADD) (minor products) were recorded after 72 h using 2% Ca - alginate immobilized fungal cells. Relatively lower bioconversion rates were achieved when the bioconversion process was carried out in top - laboratory fermentor using free cells of the promising fungus.

Key words: *Fusarium dimerium,* Progesterone, Bioconversion.

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CONSTITUENTS OF *PRUNUS ARMENIACA*

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Phytochemical screening of the non-alcoholic extract of *Prunus armeniaca* has revealed the presence of a triterpenoid belonging to Ursane / Oleanane series and a steroid alongwith its glucoside for the first time from this source. Structures were confirmed by spectroscopic methods, using IR, ^{1}H-NMR,^{13}C-NMR and Mass spectra.

Keywords: *Prunus armeniaca,* Fruits, Steroidal glycosides and a triterpenoid.

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EFFECT OF SELECTED FOOD ADDITIVES ON PHYTIC ACID CONTENT OF SOYBEAN DURING SOAKING

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(Received November 9, 2002; accepted March 3, 2004)

The effect of food additives of sodium chloride (NaCl) and sodium bicarbonate ($NaHCO_3$) was studied on the hydrolysis of phytic acid in soybean, soaked in water and in solutions of pH4 and 6 at 30°C for 6 and 12 h. Four varieties of soybean V1 (B1-080/36), V2 (AGS-62), V3 (G1-0031) and V4 (EPPS) were selected. The amount of phytic acid in V1, V2, V3, and V4 of soybean was 12 mg, 11 mg, 13 mg and 12.5 mg/g respectively. Soaking of soybean flour for 6 and 12 h in water and in pH4 and 6 solutions have significantly reduced ($P < 0.05$) the levels of phytic acid. The effect of pH6 solution was most effective, while the effect of water and pH4 was similar in lowering the phytic acid in soybean. The presence of mixed food additives (1% NaCl + 2% $NaHCO_3$) in water, and pH4 and 6 solutions, reduced the level of phytic acid in soybean to 38%, 52% and 56% for 6 h, and 48%, 55% and 68% for 12 h in respective solutions. It was observed that soaking of soybean flour in pH 6 solution in the presence of NaCl and $NaHCO_3$ phytase enzyme of the flour is well activated to hydrolyse phytic acid. These results suggest that soaking with sodium chloride and sodium bicarbonate can reduce the phytic acid in soybean flour. This treatment can improve the nutritional value of the soyabean flour, which is used in various food products of dairy and confectionery etc.

Key words: Food additives, Phytic acid, Soyabean, Soaking.

Pak. J. Sci. Ind. Res. 2004 ***47*** *(2) 153 - 156*

LEAF MODIFICATIONS TO QUANTIFY YIELD, EARLINESS AND FIBRE TRAITS IN *GOSSYPIUM HIRSUTUM* L.

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(Received June 1, 2002; accepted March 9, 2004)

Ten BC_4 : F_2 back-cross derived near-isolines developed from ten different cross combinations, differing in only leaf shape i.e. Normal, Okra, Sub-okra and Super-okra were compared for quantifying their yield, earliness and fibre traits. Sub-okra leaf cotton (L^{u_2}) was observed as an appropriate replacement for the normal leaf to improve the traits. Sub-okra types in all the combinations were superior for most of the traits. On an average over the populations, Sub-okra gave 19.7% higher yield, 1.5% earliness, 4.7% longer fibre and 2.1% more uniform fibre than the normal leaf isolines. Nevertheless, Sub-okra ginned and gave equally better fibre strength with the normal leaf. Yield, earliness, longer and uniform fibre superiority of Sub-okra leaf cotton over the normal leaf coupled with established insect resistance of modified leaves suggested that the potentiality of mutant leaves be exploited in future breeding programmes.

Key words: Leaf modifications, Fibre and earliness characters, *Gossypium hirsutum* L.

Short Communication

Pak. J. Sci. Ind. Res. 2004 ***47****(2) 157 - 159*

STUDY OF SOME KINETIC PARAMETERS FOR CITRIC ACID BIOSYNTHESIS BY *ASPERGILLUS NIGER* MUTANT NG - 110 USING SHAKE FLASK TECHNIQUE

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(Received February 20, 2003; accepted March 11, 2004)

Citric acid can be produced from various microorganisms such as bacteria, filamentous fungi and yeast by applying various fermentation techniques. Because of its high solubility, palatability and low toxicity, citric acid has now become one of the most commonly used acids. Approximately, 75% of this compound is used as food acidulate and 12% in pharmaceutical industry (Haq *et al* 2001). Various fungi have been evaluated for citric acid production but best one for abundant citric acid production is *Aspergillus niger* (Maddox and Brooks 1998). The present study is concerned with the effect of pH and various concentrations of $K_4Fe(CN)_6$ and K_2HPO_4 on citric acid bio-production and their kinetic analysis.

Short Communication

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PHYTOCHEMICAL ANALYSES AND ANTIMICROBIAL ACTIVITIES OF THE LEAF AND STEM BARK EXTRACTS OF *GARCINIA KOLA* - HERKEL (FAMILY GULTIFERAE)

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(Received October 10, 2003; accepted March 30, 2004)

Preliminary phytochemical analyses carried out on the leaves and stem bark extracts of *Garcinia kola* revealed the presence of glycosides, saponins, tannins and flavonoids. Alkaloids were present only in the leaf extract. Thin layer chromatography (TLC) on silica gel using different solvent systems showed the alkaloids to be both of salt and basic forms. Different concentrations of methanolic extracts (50µg/ml, 100µg/ml, 150µg/ml and 200µg/ml) were tested on cultures of bacteria and fungi to determine their sensitivity and minimum inhibitory concentrations (MIC). Antibiotic gentamycin (1mg/ml) was used as the standard drug. The stem bark and leaf extracts of *Garcinia kola* had very high inhibitory activities, only on *Staphylococcus aureus* with MIC of 100µg / ml and 150µg/ml, respectively. The stem bark and leaves of this plant can be used for the treatment of diseases caused by *Staphylococcus aureus.*

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Studies on Sodium Sulphide Prepared from Sodium Sulphate

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(Received January 22, 2002; accepted November 13, 2003)

The aim of this investigation was to prepare purified sodium sulphide which is utilized for multiple purposes. The reaction between commercial sodium sulphate and coal gives sodium sulphide and various products. The effect of reaction temperature and maximum composition were studied to establish the optimum conditions for maxium yield. The reaction is found suitable for large scale production of sodium sulphide from commercial sodium sulphate.

Key words**:** Commercial sodium sulphate, Coal, Sodium sulphide.

Erratum

The address of co-author was overlooked in the paper published in Vol. 47, January – February, 2004, Page 50. The correct address of co-author Y.M. Khanif is Department of Land Management, Faculty of Agriculture, University Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia. Also in Table 2, page 52, Grain yield (t ha^{-1}) was erroneously printed. This may be read as N Content (%) in grain.

INSTRUCTIONS TO AUTHORS

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EXAMPLES

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In Text:

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