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Physical Sciences Section

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DETERMINATION OF COHESION AND INTERNAL FRICTION OF PLAIN CONCRETE

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(Received December 1, 1990; revised November 3, 1992)

This study investigates the ultimate friction angle and cohesion of plain concrete from its ultimate compressive strengths. Long concrete blocks (depth $\geq$ width) with 6 inch (15 cm) square loaded faces were crushed by mild steel loading plates of 1 - 6 inches (2.5 - 15 cm) width with an incremental step of 1/2 inch (12 mm). The experimental results reveal that the ultimate failure stresses of plain concrete increases with the increase in depth of concrete blocks and decreases with increasing width of loading plates. The failure stresses are related reciprocally to the ratios of the width of loading plates to the width of concrete block. A stronger concrete was found to possess greater cohesion and lesser friction angle than a weaker concrete. The cohesion of plain concrete was found to be practically equal to its allowable stress.

Key words: Concrete, Cohesion, Friction angle.

PREPARATION AND ELECTRICAL CONDUCTIVITY OF IODINE DOPED POLYACRYLAMIDE - CUPRIC CHLORIDE COMPLEX

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(Received April 2, 1991; revised December 5, 1992)

The preparation, DC volume conductivity and thermal analyses of crystalline complex of iodine doped polyacrylamide with cupric chloride are described. The highest electrical conductivity (1-10 S/cm), using a four point probe measurement is observed in the plane of polyacrylamide - $\text{CuCl}_2 / \text{I}_2$ film.

Key words: Polyacrylamide; Cupric chloride; Crystalline complex; Electrical conductivity.

Introduction

removed under vacuum. It became stiffer and brittle and the

SINGLE CRYSTAL GROWTH OF SUPERCONDUCTING COMPOUND Bi-Sr-Ca-Cu-O

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(Received February 29, 1992; revised December 9, 1992)

Single crystals of high temperature superconductors in the system Bi-Sr-Ca-Cu-O have been prepared by a flux method. The d.c. electrical resistivity showed that the metal to superconductor transition is at 82K. SEM showed a layered structure, while X-ray diffraction analysis indicated an ortho-rhombic structure with $a=5.39(2) \text{ \AA}$, $b=5.35(2) \text{ \AA}$ and $c=30.65(3) \text{ \AA}$.

Key words: Single crystal, Super conductors, Systems Bi-Sr-Ca-Cu-O.

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DIELECTRIC RELAXATION IN SOLID LYSOZYME

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(Received May 23, 1990; revised December 14, 1992)

Dielectric constant and loss factor of solid polycrystalline lysozyme have been measured as a function of frequency from 30 Hz to 3 MHz at different temperatures from -25° to 30° . A very weak and broad dispersion peak has been observed in the frequency range 10 - 100 KHz in addition to a strong dispersion at lower frequencies. Activation parameters of the former relaxation process have been obtained using the Cole-Cole modified Debye model of dielectric relaxation. Internal mobilities in the polar protein components are found to be the probable cause of relaxation.

Key words: Dielectric relaxation, Protein dynamics, Lysozyme.

ELECTROCHEMICAL STUDIES ON SOME AZODISPERSE DYE STUFFS AZOCREATININE

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(Received April 22, 1992; revised December 19, 1992)

Polarographic behaviour of some azodisperse dye stuffs; 4,4'(5-azo-2-imino-1,5-dihydro-1-methylimidazol-4(H)-one) diphenyl (A); 3,3'-dimethoxy-4,4'-(5-azo-2-imino-1,5-dihydro-1-methylimidazol-4(H)-one) diphenyl (B); 4,4'(5-azo-2-imino-1,5-dihydro-1-methylimidazol-4(H)-one)-2,2'-stilbene disulphonic acid (C) and 2',3'-dimethyl-4-(5-azo-2-imino-1,5-dihydro-1-methylimidazol-4(H)-one)-benzidine (D) have been studied in universal buffer solution containing 10% (v/v) DMF over pH range 2-12. Millicoulometric method was employed for the determination of the total number of electrons in the reduction process, and the kinetic parameters $\propto k_{f,b}^-$ and $\Delta G^\ddagger$ were evaluated. The proposed reduction mechanism was based on the results obtained. The d.c polarography was used to develop an analytical method for azodisperse dye determination in the micro scale.

