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Physical Sciences

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SYNTHESIS AND PHARMACOLOGICAL ACTIVITIES OF CERTAIN ESTERS OF ANTHRANILIC ACID CONTAINING THE SULFANILAMIDE MOIETY

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The potassium salts of N-substituted anthranilic acid (**I**) were allowed to react with N⁴-chloroacetylsulfonamides (**II**), to give substituted aminosulfamoylphenyl aminocarbonylmethyl, N-substituted anthranilic acid esters (**III**). The structure of the produced ester (**III**) were confirmed by microanalytical and spectral data. Preliminary pharmacological testing of the new esters showed that, some derivatives were found to possess marked antipyretic, analgesic and antispasmodic activities compared with paracetamol and atropine as reference drugs.

Key words: Anthranilic acid, Sulfanilamide moiety, Ester

HEAVY METAL CONTENTS AND OTHER PHYSICAL QUALITY INDICES OF SEWERAGE, CANAL AND DRINKING WATERS

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Analysis of Cd, Pb and Cu in canal, sewerage and drinking waters by potentiometric stripping analysis (PSA) is described. Other quality indices of waters such as temperature, pH, EC and total solid were also determined. The levels of heavy metal contents of sewerage, canal and drinking waters revealed marked differences and wide coefficient of variability (CV). Generally Cd and Pb contents were higher in sewerage than canal and drinking waters. However, Cu content of drinking waters was higher than other waters tested. The total solids were found to be generally higher in sewerage and canal waters than drinking waters. The variations in temperature, pH and EC were marginal to marked depending upon the source and the location.

Key words: Environmental pollution, Water pollution, Heavy metals and contamination.

GRAFTING OF GROWING POLYMERIC CHAINS

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Growing polymer chains of vinyl acetate were grafted onto casein in an aqueous medium at 60°C using $K_2S_2O_8$ as initiator. The effects of monomer concentration, backbone concentration and activator concentration were determined. Grafting was confirmed by elemental analysis, solubility, IR spectroscopy and intrinsic viscosity.

Key words: Grafting efficiency, Hetrogenous protein, Swelling uptake.

STUDIES ON PESTICIDE RESIDUES IN HUMAN BLOOD

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(Received 31 July 1999; accepted 11 September 2000)

Organochlorine, organophosphorus and synthetic pyrethroid pesticides, commonly used for cotton crop protection were examined in human blood samples of pickers and farmers of cotton growing areas of Multan division. A total of 75 samples, collected during 1992 and 1993 crop seasons were screened for the presence of the pesticides by analytical procedures involving extraction, cleanup and gas chromatographic determination. 85% samples were found to contain residues of studied pesticides. However, their quantities were quite low and not harmful for health except in very few cases.

Key words: Pesticide residues, Human blood, Cotton pickers.

CURING OF NATURAL RUBBER AND EPOXY ADHESIVE

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Low molecular weight epoxy resin based on diglycidyl ether of bisphenol A was synthesized and mixed at constant percentages with natural rubber. The rubber/epoxy system was cured with various types of curing agents such as ethylene diamine, maleic anhydride as well as the prepared resole phenol formaldehyde. A study of the photo-induced crosslinking of the prepared elastic adhesives and film samples was carried out by exposure to ultraviolet lamp (300 W) for 2 weeks at 20°C. Samples containing ethylene diamine were cured at $25 \pm 1^\circ\text{C}$ for 24 h while samples containing maleic anhydride or resole phenol formaldehyde resins were thermally cured at 150-170°C for 10 min. Cured adhesive compositions were tested mechanically and physically and evaluated as wood adhesives. While hardness, chemical resistance as well as heat stability of the prepared cured film samples were investigated. The obtained data indicate that the highest epoxy resin content and the presence of resole phenol formaldehyde resin in compositions improve the tensile strength and adhesion properties on wood. While their cured film samples have the best hardness properties, chemical resistance and heat stability.

Key words: Wood adhesives, Natural rubber, Epoxy resin, Ethylene diamine, Maleic anhydride, Resole phenol formaldehyde, Ultraviolet curing, Thermal curing.

SPECTRAL STUDIES OF BINARY AND TERNARY COMPLEXES OF SOME SULFA-DRUGS

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The complexes of Sulfamethazine (SMZ), Sulfathiazole (STZ) and Tolbutamide (TA) with Cu(II) and Fe(III) have been investigated. The formation of 1:1 and 1:2 species were inferred from electronic spectra and conductivity measurements. The bonding sites are the oxygen of sulphonamide group and heterocyclic nitrogen atom of aryl moiety. Interaction of Cu(II) and Fe(III) ions with salysaldehyde as the primary ligand and with SMZ, STZ and TA as secondary ligands has been studied spectrophotometrically. The data indicate the formation of ternary complexes with stoichiometric ratio of (1:1:1). Stability of binary and ternary complexes was found to be in the order. SMZ>STZ>TA

Key words: Binary and ternary complexes, Sulfadrugs, Sulfamethazine, Sulfathiazole, Tolbutamide.

