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Physical Sciences Section

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SYNTHESIS OF n-BUTYL ACRYLATE-CO-ETHYL ACRYLATE AND POLYBLENDS WITH CHLORINATED RUBBER (CR)

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Free radical copolymerisation of n-butyl acrylate (n-BA) and ethyl acrylate (EA) in methyl ethyl ketone MEK was accomplished at 60°C using BPO as initiator. It was observed that these monomers form copolymers in all monomeric ratios. Tensile properties and hardness were investigated for the polyblends prepared from chlorinated rubber and n-BA-Co-EA. It was further observed that crosslinking density is increased with increase in the concentration of chlorinated rubber. Increase in crosslinking density appeared in the form of more tensile strength. Plasticizer and copolymer made the polyblends more soft and flexible. It is concluded that these blends may serve as good film forming materials.

Key words: Polymer blends, Chlorinated rubber, Butyl acrylate, Ethyl acrylate.

ISOLATION AND NMR-ASSIGNMENTS OF 19 α H-LUPEOL FROM *E. HELIOSCOPIA* LINN (N.O. EUPHORBIACEAE)

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A triterpenoid resembling lupeol was isolated from the latex of *Euphorbia helioscopia* Linn. The structure was elucidated by physico-chemical methods and confirmed as 19 α H-lupeol. The generated data have been compared with those of stereoparent lupeol, nepehinol and the previously isolated compound which was erroneously given the same structure.

Key words: Euphorbiaceae, *Euphorbia helioscopia* latex, 19 α H-Lupeol.

IMPACT OF GROUNDWATER IRRIGATION ON THE CHEMICAL CHARACTERISTICS OF SOIL AT SHAHZADPUR IN BANGLADESH

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The fate of soil chemical characteristics as a function of ground water irrigation was observed at Shahzadpur Thana under the district of Sirajgonj. The chemical analyses viz pH, EC, organic carbon, N, P, K, Ca, Mg, S, Zn, Fe, Cu, Mn, B and Na were performed on 20 irrigated and respective 20 non-irrigated soils. Before irrigation, soil pH was neutral to slightly alkaline. Irrigation did not bring remarkable change on soil pH but increased EC significantly (EC of non-irrigated soil was 2.16-3.34 Scm^{-1} and that of irrigated soil was 2.66-4.34 Scm^{-1}). Potassium, calcium and magnesium contents of soils were also increased significantly by the irrigation whereas, the remaining nutrients were not affected significantly.

Key words: Groundwater, Irrigation, Soil characteristics, Bangladesh.

COMPLEXES OF 1,4-DIAMINOBENZENE TETRACETIC ACID WITH SOME OF THE TRANSITION METALS

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The chemistry of the novel hexadentate amino carboxylic acid ligand 1,4-diaminobenzene tetracetic acid is reported. The title compound (BDTA) can be compared with ethylene diamino tetracetic acid (EDTA) in its structural and characteristics on coordination to several metal ions. The complexes of (BDTA) with Cobalt (II), Nickel (II), Copper (II), Manganese (II) and Zinc (II) are prepared. The structural properties of the ligand and its complexes are proposed based on elemental analysis, UV-visible, Infra-red, NMR and thermogravimetric analysis and magnetic moments.

Key words : 1,4-diaminobenzene tetracetic acid, Coordination compounds, EDTA.

Biological Sciences Section

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EFFECTS OF CHROME-SYNTAN-VEGETABLE COMBINATION RETANNAGE AND POLYMERIZATION (*IN SITU*) ON THE INTERNAL MEMBRANE OF BOVINE STOMACHS FOR EXOTIC LEATHER

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Internal membrane of bovine stomach with poor hide substance (the leather making material), a solid waste from slaughter house, was processed into exotic leather for value-added goods like ladies hand bags, purses, wallets etc. Pure vegetable, synthetic/vegetable tanning or tanning of an unlimed membrane gave unsatisfactory leather. Its thickness, hide substance, leathcrity, thermal stability and strength properties were considerably increased through polymerization *in situ* (urea formaldehyde) followed by chrome tannage and synthetic retanning, and chrome-syntan-heavy vegetable combination retannage. Resin finishing contributed additional strength and beauty to the leather. In the former case the average thickness and shrinkage temp. (Ts) were 0.8 mm and 135°C respectively with diminished surface area and coarse shrunken grain affect. In the later case the average thickness and Ts were 0.7 mm and 128°C respectively with improved stability, cutting value, better area yield with prominent natural grain patterns and about 9% more weight gain than the former case. The tensile strength in both the cases was low i.e. 34.8 kg/cm² but was within the limits of fancy light leathers.

