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Physical Sciences Section

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COPPER (I) COMPLEXES OF TRIPHENYLPHOSPHINE AND AMINOPHENOL

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Some new complexes of copper(I) containing mixed ligands having general formula $[\text{CuX}(\text{PPh}_3)(\text{Amph})]$, $[\text{Cu}_2\text{X}_2(\text{PPh}_3)_3(\text{Amph})]$ and $[\text{Cu}_n\text{Z}_n(\text{PPh}_3)_2(\text{Amph})]$ [where $\text{X} = \text{Cl}^-, \text{Br}^-, \text{I}^-$ and $\text{Z} = \text{NO}_3^-$ or SCN^- , $n = 1, 4$ or 5 and PPh_3 = triphenylphosphine and Amph = aminophenol] have been synthesized from $[\text{CuX}(\text{PPh}_3)]_4$ and $[\text{CuX}(\text{PPh}_3)_2]_2$ in benzene in variable ratios and characterized on the basis of infra red studies and elemental analysis. Magnetic susceptibility and conductivity measurements have also been carried out. These appear to be dimers and polymeric structures having bridging of halides, nitrate or thiocyanate groups between the two copper atoms.

Key words: Copper (I) Complexes. Mixed ligand of Triphenylphosphine, Aminophenol complexes.

**COMPARATIVE STUDIES OF BIOGENIC AMINES AND THEIR METABOLITES IN
PERIPLANETA AMERICANA BY GAS CHROMATOGRAPHY/NEGATIVE ION
CHEMICAL IONISATION-MASS SPECTROMETRY (GC.NICI-MS)**

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(Received June 9, 1992 ; revised February 6, 1995)

Biogenic amines and their metabolites in the brain tissue of the American Cockroach have been identified and quantified by different methods of extraction and derivatisation. The molecular ion of these derivatives carried most of the ion current under NICI conditions, with potential limits of detection low to the picogram level.

Key words: Biogenic amines, *Periplaneta americana*, GC-NICIMS.

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SYNTHESIS OF SOME HYDRAZONE AND PYRAZOLINE DERIVATIVES

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(Received October 1992 ; revised February 20, 1995)

Condensation of chalcones (1) with aroyl- and arylhydrazines afforded the corresponding hydrazones (2 and 3), cyclization of the hydrazones (3) with HCl gave the pyrazoline derivatives (4) which on oxidation with bromine water yielded the corresponding pyrazoles (5). Addition of 5-p-bromophenyl-3-methyl-1-p- sulphamylphenylpyrazole (5c) to allylisothiocyanate afforded the thiourea derivative (6) which was readily cyclized with ethyl bromoacetate to the corresponding oxothiazolidine (7).

Key words: Hydrazones, Pyrazolines, Preparation.

GRAFT COPOLYMERISATION OF ACRYLONITRILE ON TO POLYVINYL ALCOHOL

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(Received June 28, 1994; revised March 22, 1995)

Acrylonitrile (AN) has been graft polymerised on to polyvinyl alcohol (PVA) in aqueous medium using potassium persulfate as an initiator. The grafting was characterised by elemental analysis, solubility, I.R. and intrinsic viscosity measurements. The rate of conversion of monomer, rate of graft copolymerisation (R_g), grafting ratio (GR) increased with increasing concentration of AN and decreased with increasing concentration of PVA. Increase in catalytic concentration was found to increase rate of conversion of monomer R_g and Gr. Some PVA is left unturned by growing polymer chain of PAN which increases with increasing concentration of AN PVA or potassium persulfate. The effects of concentration of AN, PVA and potassium persulfate on GR, R_g, rate of conversion of monomer and PVA used in grafting (PG) were studied.

Key words: Grafting efficiency, Mutual termination of radicals, High energy irradiation.

PREPARATION AND CHARACTERIZATION OF ACTIVATED CARBONS FROM CASHEW NUT SHELL LIQUID AND SHELLS

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(Received September 21, 1994 ; revised April 3, 1995)

Activated carbons based on polymerized technical nut shell liquid (CNSL), polymerized cardanol, and cashew nut shells have been produced and characterized by nitrogen and benzene adsorption. High temperature activation to various percentage carbon burn-off gave products whose surface areas ranged between 200 and 1900 m²g⁻¹ and pore volumes between 0.12 and 0.68 ml g⁻¹. Both surface areas and pore volumes increase with increase in burn-off. Activation with potassium hydroxide produces the highest values of both surface areas and pore volumes. Cashew nut shell activated carbons are almost exclusively microporous with an average pore radius of 1 nm. Several analytical techniques give similar trends in the values of surface areas, pore volumes and pore radii.

Key words : Characterization, Activated carbon, Cashew plant

Biological Sciences Section

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ABUNDANCE, DISTRIBUTION AND DIVERSITY OF *BACILLUS THURINGIENSIS* IN PAKISTANIAN ENVIRONMENT

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(Received August 15, 1994 ; revised November 29, 1994)

Four hundred and seventy six samples of soil, insect cadavers, wild animal dung, decaying leaves and grain dust collected from different ecological environments in Pakistan, were used as source material to separate 647 *Bacillus thuringiensis* isolates. The abundance and frequency of Bt in the various samples was found to be in the order of soil > grain dust > wild animal dung > bird droppings > others. Isolates were randomly selected to study pesticidal protein profile on SDS-PAGE and entomocidal properties in biotoxicity assays against *Heliothis armigera* (Lepidoptera) and *Anopheles stephensi* (Diptera). Several isolates were more efficacious against *Heliothis armigera* than the available reference strain.

Key words: Crystal protein, Lepidoptera, Diptera, *Bacillus thuringiensis*.