CONDENSED BENZOPYRANS VI. 8 *H*-PYRANO[3,2-*f*]QUINOXALINES

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The basic ring system 8*H*-pyrano[3,2-*f*]quinoxaline and its alkyl, aryl and oxo derivatives (5a-5d) were prepared by the reaction of 5,6-diaminocoumarin with appropriate 1,2-dicarbonyl compounds.

Key words: Pyrano[3,2-*f*]quinoxalines, coumarins, ¹H NMR Spectra.

Biological Sciences

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EFFECT OF BENLATE ON THE EFFICACY OF *BRADYRHIZOBIUM* SP., IN THE CONTROL OF ROOT ROT DISEASES OF CROP PLANTS

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(Received 6 August 1999; accepted 5 August 2000)

Effects of Benlate fungicide on the efficacy of *Bradyrhizobium* sp., in the control of root infecting fungi viz., *Macrophomina phaseolina*, *Rhizoctonia solani* and *Fusarium* spp. were evaluated under field conditions on mungbean, soybean, cotton and sunflower. *Bradyrhizobium* sp., used alone or mixed with Benlate showed good biocontrol and growth promoting effects. Benlate was found as the most effective treatment in the suppression of *F. solani* infection.

Key words: Benlate, *Macrophomina phaseolina*, *Rhizoctonia solani*, *Fusarium solani*.

AUTOLYSIS OF PROTEOLYTIC ENZYME IN METASTATIC BREAST CANCEROUS TISSUE

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Studies on autolysis of proteolytic enzyme like cathepsin revealed that the purified enzyme was autolysed by metastasis or due to absence of stabilizer. Crude tissue was extracted with sodium chloride buffer containing EDTA and Triton x-100. Extract was analyzed for total protein and protease activity. Protein/peptide was analyzed/purified using SDS polyacrylamide gel electrophoresis, ion exchange chromatography and reversed phase HPLC. Results indicated the autolysis during purification of enzyme. It is concluded that during and after purification suitable stabilizer of enzyme should be added. *In vitro* experiment indicated that *in vivo* (cancerous tissue), the imbalance of specific stabilizer/inhibitors of protease cause autolysis of enzyme and the resulting peptides cause the damaging effects.

Key words: Proteases, Chromatography, Breast cancer, Autolysis.

TRAFFIC NOISE IN HYDERABAD CITY, PART-II. VEHICULAR CONTRIBUTION TO ROAD TRAFFIC NOISE

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The results of a road traffic noise survey carried out in Hyderabad city showed that the levels of traffic noise in the City are alarmingly high and much beyond the comfortable limits. Therefore, in order to investigate the level of the noise emitted by different types of vehicles plying on the city roads and to assess their individual contribution to high level traffic noise, studies have been carried out on the measurement of noise emitted by motorcycles, buses, auto-rickshaws, and motor vehicle horns as they normally move on the city roads. The data collected has been analyzed for L_{v99} , L_{v90} , L_{v50} , L_{v10} , and L_{v1} and results are discussed with reference to the existing motor vehicle rules in Pakistan and motor vehicle noise emission limits set by the EEC and other developed countries. Some suggestions have also been made to limit high level traffic noise.

Key words: Traffic noise, Noise pollution, Motor vehicle noise.

HYPOTENSIVE ACTION OF AN EXTRACT OF *HIBISCUS ROSA SINENSIS*, LINN

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(Received 11 February 1999; accepted 28 August 2000)

Hypotensive action of extract of pink flowers of *Hibiscus rosa sinensis*, Linn. was investigated in rats and dogs. It was found that 45 mg kg⁻¹ of an aqueous extract of pink flowers lowered the blood pressure of rats from 80 mmHg to 40 mmHg while a dose of 60 mg kg⁻¹ of same extract produced a fall in blood pressure of dogs from 120 mmHg to 40 mmHg, but the duration of hypotensive action was more than 3-4 h in both the cases i.e. rats and dogs. Also the biphasic response of the drug and its possible mode of action is discussed.

Key words: *Hibiscus rosa sinensis*, Aqueous extract, Hypotensive action.