Key words: Azodisperse, Dyestuffs, Polarography, Electrochemistry.

Introduction

$\text{Ag}^+/\text{AgCl}^-/\text{KCl}$ as a reference electrode and a platinum

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THE SYNTHESIS AND IDENTIFICATION OF A NEW REACTIVE-DYE

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(Received August 3, 1991; revised December 1, 1992)

This study described the synthesis of a new reactive-red dye. The structure of the synthesized dye was confirmed by spectroscopic methods, elementary analysis and chemical degradation methods after purification of the crude dye by chemical and chromatographic procedures. The product so obtained dyed cotton in red colour.

Key words: Synthesis, Reactive-dye, Sulfatoethyl sulfone.

Biological Sciences Section

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ANALYSIS OF PROTEIN AND PEROXIDASE FROM EMBRYOGENIC AND NON-EMBRYOGENIC CULTURES OF *CITRUS RETICULATA* L.

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(Received March 10, 1991; revised October 6, 1992)

Cotyledons excised from 18 days old seedlings were used as explant source for callus induction in *Citrus reticulata* L. c.v. *Kinnow mandarin*. Various media combination were tested. The modified Murashige and Skoog media containing 2,4-dichlorophenoxyacetic acid (2,4-D) 1.0 mg/l, benzylaminopurine (BAP) 0.5 mg/l and naphthaleneacetic acid (NAA) 0.5 mg/l proved to be optimum for callus formation. Non-embryogenic calli were noted during first three passages and embryogenic calli started initiating from 4th passage and continued even after prolonged subculturing. Biochemical analysis revealed that quantitative differences existed in proteins both in embryogenic (E) calli and total non-embryogenic (NE) calli. Total protein quantity ($\mu\text{g/g}$ culture) drastically decreased till the 3rd passage and progressively increased later on. The embryogenic culture also showed higher level of peroxidases activity.

Key words: *Citrus reticulata* L., Cotyledon, Callus, Non-embryogenic, Protein, Peroxidase.

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PHYTIC ACID, POLYPHENOLS AND POTENTIAL NUTRIENTS IN *BRASSICA* SEEDS

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(Received April 18, 1990; revised December 17, 1992)

Some exotic and indigenous *Brassica* seeds were analysed for proximate composition, trace elements, vitamins, phytic acid and phenolic compounds. While comparing results with that reported for soybean (taken as standard) *Brassica* seeds contained higher amounts of fat (32.06 - 37.13%), iron (67-136 ppm), manganese (26.1 - 44.1 ppm) nicotinic acid (129-161 ppm) riboflavin (3.20 - 5.88 ppm), phytic acid (2.30 - 3.58%) total phenols (0.74 - 1.20%) and sinapine (0.15 - 0.55%) but were lower in protein (25.57 - 30.69%), copper (5.00 - 8.55 ppm) and zinc (30.1 - 38.4 ppm) content. More variability in phytic acid and phenolics (16.79 - 33.33%) indicated a possibility of selection of low phytic acid and low polyphenol cultivars in a breeding programme.

Key words: *Brassica* cultivars, Trace elements, Total phenolics, Sinapine, Phytic acid.

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BIOLOGICAL EVALUATION OF SEA SQUID FOUND IN PAKISTAN WATERS

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(Received September 26, 1990; revised January 14, 1993)

The protein quality of sea squid supplemented wheat flour was evaluated and compared with casein supplemented and unsupplemented wheat flour, using albino rats as the experimental animals. The protein efficiency ratio (PER), net protein ratio (NPR), true digestibility (TD), biological value (BV), net protein utilization (NPU) and net protein utilization standardised (NPUs) were found to be 3.27, 4.17, 95.1, 82.6, 79.0 and 95.0 respectively. These values were significantly higher than those for casein supplemented wheat flour except TD which was slightly lesser, but exceeded by the value of unsupplemented wheat flour. The sea squid flour may be an ideal source of protein for enriching the wheat flour which is deficient in lysine.