Key words: Exotic leather, Heavy vegetable retanning, Polymerization.

USE OF FILTER CAKE IN ANIMAL DIET *PART I*. EFFECT OF USING FILTER CAKE IN THE DIET ON THE WEIGHT GAIN OF YOUNG BUFFALO CALVES

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To economize the feeding expenditure, a mixture of filter cake (a sugar industry by-product) and cotton seed cake in addition to other feed ingredients, was fed to the young buffalo calves. In addition, the animals were fed on maize fodder in Kharif season (summer) and berseem in Rabi season (winter) *ad-libitum*. The duration of experiments varied from 121 to 150 days. In all the experiments, weight gained by the animals increased with increasing quantity of filter cake in the diet. The trend in weight gain due to treatments remained almost similar and filter cake containing diet gave higher weight gains over pure cotton seed cake. Weight gain(%) by animals receiving pure cotton seed cake varied from 18.1 to 24.7 %, whereas filter cake containing diets gave 20.6 to 37.7% weight gain.

Key words: Filter cake, Buffalo calves, Diet.

PRODUCTIVITY OF RICE-WHEAT SYSTEM IN RELATION TO AZOLLA GREEN MANURE FERTILIZED WITH NITROGEN AND PHOSPHORUS

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(Received 19 February 1995; accepted 23 August 1997)

Nitrogen contribution of *Azolla* fertilized with nitrogen (N) and phosphorus (P) in rice-wheat sequence was investigated in a greenhouse study. Rice yield was significantly increased over control when 100 mg N kg⁻¹ soil alongwith 12 and 24 mg P kg⁻¹ soil was applied in the absence of *Azolla* green manuring. The rice straw yield was significantly increased at both 50 and 100 mg N kg⁻¹ soil over control. *Azolla* green manure increased both the straw and grain yield significantly ($P < 0.05$) at all levels of N and P application. Total N uptake followed the trend observed for straw and grain yield. The 50-12 mg N-P kg⁻¹ soil alongwith *Azolla* green manure contributed 2 % of the total N to rice whereas by doubling the P application rate, N contribution increased to 50%. However, application of 100-24 mg N-P kg⁻¹ soil, the relative N contribution by *Azolla* sharply decreased to about 30 %. The highest residual N content in soil was observed where 100-24 mg N-P kg⁻¹ soil and *Azolla* green manure was applied. However, the highest P content of soil was observed which received 50-24 mg N-P kg⁻¹ soil. The residual effect of applied N and P and *Azolla* green manuring significantly increased straw and grain yield of wheat in soil where 50-12, 50-24 and 100-24 mg N-P kg⁻¹ soil were applied to rice crop as compared with control.

Key words: Rice-wheat system, *Azolla* green manure, Nitrogen fertility.

EFFECT OF OKRA LEAF SHAPE ON BOLL ROT, EARLINESS AND YIELD OF UPLAND COTTON *GOSSYPIMUM HIRSUTUM* L

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Seedcotton yield, earliness and boll rot incidence studies on the okra leaf trait against normal leaf were carried out at Cotton Research Institute, Sakrand during 1993. Boll rot incidence of 28.8% was recorded in normal leaf trait as against 7.7% of okra leaf. Thus okra leaf trait reduced the boll rot incidence considerably and the percentage difference over normal was 70.8%. Okra leaf shape was earlier than normal leaf shape and formed and opened more number of bolls per plant thus out yielded normal leaf cultivar by giving 3002 kg ha⁻¹ seedcotton yield as compared with 2870 kg ha⁻¹.

Key words: Okra leaf, Earliness, Boll rot, Yield.

PREPARATION OF WEIGHT REDUCING DIET AND ITS BIOLOGICAL AND CLINICAL EVALUATION

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Present studies were carried out for the preparation of weight reducing diet for obese people. Formulation of weight reducing diet is based on entirely local ingredients. It is cheaper than all other foods imported for this purpose. Clinical evaluation showed that average body weight reduction was 3 lbs week⁻¹ and it had no side effects like hypoglycaemia, hypokalaemia, hyponatraemia and hyperuricaemia.