UTILIZATION OF RAPESEED MEAL/CAKE IN POULTRY FEED. PART II. EFFECT OF INCORPORATING HIGHER LEVELS OF RAPESEED CAKE IN POULTRY DIET ON LAYING PERFORMANCE OF BROWN-EGG LAYER (TETRA SL)

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(Received 7 May 1999; accepted 28 August 2000)

An experiment was conducted to see the effect of higher levels of rapeseed cake (15, 20 and 25%) in poultry diet on the performance of laying hen (Tetra SL). All the diets were isocaloric (within the range of 319 to 321 kcal 100 g⁻¹), isoproteinacious (17.19 to 17.31%) and the fibre contents were within the recommended range (2.98 to 3.52%). The experiment was of 28 days duration. Egg size was maximum for the 20% rapeseed cake group (62.25g) followed by the 25% group (61.24 g) and minimum for 15% rapeseed cake group (58.26 g). Egg size of standard group was 58.99 g. The egg laying percentage was 60% for standard group and 59.33% for 25% rapeseed group. No difference in birds live weight was observed due to feed variation throughout the experimental period. No mortality was recorded. Organoleptic evaluation by trained judges revealed no difference in overall acceptability of eggs by all the groups.

Key words: Rapeseed meal, Poultry diet, Egg laying.

STUDIES ON THE ISOLATION AND SCREENING OF INDIGENOUS CITRIC ACID PRODUCING STRAINS

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(Received 20 April 2000; accepted 30 August 2000)

Sixty three strains of *Aspergillus niger* were isolated and investigated for citric acid production. Three strains S-43, S-44 and S-63 were found to produce citric acid with approximately 40% yield on the basis of glucose or sucrose supplied. Media and carbohydrate concentrations were varied to optimize the citric acid production.

Key words: Citric acid, *Aspergillus niger*, Mutation.

THE RHEOLOGICAL AND BAKING PROPERTIES OF WHEAT/COCOYAM COMPOSITE FLOUR

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(Received 1 October 1997; accepted 31 August 2000)

Rheological and baking tests were carried out on wheat-cocoyam composite flour mixed in different proportions. The results of the farinograms and extensograms showed that replacement of wheat flour up to 20% level gave bread of acceptable quality. The proportion of extensibility and resistance to force decreased with the increase of cocoyam flour in the composite mix. Mixing tolerance index also indicated the poor quality of the composite flour beyond 20% replacement. Breadmaking properties, as indicated by internal and external scores, also showed that beyond 20% replacement level the bread was unattractive and lacking in the required quality attributes.

Key words: Cocoyam-wheat flour blends, Rheological properties, Baking properties, Wheat-cocoyam flour blends.

ECONOMIC GAIN FROM SUNFLOWER-MUNGBEAN INTERCROPPING SYSTEMS UNDER RAINFED CONDITIONS

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(Received 25 May 1999; accepted 17 October 2000)

Economic gain from sunflower-mungbean intercropping systems was assessed at University of Arid Agriculture, Rawalpindi, Pakistan, during spring and summer, 1996. Land equivalent values showed a significant advantage of intercropping in both the systems and the seasons. Economic analysis showed that sunflower + mungbean (1:1) during spring season and sunflower + mungbean (1:2) during summer season provided higher benefit cost ratio (BCR) and net income.

Key words: Intercropping, Benefit-cost Ratio, Sunflower, Mungbean.

Short Communication

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**BIOCHEMICAL AND ANTIBACTERIAL
STUDIES OF AJOWAN (*CARUM COPTICUM*)
OIL**

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Carum copticum is used for the treatment of gastric and

Technology

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IMPACT OF ALUMINIUM TANNING ON THE INTERNAL MEMBRANE OF BOVINE STOMACH FOR NOVELTY LEATHER

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(Received 21 December 1999; accepted 7 October 2000)

Internal membrane of bovine stomach is a by-product of slaughter house. Employing masked alum tannage on the delimed and well-bated membranes, they have been converted successfully into cream coloured novelty leather. The leather was found fit to fabricate ladies hand bags, jewellery boxes, wallets, purses etc. The stomach leather was light weight (168-465 g) with adequate percent elongation at break (43.8 - 112.3% longitudinally and 16 - 110% laterally) and has shrinkage temperature between 73 - 77°C. The tensile strength of the leather (100.6 N/cm²-423 N/cm² longitudinally and 102.9 N/cm²-405 N/cm² laterally) was within the range of light weight fancy leathers. It bears good resistance to repeated flexing (20,000 flexes, dry). Its has moderate resistance to washing in solution of neutral detergents. Thickness of the leather (0.6 - 1.3 mm) is also suitable for making the fancy leather products.

Key words: Novelty leather, Masked alum tannage, Bovine stomach.

DETERMINATION OF THE THICKNESS OF GOLD LAYER

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A method for the determination of the thickness of gold layer on top of silver substrate has been developed. Various samples having silver as the substrate were coated with gold for different time durations by ion sputtering. The gold to silver X-ray counts ratios were determined using an energy dispersive spectrometer equipped to the scanning electron microscope. A graph plotted between the gold to silver X-ray counts ratios and the thickness of the gold layers enables to determine the gold layer thickness of an unknown sample by merely measuring its gold to silver X-ray counts ratio and then extrapolating this ratio to its corresponding thickness.

Key words: Gold layers, Silver substrate, Ion sputter.