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Physical Sciences Section

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SUITABILITY OF SOIL TEST PROCEDURES FOR PREDICTING RESPONSE OF FLOODED RICE TO ZINC APPLICATION ON CALCAREOUS SOILS

M. Sharif Zia, F. Hussain, Rahmatullah, M.B. Tahir and M. Inayat Khan
Land Resources Section, National Agricultural Research Centre, Islamabad-45500, Pakistan

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Zinc (Zn) deficiency is wide-spread in agricultural crops produced on alkaline calcareous soils of Pakistan. A greenhouse study was, therefore, undertaken on six soil series of rice area for evaluating the suitability of different extractants for extracting available zinc and to determine the critical soil Zn values for predicting rice response to Zn application. Zinc treatments were nil and 10 mg Zn kg^{-1} soil. Rice variety KS 282 was the test variety. Results revealed that DTPA extractable Zn in the soil had positive correlation with relative dry matter yield, tillers (in control pots), Zn concentration and its uptake in rice. Similarly, AB-DTPA extractable Zn was significantly correlated with the number of tillers/plants dry matter yield and Zn uptake in rice. Mehlich-3 extractable Zn had highly significant correlation with relative dry matter yield and Zn concentration in rice. Zinc extracted by HCl was significantly correlated with the number of tillers/plant and dry matter yield and it has highly significant correlation with Zn uptake in rice. Ammonium acetate extractable Zn was neither correlated with rice growth parameters nor with Zn concentration and its uptake in rice. Critical values of Zn determined were: DTPA, 0.99 mg Zn kg^{-1}; AB-DTPA, 1.22 mg Zn kg^{-1}; Mehlich-3, 2.47 mg Zn $(dm^3)^{-1}$ and HCl, 0.34 mg Zn kg^{-1} soil. The AB-DTPA procedure of monitoring Zn availability in soils is preferred since it is a multielement soil test.

Key words: Flooded, Lowland, Rice, Calcareous soils, Zinc extractant, Critical level, Zinc.

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CORROSION BEHAVIOUR OF TIN IN CARBOXYLIC ACID SOLUTIONS CONTAINING NO_2^-, NO_3^- AND Cl^- ANIONS AT DIFFERENT pH VALUES

GAMAL K. GOMMA
Chemistry Department, Faculty of Education, Kafr El-Sheikh, Egypt

(Received July 7, 1993; revised May 16, 1994)

The corrosion behaviour of pure tin in deaerated solutions of oxalic, tartaric and citric acids in the presence and absence of NO_2^-, NO_3^- and Cl^- anions were studied by means of potential-time measurements, corrosion rate and galvanostatic technique at the pH range 2.5 - 6.5 for 0.1 M of the three tested acids. At pH 4.5 there is a maximum negative potential for oxalic acid and at pH 5.5 for tartaric and citric acids. From pH 2.5 to 4.5, the corrosion mechanism is anodically controlled by the reaction of Sn^{+2} ion with the anion of the tested acids. At pH 5.5 the corrosion of tin is reduced which may be due to the formation of a film on the tin electrode resulting from the hydrolysis of tin complex species. The potential of the tin electrode in the three tested acid solutions tends to be shifted to the less negative values in the presence of additives NO_2^-, NO_3^- and Cl^- anions at pH 4.5.

Key words: Corrosion, Tin, Carboxylic acids, NO_2^-, NO_3^- and Cl^- additives.

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O-PHTHALALDEHYDE AS A DERIVATISING REAGENT FOR THE SPECTROPHOTOMETRIC DETERMINATION OF AMINES AND AMINO ACIDS

M. AMINUDDIN AND NASIR MAHMOOD RANA
Department of Chemistry, Islamia University, Bahawalpur, Pakistan

(Received January 27, 1994 ; revised June 5, 1994)

O-Phthalaldehyde has been used as a derivatising reagent for compounds containing an amino functional group. The reaction product is an isoindole which absorbs at 335 nm. This property has been utilized for spectrophotometric determination of amines and amino acids. The spectrophotometric method is found to be suitable for quantities as low as 4.0×10^{-5} mol/l. The method is simple, rapid and reproducible.

Key words: *O*-Phthalaldehydes, Spectrophotometric determination, Amines and amino acids.

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DETERMINATION OF INORGANIC COMPONENTS INCLUDING MINOR AND TRACE ELEMENTS IN SURMA (KOHL) FORMULATIONS

AZHAR M. SYED, M. QADIRUDDIN, K. SHIRIN AND ZAHEER BABAR HASHMI*
PCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

(Received May 24, 1993 ; revised June 9, 1994)

Quantitative estimations of silicon dioxide, phosphate, chloride and nitrates alongwith minor and trace elements in various Surma (Kohl) formulations have been carried out using chemical and AAS methods. Out of ten different preparations, eight were found to contain lead as major constituent (72 - 82%). The remaining two were zinc based having 53 and 63% of zinc, respectively.

