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Physical Sciences

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SYNTHESIS OF GRAFT COPOLYMER CASEIN-G-BUTYLACRYLATE

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Poly (butylacrylate) was graft copolymerised onto Casein in the presence of phosphate buffer using potassium persulphate as catalyst. The effects of concentration of monomers, backbone and catalyst on rate of conversion of monomer (Rp), rate of graft copolymerization (Rg), rate of homopolymerization (Rh), grafting efficiency (GE) and grafting ratio (GR) have been discussed.

Key wrods: Graft copolymer, Casein-g-butylacrylate, Homopolymerization.

Pak J Sci Ind Res 1999 **42** *(3) 113-116*

Effects of Probe Shapes on the Barrier Height and Surface Conductance of Tellurium Thin Films

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The study centered on the effects of probe shapes on the conductance and barrier height of Tellurium thin films. It was found that the shape of the contacts affected the conducting behaviour of the films. The conductances of each of the sample used changed with the shape of the contacts. This can even be discovered with those of the differential electrodes having relatively lower conductance compared with their counterparts. However, the study revealed that the shape of the contacts had no significant effects on the barrier height of tellurium thin films.

Key words: Probe shape, Barrier height, Conductance, Tellurium, Thin films.

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THERMODYNAMIC AND VISCOMETRIC STUDIES OF POLYBUTADIENE RUBBER IN TOLUENE AT VARIOUS TEMPERATURES

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(Received 28 May 1997; accepted 6 October 1998)

The behaviour of Poly (butadiene) rubber used in local tyre industry was studied in a common solvent in the temperature range of 288-348 K by viscosity technique. Huggins and Kraemers equations were used to determine the intrinsic viscosity which showed increase with temperature. Thermodynamic parameters like ΔGv, ΔHv and ΔSv were determined showing orientation and uncoiling of molecules during flow and system becoming more ordered. Hydrodynamic volume values are reported at different temperatures.

Key words: Viscometric studies, Polybutadiene rubber, Toluene

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PHYSICO-CHEMICAL STUDIES OF EFFLUENTS AND EMISSIONS OF GHEE/EDIBLE OIL INDUSTRIES IN PAKISTAN

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Samples of the effluents from various Ghee / Edible Oil Industries were collected on fortnightly basis from July 1993 to June 1994 and of the emissions from January to April 1994. Parameters such as temperature, pH, conductivity, total dissolved solids (TDS), total suspended solids (TSS), total alkalinity / total acidity, total hardness, chemical oxygen demand (COD), chlorides, sulphates, phosphates, silica, calcium, magnesium, sodium, and iron were determined in the effluents. Trace metals like copper, manganese, nickel, and zinc were determined by atomic absorption spectroscopy, whereas SO_2, CO CO_2, hydrocarbons, hydrogen, nitrogen, oxygen and argon were examined in the flue gases by Gas Chromatography and other standard techniques such as Orsat Gas Analyzer and Dragger Detection Tubes. Remedial measures were suggested for the pollutants exceeding the National Environmental Quality Standards, (NEQS). Parameters like chlorine, ammonia, sulphides, arsenic,cadmium, chromium, cobalt, lead and tin were also analyzed in the effluents and were found to be nil or below the detection limit, while particulate matters, HCl, chlorine, HF, H_2S, mercaptans and NH_3 were found to be nil in the flue gases.

Key words: Edible oil, Atomic absorption spectroscopy, Vanaspati ghee

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CURRENT STATUS OF NICKEL CONTAMINATION OF LOCAL VEGETABLE GHEE

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(Received 11 July 1988; accepted 1December 1998)

Nickel contamination of locally produced vegetable ghee has been evaluated using the atomic absorption flame photometric method, employing n-hexane as solubilization medium. The data, based on 3 batches of samples comprising a total of 32 samples procured from 18 manufactures, is reported as $\bar{X}\pm SD$, for 3 to 5 replicates. The nickel concentration ranges for the three batches are, 0.445-0.726 mg 100 g^{-1}, 0.668-1.2668 mg 100 g^{-1}, and 0.395-1.234 mg 100 g^{-1}, thereby indicating an inefficient nickel filtration process at individual industrial units. Substantial comparative variations in the nickel concentration are observed in the output of a given ghee industry. The estimated levels of nickel exceed the WHO's lower safe limit of 0.10 mg 100 g^{-1} ghee serving.

Key words: Nickel contamination, Vegetable ghee, Hydrogenation.

Short communication

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SOME MIXED LIGAND COMPLEXES OF ZIRCONIUM (IV), THORIUM (IV) AND URANIUM (VI)

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Biological Sciences

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STUDIES ON THE EFFECT OF BLANCHING MEDIA ON YIELD AND NUTRITIONAL QUALITY OF CARROT JUICE

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(Received 1 July 1996; accepted 7 January 1998)

Effect of various blanching processes on the retention of different nutrients in carrot juice products was investigated. Maximum brix value of the juice was 9.3 when carrots were blanched in 0.05 N acetic acid solution containing 0.2% $CaCl_2$. However, brix values of the juice obtained from unblanched and water blanched carrots were 8.1 and 8.5 respectively. Highest amount of carotene and vitamin C was also found in the juice which was obtained from carrots after blanching in acetic acid and 0.2 % $CaCl_2$ solution. Other blanching processes showed adverse effects on the retention of carotene in carrot juice products compared with unblanched carrot juice.

Key words: Carrot, Blanching processes, Carrot juice, Nutritional value.