Key words: Sea squid, Biological evaluation, Enriched wheat flour.

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QUANTITATIVE STUDIES ON THE WEEDS OF WHEAT FIELDS OF RIWAT AREA, ISLAMABAD

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(Received September 9, 1991; revised December 19, 1992)

A study of the weeds of wheat fields of Riwat area, Islamabad, showed the presence of 51 species of which about 84% were dicots, the rest being monocots. The families Asteraceae (7 spp.), Papilionaceae (6 spp.) and Poaceae (6 spp.) contained the largest number of species. On the basis of importance value index the five most dominant weed species were *Convolvulus arvensis*, *Anagallis arvensis*, *Fumaria indica*, *Oxalis corniculata* and *Taraxacum officinale*. Nearly 79% of the species were annual.

Key words: Weed, Wheat, Quantitative, Islamabad.

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HYPOCHOLESTEMIC ACTIVITY OF SEA SQUID FROM KARACHI COAST

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(Received November 30, 1991; revised December 24, 1992)

Studies have been carried out to determine the cholesterol content of sea squid and the effect of squid meat diet on the cholesterol level of rabbit serum. The cholesterol in five species of sea squid varied between 215 and 349 mg/100 g of raw tissue. The cholesterol in rabbit serum after feeding on diet containing sea squid meal ranged from 98.26-188.91 mg/100 ml of serum compared to control group with a value of 185.01-188.12 mg/100 ml of serum.

Key words: Squid, Hypocholestemic activity, Rabbit.

PERFORMANCE OF F_1 HYBRIDS FROM INTRAHIRSUTUM CROSSES OF UPLAND COTTON

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(Received November 12, 1991; revised December 24, 1992)

Study was conducted to estimate the magnitude of heterosis for seven important characters of intrahirsutum F_1 hybrids. The characters studied included, yield of seed cotton per plant, bolls per plant, boll weight, seed and lint indices. The data showed significant differences between mid parents and F_1 hybrids for all the traits except boll weight. The maximum positive heterotic response of F_1 hybrids over mid and better parents respectively were, 20.62 and 13.72% for seed cotton yield, 19.34 and 12.77% for number of bolls, 15.22-12.88% for boll weight, 3.25 and 2.35% for lint percentage, 7.62 and 2.74% for staple length, 4.22 and 2.44% for lint index. With respect to seed index, the maximum heterosis of 9.66% in F_1 over mid parent was recorded. Considerable amount of heterosis displayed by various traits suggested possibility of more improvement in these traits and number of bolls is the most important criterion for increasing cotton yield.

Key words: *Gossypium hirsutum*, Heterosis, Yield, Yield components.

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PODOSPORA PSEUDOINQUINATA SP. NOV.

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(Received December 22, 1991; revised January 10, 1993)

During the investigation on coprophilous fungi, a species of *Podospora* was collected on camel dung from Paradise Point, Karachi. Since this species does not fit with any of the known species, a new species *Podospora pseudoinquinata* is proposed.

Key words: *Podospora*, New species.

Short Communication

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Toxicity of Endosulfan to Adult *Aphytis melinus* De Bach (Hymenoptera: Aphelinidae)

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Technology Section

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SUITABILITY OF SELECTED FRUIT AND VEGETABLE PULPS FOR JAM PREPARATION

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(Received December 19, 1991; revised December 30, 1992)

This study reports on processing of single and mixed-fruit jams from mango, pineapple, jack-fruit, guava, water-melon and carrot pulps. The fruit and vegetable pulps were analysed for moisture, total soluble solids, total sugar, acidity, ascorbic acid and ash contents. Forty eight samples of jams were prepared from single and composite of these fruit and vegetable pulps. Freshly prepared jams were analysed for total soluble solids, acidity and pH and their acceptability were evaluated by a taste panel. The optimum total soluble solids and pH were found around 67.0% and 3.0 respectively. Except watermelon all other fruit and vegetable pulps were suitable for jams preparation. The jams were shelf-stable under ambient temperature upto 12 months.

Key words: Fruit and vegetable pulps, Jams, Processing.