Key words: Estimations, Inorganic components, Surma (Kohl).

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PETROMINERALOGICAL AND GEOCHEMICAL STUDIES OF HAVELIAN BARITE, HAZARA, NWFP, PAKISTAN

HAMEEDULLAH KHAN, VIQAR HUSAIN, KHALID QURESHI, KAMAL PASHA* AND NISAR AHMAD
PCSIR Laboratories, Jamrud Road, Peshawar, Pakistan

(Received March 7, 1993; revised June 12, 1994)

The epigenetic vein type barite deposits occur at several localities near Havelian in limestone and shale sequence belonging to Eocene age. Barite veins varying in thickness from a few inches to several feet occur in grey coloured argillaceous limestone and shale. Thin bands of barite and galena are also seen in some samples. Important minerals occuring along with barite are calcite, quartz and magnesite. In polished sections, galena, pyrite and goethite were also identified. Petrographically, barite occurs in several textural types: massive, crystalline, lath or platy shaped ranging from fine to coarse in size. The $BaSO_4$ content in Havelian barite samples ranges from 20 to 92%. Major impurities are SiO_2, CaO, MgO, Fe_2O_3 and Al_2O_3. Barite deposits in Havelian are structurally controlled vein and cavity filling type deposits. These barite deposits have not been developed and mined systematically. Barite deposits of this district are good in quality and need detailed investigations for determining mineable reserves. The physical and chemical characteristics of Havelian barite show their suitability for paint, paper, rubber, petroleum drilling and chemical industries with or without processing.

Key words: Barite, Petrochemistry, Industrial uses.

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ELECTRICAL CONDUCTIVITY PROPERTIES OF SOME THIAZOLYLAZO-PYRIMIDINE DERIVATIVE COMPLEXES AT DIFFERENT TEMPERATURES

MAMDOUH S. MASOUD, OSAMA F. HAFEZ AND NAGDA A. OBEID*
Chemistry Department, Faculty of Science, Alexandria University, Alexandria, Egypt

(Received October 17, 1993; revised July 4, 1994)

The electrical conductivities of complexes of some thiazolylazo-pyrimidine derivative complexes have been investigated at different temperatures. The complexes were found to be of two types; the first one has a semi-conductor behaviour and a constant conductivity value above 398°K, whereas the second type shows three segments with variable activation energy. The dissimilarity between the two types of complexes is attributed to the steric effect of the phenyl group in the first type. The conductivity data measured in the temperature range 298° - 570°K were correlated to the geometrical change of these complexes, indicating that the cobalt (II) complexes have higher conductivity than those of copper (II) and nickel (II), depending on the chemistry of the metal ion and the molecular structure of complexes. Empirical equations to correlate ΔE with log σ_0 values for the complexes were deduced by the use of the least square method. Also, the mobility values (m) of these complexes were calculated.

Key words: Electrical conductivities, Thiazolylazo-pyrimidine derivative complexes, Temperature.

Biological Sciences Section

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COMPARATIVE STUDY OF SOME FEEDS FOR MAGUR *(CLARIAS BATRACHUS)* LINN. FRY

N. BAGUM, M.Y. MIA AND M. BEGUM

Fisheries Research Institute, Mymensingh-2201, Bangladesh

(Received September 26, 1992; revised April 16, 1994)

Magur *(Clarias batrachus)* fry were reared for a period of twelve days in plastic bowl to determine the effect of different feeds (live plankton, frozen plankton, dried plankton and Tubifex) on survival rate and growth. Survival was found to be comparatively higher with live Tubifex and live plankton. Greatest length (13.0 mm) was obtained with Tubifex and least (11.0 mm) with dried plankton.

Key words: Feed effect, Survivility, Comparison.

Introduction

for 2 days in an oven drier at 70°C. live Tubifex were collected

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NITROGEN USE EFFICIENCY IN WHEAT

FAZLI QAYYUM, AFSARY S. QURESHI AND M. AHMAD
Pakistan Agricultural Research Council, P.O. Box 1031, G-5/1, Islamabad, Pakistan

(Received December 3, 1992; revised May 16, 1994)

A field experiment with three sources of nitrogenous fertilizers (NH_4, NO_3, Urea) applied at 100 kg N/ha as broadcast, dibbled 10 cm deep and dibbled 10 cm deep mixed with poultry manure at 1 ton/ha between 25 cm part rows of wheat. Phosphorus at 90 kg P_2O_5 and potash at 60 kg K_2O/ha were applied as a basal dose. Grain and straw yields were improved significantly (5% level) due to the method of fertilizer application. Ammonium sulphate applied mixed with poultry manure proved best combination over other sources and methods of application. Total nitrogen uptake was maximum from ammonium sulphate followed by urea and nitrate forms where poultry manure was applied with these sources. To meet the crop requirements applied N was supplemented from soil N to a depth of 75 cm. It was concluded that wheat uptake of nitrogen was increased and used more efficiently with deep placement (dibbling) as compared to broadcasting.

