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Physical Sciences Section

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CHROMIUM IN SEDIMENT OF THE MOVING STREAM OF TANNERY WASTE-WATER, FROM SECTOR 7-A OF KORANGI INDUSTRIAL AREA TO ARABIAN SEA.

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Chrome compounds are included in the category of heavy metal derivatives and thus are part of a group which must be kept out of the environment. Tanneries, located in sector 7-A of Korangi industrial area of Karachi, are discharging their effluent without any treatment. This effluent carries chromium, used in the tanning process, towards the sea. Due to mixing of different streams of tannery waste into the drain, most of the chromium settles down in sediment and leaves very little chromium in liquid. Samples were collected to check chromium in sediments in the stream of tannery effluent, from the source of discharge, sector 7-A to the sea. It has been found that after some distance the chromium in wastewater become undetectable which shows almost complete settling of chromium into the sediment. Results showed that even at 10 Km away from the source, considerable quantity of chromium was found to be present in the sediment, which reveal that sludge formed during the mixing is travelling toward the sea and contaminating it with chromium.

Key words: Chromium, Tannery waste Water, Pollution.

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DETERMINATION OF AVAILABLE BORON CONTENT OF THE SOILS OF JOS PLATEAU, NIGERIA

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The available boron content of sixteen soil samples from an agricultural area of Jos Plateau were critically investigated. The hot water extractable boron (available boron) contents were found to range from 6.0 ppm to 14.5 ppm. These values lie outside the range (0.5 - 5.0 ppm) required by most plants and may prove toxic if corrections are not applied. The boron content of the top soils were slightly higher in all cases than in the sub-soils. Relationship between the available boron and the pH of the soil samples followed the usual trend i.e. the boron content of the samples were found to increase as the soils pH increased.

Key words: Soils, Boron content. Nigeria.

TRACE ELEMENT STUDIES IN UROLITHIASIS: PRELIMINARY INVESTIGATION ON CALCIUM OXALATE AND MIXED CALCIUM OXALATE-HYDROXYAPATITE URINARY CALCULI

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In this preliminary investigation, the levels of the trace elements copper, zinc, magnesium, lead, iron, aluminium, nickel, chromium, sodium and potassium were estimated in seven calcium oxalate (CaOx) and six mixed calcium oxalate-hydroxyapatite (CaOx/APA) urinary calculi. The results were compared with those from South Africa, Turkey and Austria. Our mean results for the CaOx and CaOx/APA calculi were respectively, copper 4.3, 7.15 ng/mg; zinc 141.8, 191.1; magnesium 18520, 7203; lead 21.7, 15.5; iron 24.7, 78.35; aluminium 14.3, 42.7; nickel 0.39, 0.85; chromium 1.52, 1.88; sodium 4057, 3260; potassium 200, 150 ng/mg. Only for aluminium was the difference significant: $0.05 > p > 0.02$.

Key words: Trace elements, Urolithiasis, Urinary calculi (CaOx and CaOx/APA).

Biological Sciences Section

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BENEFICIAL EFFECTS OF *ALLIUM SATIVUM* LINN IN EXPERIMENTAL CHOLESTEROL ATHEROSCLEROSIS IN CHICKEN. *Part II: Curative Effects*

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Curative effects of garlic were established in a chicken model of atherosclerosis. Atherosclerosis was produced in chickens by feeding them cholesterol-enriched feed for a period of 12 weeks and later administered twice weekly alongwith garlic for another 12 weeks. At the end of 24 weeks, the animals were sacrificed and their dorsal aortae were removed to examine the atherosclerotic lesions. The results of studies on blood showed that garlic administration leads to significant decrease in plasma levels of triglycerides, total cholesterol and LDL(+VLDL)-cholesterol. The aortic damage was also significantly lower in the garlic-administered group as compared to the model group fed on cholesterol-enriched feed alone. In addition, aggregation studies showed a marked inhibitory effect of the aqueous extract of garlic on platelet aggregation *In vitro*. Thus, it may be inferred that administration of garlic provides a significant protection against hyperlipidemia and possibly thrombus formation and therefore has a potential to protect against cardio-vascular anomalies.

Key words: *Allium sativum*, Hypolipidemia, Chicken.

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AUTECOLOGICAL STUDIES OF EXOTIC PLANT *HIBISCUS SABDARIFFA* L. (ROSELLE), A MULTIPURPOSE PLANT, FOR ITS INTRODUCTION AND CULTURE

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(Received October 12, 1993 ; revised September 14, 1994)

Hibiscus sabdariffa L. (Roselle) is a plant of economic importance. The data on all aspects of its autecology and culture have been reported and a method of its cultivation has been developed which gave good (per acre) yield. The seeds were found to be viable upto 85%. The optimum temperature range and photocexposure for germination were found to be 25-35°C and 12 hrs respectively. The crop needed irrigation twice in Karachi area climatic condition for the best growth. The viability of seeds collected from the harvested crop showed gradual decrease one year after collection and further on.

Key words: Autecology, Culture, *Hibiscus sabdariffa* L.