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Effects of Sulphur, Zinc and Boron On Yield, Yield Components and Nutrient Uptake of Wheat

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(Received 12 December 1996; accepted 4 June 1998)

A field experiment was carried out in an alluvial soil of Bangladesh to study the effect of S, Zn and B on yield, yield components and nutrient uptake by wheat (cv. Kanchan). There were eight treatments consisting of control, S, Zn, B, S+Zn, S+B, Zn+B and S+Zn+B. The rates of application of S, Zn and B were 20, 4 and 3 kg ha^{-1} in the form of gypsum, zinc oxide and boric acid, respectively. Basal doses of 100 kg N ha^{-1} as urea, 60 kg P_2O_5 ha^{-1} as TSP and 40 kg K_2O ha^{-1} from muriate of potash were applied to all plots. The experiment was carried out in randomized block design with four replications. The application of S, Zn and B significantly increased plant height, effective tillers $plant^{-1}$, spike length, grain $spike^{-1}$, 1000-grain weight and grain and straw yields of wheat. The effect of S was dominant in increasing grain yield followed by B and Zn applications. The highest grain yield of 25.82 q ha^{-1} was obtained when S, Zn and B were applied together which was 42% higher over control. Nutrient analysis of grain and straw indicated that S, Zn and B contents were significantly influenced by the treatments. The content of S, Zn and B in grain was higher when a particular nutrient was applied. Thus, for efficient wheat production in this soil, application of S, Zn and B is essential.

Key words: Micro nutrient uptake, Wheat, Yield.

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COMBINING ABILITY ANALYSIS IN MAIZE (*ZEA MAYS* L.)

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(Received 22 October 1996; accepted 23 September 1998)

Combining ability analysis was carried out in maize (*Zea mays* L.) in a 7x7 diallel, excluding reciprocals. Both the general (GCA) and specific combining ability (SCA) effects were significant for all the characters studied namely days to pollen shedding, days to silk, plant height, ear height and biomass weight per plant. Combining ability analysis indicated that additive gene action was more important than non-additive gene action and the best general and specific combiners were selected. Lines #7721 and #7785 showed significantly desirable GCA effects for days to pollen shedding and days to silk, S 2-9, for plant height, S 16-2, for ear height and #1018 and S16-2 for biomass weight per plant. The number of crosses showing desirable significant SCA effects for days to pollen shedding, days to silk, plant height, ear height and biomass weight per plant were 7, 4, 6, 6 and 8 respectively.

Key words: Diallel, Maize, General Combining Ability (GCA).

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EFFECTS OF UREA, *AZOLLA* AND *SESBANIA* INCORPORATION ON THE CONCENTRATION AND UPTAKE OF N, P, K AND S IN RICE (*ORYZA SATIVA*)

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(Received 29 September 1996; accepted 22 September 1998)

A field experiment was conducted to examine the effect of urea, *Azolla*, and *Sesbania* incorporation on N, P, K and S concentration and uptake in BR11 rice. *Sesbania* plants (with or without *Bradyrhizobium* inoculation) were incorporated to soil after 70 days of sowing. *Azolla* was mixed with soil after 20 days of its application. The *Sesbania* treatment resulted in the highest nutrient concentration and uptake in rice. Next to *Sesbania* (inoculated), urea and *Sesbania* (uninoculated) played a good role in improving nutrient level of rice. *Azolla* manuring did not give good result due to poor growth because of high temperature prevailing during the growth period. Ratio of N-P, N-K and N-S concentrations in both grain and straw were fairly constant during the treatments.

Key words: *Azolla*, Micronutrient uptake, Rice, *Sesbania*, Urea.

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TOXIC EFFECTS OF ZINC ON DIFFERENT TREE SEEDLINGS

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(Received 15 September 1997; accepted 11 January 1999)

A significant reduction in seed germination, seedling growth and dry weight of *Albizia lebbeck*, *Peltophorum pterocarpum* and *Thespesia populnea* was noted when zinc concentration was increased. A significant reduction ($p<0.05$) in seed germination due to zinc toxicity at 50 $\mu g\ ml^{-1}$ was observed in *A. lebbeck* and *P. pterocarpum*. Higher percentage of decrease in seed germination of *P. pterocarpum* was found with 125 $\mu g\ ml^{-1}$ zinc treatment. The seedling length and seedling dry weight of *A. lebbeck* was significantly ($p<0.05$) reduced with 50 $\mu g\ ml^{-1}$ and 75 $\mu g\ ml^{-1}$ treatment of zinc respectively.

Key words: Germination, Seedling growth, Tolerance, Toxicity, Zinc sulfate.

Short Communication

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STUDY OF ANABOLIC EFFECTS OF *PEGANUM HARMALA* OIL

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Technology

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Development of Catalyst from Natural Clays for Friedel Crafts Alkylation and New Synthesis of 9,10 Dihydroanthracene

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(Received 8 September 1997; accepted 17 May 1998)

Catalytic activity of the natural kaolinitic clays of Pakistan containing transition metals (Fe and Ti) has been examined for the synthesis of 9, 10 dihydroanthracene [I]. The chemical composition of these clays has been determined with and without activation and XRF analysis has been carried out. Catalytic activity of these clays has also been evaluated for the synthesis of 9, 10 dihydroanthracene [I] of low temperature (60-100°C). This method has been standardised, which is a simple method as compared to the methods reported in the literature. The benzylation of phenol with benzyl chloride, resulting in the formation of ortho [II]and para [III] hydroxydiphenyl methane proceeds very smoothly in the water bath to yield 100% of the product. Clays containing (Ti) and Fe) are most effective for the alkylation with benzyl chloride. Leaching of alkaline cations results in the generation of large amount of transition metal cations. This improves the catalytic effect of the acid treated clays.

Key words: Clay catalyst, Synthesis of 9, 10 dihydroanthracene.