Key words: Weight reduction, Low calorie diet, Soybeans.

SEED-BORNE MYCOFLORA OF VEGETABLE SEED LOTS IN NORTHERN AREAS OF PAKISTAN

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Seed-borne mycoflora of sixty six vegetable seed lots from Northern Areas of Pakistan were examined using the standard blotter technique. Thirteen genera and 21 species of fungi were obtained from contaminated seed lots. *Alternaria alternata* was found in 71.21% of the seed lots (range 0.5-89.5%), *Fusarium moniliforme* was recorded in 34.84% of the seed lots (range 0.5-57%) and *Penicilium* sp were observed in 28.78% of the lots (range 0.5-11.1%). Besides these *Aspergillus flavus*, *Alternaria radicina*, *A tenuissima*, *Botrytis cinerea*, *Cephalosporium* sp, *Chaetomium* sp, *Cladosporium* sp, *Curvularia* sp, *Dichomera* sp, *Drechslera hawaiiensis*, *Fusarium culmorum*, *F equiseti*, *F nivale*, *F oxysporum*, *F semitectum*, *F solani*, *Nigrospora* sp and *Verticillium* sp, were also encountered from the seed samples.

Key words: Mycoflora, Vegetable seeds, Blotter technique.

HETEROTIC RESPONSE OF F_1 SORGHUM HYBRIDS TO NaCl SALINITY AT EARLY STAGE OF PLANT GROWTH

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The analysis of variance revealed highly significant differences among 12 genotypes (6 parents and 6 F_1 hybrids) of sorghum, four NaCl solutions and interaction components. The heterotic response of the six hybrids was studied in 100 mM and 150 mM NaCl solution. In 100 mM NaCl, all the hybrids manifested positive and significant amount of heterosis over mid-parent, and when compared with their better parents four hybrids displayed significant increase in root length. Under 150 mM salinity level root length of all the genotypes was inhibited severely; only two hybrids i.e. B-378 Red Lan x QL 10 and INRA 209 X B-378 Red Lan yielded best heterosis and heterobeltosis. The results suggested that manifestation of non-significant and significant heterosis over mid parent is due to the genes acting additively and non-additively, respectively, whilst the occurrence of heterobeltosis is by the genes with overdominance.

Key words: Sorghum Hybrids, Heterosis, Salinity.

GENETIC STUDIES OF COTTON (*GOSSYPIMUM HIRSUTUM* L) I. COMBINING ABILITY AND HETEROSIS STUDIES IN YIELD AND YIELD COMPONENTS

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To estimate the heterosis and combining ability effects in cotton, 4 x 4 diallel cross experiment was conducted. Significant general combining ability effects were observed in seed cotton yield, bolls per plant, plant height, seeds per boll and seed index, (100 seed weight), whereas specific combining ability effects were significant for seed cotton yield, bolls per plant, boll weight, seed index and non significant for plant height and seeds per boll. Reciprocal effects were observed for seed index only. B557 was the best general combiner for seed cotton yield, bolls per plant and plant height. Heterosis and heterobeltiosis were observed for all the characters under study.

Key words: General combining ability, Specific combining ability, Hybrid, Heterosis.

Technology Section

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GEOCHEMICAL CHARACTERIZATION OF IMPORTANT MAGNESITE DEPOSITS OF PAKISTAN FOR THEIR MODERN INDUSTRIAL APPLICATION

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Magnesite occurrence in Pakistan appears to be a part of Himalayan Orogenic System as all magnesite deposits occur along the Axial Belt. Two major genetic types of magnesite have been recognised in Pakistan. Crystalline and replacement magnesite hosted in carbonate rocks and cryptocrystalline (amorphous) magnesite hosted in ultramafics. Commercially both types of deposits occurring in Kumhar and Muslimbagh are important but the reserves of Kumhar are large. Magnesite deposits in Pakistan are being mined by open cast method and the production is only few thousand tons per annum. This paper discusses briefly the quality and size of these magnesite deposits and their possible modern industrial applications.

Key words : Geochemistry, Magnesite, Pakistan, Industrial Applications.