**COMPARATIVE STUDY OF *ABELMOSCHUS ESCULENTUS* (L.) MOENCH METH,
OKRA FRUIT AND COTTON LEAVES SUITABILITY FOR REARING AND
BIOLOGY OF *EARIAS FABIA* STOLL**

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(Received July 1, 1992 ; revised November 16, 1994)

Spotted bollworm *Earias fabia* Stoll was reared on okra, *Abelmoschus esculentus* (L.) Moench Meth fruits, as compared with cotton leaves, at $30 \pm 5^{\circ}\text{C}$ and $65 \pm 5\%$ R.H. The okra fruit was found to be as good as cotton leaves. No significant difference was observed, in incubation period, larval period, pupal period, adult life, numbers of eggs/female and total life cycle, amongst the insects developed on okra fruits or on cotton leaves. The larvae developed on okra fruits took a period of 18 ± 0.882 days and the adults emerged, therefrom showed longevity of a range of 5.5 ± 3.1456 days at 95% confidence limit, whereas the total incubation period and pupal period was observed at a range of 6.33 ± 0.9996 days and 11 ± 3.3316 days, respectively, for three consecutive generations on okra.

Keywords: *Earias fabia* Rearing, *Abelmoschus esculentus* (L.).

SCREENING OF DRUGS AGAINST MICROSPORIDIA

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Thirteen drugs were tested against *Nosema bombycis* Naegeli in an *in vitro* system using *Spodoptera frugiperda* cell culture to investigate antimicrosporidial activities. Drugs tested were: fumagillin, benzimidazole, pentostam, thimerosal, ciprofloxacin, metronidazole, itraconazole, sulphadimidine, sulphapyridine, rimocidin sulphate, cerulenin, imidocarb dipropionate and compound 566C80 (atovaquone). Only five drugs namely, fumagillin, benzimidazole, pentostam, ciprofloxacin and thimerosal showed antimicrosporidial activity when infected cultures were exposed to the drug. Although thimerosal inhibited development of the microsporidia relative to controls, but it did not prevent an increase in the percentage of infected cells from the initial level. The other four drugs not only prevented further spread of infections between cells but also reduced the level of infection from the initial point. The minimum concentrations of the drugs which inhibited further spread of the parasite were: fumagillin at 5.0 µg/ml, benzimidazole at 250 µg/ml, pentostam at 2000 µg/ml and ciprofloxacin at 250 µg/ml.

Key words: *Nosema bombycis*, Drug screening, *In vitro*.

RESPONSE OF SOME COTTON VARIETIES TO COTTON LEAF CURL VIRUS

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(Received January 1, 1994 ; revised December 27, 1994)

Incidence of cotton leaf curl and yield of seed cotton in six varieties/strains of upland cotton viz; CIM-109, CIM-240, CIM-243, CIM-262, MS-84 and S-12 were recorded at nine locations. Leaf curl infestation was minimum in CIM-240 followed by CIM-109. Based on average at 9 locations, CIM-240 gave the highest yield closely followed by CIM-109.

Key words: *Gossypium hirsutum*, Leaf curl virus, yield.

Technology Section

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SYNTHESIS OF NITROGENOUS COMPOUNDS. *Part -V*

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(Received May 24, 1992; revised July 10, 1994)

Condensation of 3,4-disubstituted-but-3-en-2-ones (3) with hydrazines produced the hydrazones (4) which with ethanolic HCl underwent cyclization to the pyrazolines (5). Oxidation of (5) with bromine-water furnished the pyrazoles (6). Similarly, condensation of (3) with acylhydrazines generated the acylhydrazones (7).

Ethyl 6-aryl-2, 4-dioxo-5-substituted hexenoates (8) has been synthesized by condensation of 3,4-disubstituted-but-3-en-2-ones (3) with ethyl oxalate. Esters (8) on reaction with hydroxylamine afforded the isoxazole esters (9), whereas, with acylhydrazines furnished the acylhydrazones (10) which were cyclized to N-acylpyrazoles (11). With hydrazines, compounds (8) underwent cyclization to the pyrazole esters (12) which were converted either to the acids (13; $R^2 = OH$) or to the acid hydrazides (13; $R^2 = NHNH_2$). Reaction of (12; $R' = C_6H_4SO_2NH_2(p)$) with the appropriate isothiocyanate derivatives produced benzenesulphonylthioureas which with ethyl bromoacetate and ethyl β -bromopropionate furnished 2-iminothiazolidinones (15) and 2-iminothiazinones (16) respectively. Moreover, esters (8) with α -phenylenediamine yielded the oxyquinoxalines (17).

Key words: Synthesis, Heterocyclic compounds.

EXTRACTION, SEPARATION AND DETERMINATION OF COPPER (II) AND IRON (III) BY HIGH MOLECULAR WEIGHT AMINES

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(Received August 11, 1993 ; revised September 22, 1994)

The work describes the development of analytical methods for the extraction, separation and trace determination of Cu (II) in the presence of macro-amount of Fe (III) and the application of these methods to the analyses of geological samples i.e. the ores of Cu such as malachite, azurite and pyrite of Waziristan Agency. An investigation of the complexes formed between Cu (II) and Fe (III) in the presence of hydrochloric acid and thiocyanate were carried out and extractability of Cu(II)-SCN complex by two types of long chain high molecular weight amines (HMWA) Alamine 336 and Tribenzylamine were examined. The extraction of the thiocyanate complex by high molecular weight amines indicate that the species are anionic in nature. The results achieved were successful and gave better results than the existing methods.

Key word: Extraction, Copper, Highmolecular weight amines.

Short Comm

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Evaluation of *Bradyrhizobium japonicum* Strains for Biological Nitrogen Fixation in Soybean

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