Key words: Nitrogen, Efficiency, Wheat.

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EFFECT OF GENOTYPE AND SOWING DATE ON THE RESPONSE TO BORON IN WHEAT

M.A. HOSSAIN, M. JAHIRUDDIN, M.S.HOQUE AND M.I. ALI*

Department of Soil Science, Bangladesh Agricultural University, Mymensingh, Bangladesh

(Received August 12, 1993 ; revised May 16, 1994)

A field trial was conducted in an alluvial soil of Bangladesh to evaluate the effect of boron on the number of grains/spike, grain yield and nitrogen content of wheat sown in different dates. The experiment comprised two B treatments (0 and 3 kg B/ha), three wheat varieties (Sonalika, Kanchan and Aghrani) and four dates of sowing with 2-week intervals beginning from the November 15 of 1992. The experiment was laid out in split-split plot-design with sowing date as main-plot, wheat variety as sub-plot and boron treatment as sub-sub-plot. The results showed that added B had positive efffect on the number of grains/spike and grain yield. Both grains/spike and grain yield were decreased as the date of sowing was delayed particularly after December 1, over the varieties. Among the varieties, Kanchan gave comparatively better yield. Nutrient analysis showed that N and B contents in grain were increased after B treatment to soil indicating that B probably helped protein synthesis. Like grain yield, grain N level had declined with the delaying of sowing date. Such adverse effect of late sowing was thought to be related with elevated temperature prevailing at flowering stage that induced slower rate of B mobility in plant, poor number of grains/spike and lower grain yield.

Key words: Boron, Sowing date, Wheat.

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DISTRIBUTION OF WOOD DENSITY IN A SINGLE STEM OF *POPULUS EURAMERICANA*

ABDUL MAJEED*, SHAHID YAQOOB AND MASOOD A.A. QURAISHI
Department of Forestry and Range Management, University of Agriculture, Faisalabad, Pakistan

(Received April 2, 1991 ; revised June 7, 1994)

Four 12-years old trees of *Populus euramericana* harvested in Faisalabad and Toba Tek Singh Districts were analysed to determine the density distribution in the stem. Density increased with age and increasing height. Minimum density noted was 0.25 g/cm^3 and maximum density was 0.56g/cm^3.

Key words: Distribution, Wood density, Stem, *P. euramericana.*

Technology Section

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SYNTHESIS OF SOME 7-AZAINDOLE DERIVATIVES: THEIR CYTOTOXICITY AND ANTIBACTERIAL ACTIVITY

ZAFAR SAEED SAIFY, SYED MOAZZAM HAIDER, MANSOOR AHMED, MOHAMMAD SAEED, ABDULLAH KHAN AND BINA SHAHEEN SIDDIQUI*

Department of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Karachi, Karachi 75270, Pakistan

(Received November 18, 1993; revised May 16, 1994)

In the course of pharmaco-chemical studies, a number of new 7-azaindole derivatives have been prepared. The spectroscopic techniques such as ^{1}H NMR, EIMS, UV and IR were utilized for their structure elucidation. These compounds were tested against a variety of Gram + ve and Gram-ve bacteria. These compounds were also screened for their cytotoxicity against *Artemia salina*. Compound IV displayed significant antibacterial activity amongst all the tested compounds. Whereas compound VI was found to be the most significant cytotoxic when screened through brine shrimp bioassay.

Key words: 7-Azaindole, Cytotoxicity, Antibacterial activity.

Technology Section

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Key words: 7-Azaindole, Cytotoxicity, Antibacterial activity.

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PURIFICATION OF ESTERIFIED FUSEL OIL BY EXTRACTION OF ACETIC ACID

N.M. AL-MANSI, M.A. KHEDR* AND E.M.EL-ZANATI*

Chemical Engineering Department, Cairo University, Cairo, Egypt

(Received December 14, 1993 ; revised June 23, 1994)

Extraction of acetic acid produced from esterification of fusel oil with acetic anhydride was experimentally investigated. The selective solvent used to extract the formed acetic acid was water. Solubility data and equilibrium curves for ternary system (water-acetic acid-acetates) were experimentally determined. The results have provided useful data in designing and operating the counter-current multistage extraction unit.

Key words : Extraction, Acetic acid, Fusel oil.

Short Comm

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Barseem (Egyptian Clover) As Ruminant Feed

A. D. KHAN, F. H. SHAH, ABDUS SALAM SHEIKH AND M.A. RAJA*

PCSIR Laboratories Complex, Lahore-54600, Pakistan

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The Chemical Studies of *Zizyphus jujuba*

MOHSIN ALI KHAN, SHAIKH SIRAJUDDIN NIZAMI AND SHAHZAD AHMAD KHAN

Department of Chemistry, University of Karachi, Karachi-75270, Pakistan

(Received December 24, 1992 ; revised April 6, 1994)

Zizyphus jujuba Lamark, belonging to family Rham-