MEDIAN LETHAL CONCENTRATION OF COPPER TO GOLDFISH *CARASSIUS AURATUS* LINNAEUS

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(Received February 12, 1994 ; revised December 11, 1994)

This study was undertaken to determine acute toxicity level (median lethal concentration) of copper to goldfish *Carassius auratus* Linnaeus, a freshwater cyprinid. The experiment was conducted in filtered (mesh size 1 μm) freshwater having total hardness 34.2 (as CaCO_3) in a static condition. Copper sulphate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) was used as a source of copper. The LC_{50} values of copper were determined from probit values of cumulative mortality percentage against exposure concentrations (dose response) using simple linear regression model $Y = a + bX$. The LC_{50} values of copper to goldfish (10.5 $\pm$ 1.43 g) were determined as 0.44 $\pm$ 0.06, 0.36 $\pm$ 0.04, 0.20 $\pm$ 0.03, 0.19 $\pm$ 0.02, 0.15 $\pm$ 0.02 and 0.14 $\pm$ 0.02 ppm for 12, 24, 48, 72, 96 and 120 hr. respectively.

Key words: Goldfish, Copper, Toxicity.

STUDIES FOR HETEROSIS AND COMBINING ABILITY IN RICE

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(Received August 18, 1992 ; revised March 1, 1995)

A 4 x 4 diallel cross experiment was conducted to estimate the manifestation of heterosis, heterobeltosis and combining ability for plant height, number of tillers per plant, panicle length number of spikelets per panicle, number of grains per panicle, percentage filled spikelet density, panicle weight and grain yield per plant. The magnitude of positive and significant heterosis was quite high in all the characters except plant height, percentage filled spikelets and spikelet density. As regard heterobeltosis, number of tillers per plant, panicle weight and grain yield per plant showed significant positive values over the better parent in most of the crosses. A wide range of variation was noted for all the nine characters for general and specific combining abilities. Non-additive gene actions were observed for all the traits except plant height and panicle length, for which only additive gene effect were important. The mean varietal performance was linearly related to GCA values for grain yield and yield components. Basmati 385 proved to be a good general combiner for most of the traits. Based on mean performance coupled with SCA effects of the crosses and varietal GCA effects, crosses Basmati 370 X Basmati 385, 4048 X Basmati 198 and Basmati 370 x Basmati 198 could be recommended for pure line development.

Key words: Heterosis, Heterobeltosis, Combining ability, Yield components.

LOCAL DEVELOPMENT OF TSH RADIO IMMUNOASSAY AND IT'S EVALUATION

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Pakistan is an iodine deficient country, Thyroid diseases are very common and their investigation requires heavy foreign exchange to import relevant commercial kits. AEMC, Multan therefore tried to develop adequate and economical protocol for TSH radioimmunoassay. TSH-RIA protocol supplied by the commercial source did not provide the desired quality and evaluation of thyroid diseases. Our method was therefore optimized using precision profile as the criteria of performance. A total of six assay systems were studied, out of which the most precise one was selected. The new system gives results within expected limits. The sensitivity of the system, 0.3 μ IU/ml is suitable for low dose measurements. The working range, 0.6-25.1 μ IU/ml covers hypo, hyper and euthyroid levels of the hormone. Comparison with other laboratories shows an agreement of values. A low cost, locally developed good quality TSH RIA is therefore in our hand.

Key words: Development, TSH, Evaluation, Thyroid, Thyroid function.

EFFICACY OF FISH SILAGE AND FISH MEAL ON THE GROWTH PERFORMANCE OF NILE TILAPIA, *OREOCHROMIS NILOTICUS* FRY

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(Received October 10, 1993; revised April 18, 1995)

A 50-days feeding trial using *Oreochromis niloticus* fry was conducted to evaluate the performance of fish silage and fish meal prepared from marine trash fish. The fry were maintained on 3 diets, fish silage and fish meal (prepared from same raw materials) and commercial grade fish meal as major dietary protein source at 30% level. On the basis of observed growth rate, food conversion ratio, protein efficiency ratio and net protein utilization, the diet containing fish silage produced the best growth performance. There was no significant difference ($P>0.05$) between diet containing fish silage and laboratory grade fish meal but these were significantly different from commercial grade fish meal diet.

Key words: Fish silage, Fish meal, Growth, *Oreochromis niloticus*.

Technology Section

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POLLUTION DUE TO EFFLUENTS FROM TANNERIES / LEATHER INDUSTRIES IN N.W.F.P.

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(Received November 16, 1993 ; revised February 28, 1995)

Physico-chemical parameters of effluents from Tanneries (vegetable and chrome tanneries) were studied. The tanneries effluents usually discharged into the rivers streams without any pre-treatment were found to have high load of solids, COD, sulfides, phenols and chromium beside being highly coloured. The continued uncontrolled discharge of effluents with heavy pollution load would cause the deterioration of the ground water as well as adversely affects the surrounding environments of the tanneries/leather industries.

Key words: Tanneries, Effluents, Under ground water, Pollution.

PERSONAL COMPUTER BASED RAILWAY MONITORING AND SIGNALING SYSTEM

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To make railways a safer and more reliable mode of transport, it is quite necessary to introduce modernisation into existing railway signaling and control systems, because railway accidents cause great concern throughout the country. Major and minor railway accidents result from a seemingly intractable combination of human error, faulty signals, negligence and so on. When the frequency of such occurrence reaches alarming proportions, there comes a great need to improve signaling and communication systems. This clearly needs some rethinking. We propose and describe an implementation of a personal computer controlled railway monitoring and signaling system to avoid such types of disasters.

Key words. Personal computer, Railway signalling, Programmable interrupt controller.

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Odonata Of Rice Fields In Poonch And Bagh Districts of Azad Kashmir

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The Relative Importance of Predators for the Control of *Nephotettix* Spp. on Rice

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