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Physical Sciences Section

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LEAD CONTENT OF VEGETABLES AND TOMATOES AT EREKESAN MARKET, ADO-EKITI

S.S. ASAOLU

Department of Chemistry, Ondo State University, Ado Ekiti, Ondo State, Nigeria

(Received December 5, 1993; revised April 16, 1995)

Lead content of Leafy vegetables and tomatoes were determined for over a period of four months i.e. March - June, 1993 at Erekesan Market in Ado-Ekiti. The samples were taken at four different locations. The result shows a higher lead content for the samples taken along the major roads when compared with the samples taken few meters away from the major roads. Lead concentration in tomatoes was generally higher than in vegetables at each location.

Key words: Lead, Vegetables, Tomatoes.

SYNTHESIS, ANTIMICROBIAL AND ANTIAFLATOXIGENIC ACTIVITIES OF SOME BENZOFURAN CONTAINING 1,2,4-TRIAZOLE, 1,3,4-THIADIAZOLE AND OXADIAZOLE DERIVATIVES

A. H. MANDOUR, N. M. FAWZY, T. H. EL-SHIHI* AND Z. E. EL-BAZZA**

National Research Centre, Dokki, Cairo, Egypt

(Received August 4, 1995; revised June 13, 1996)

Alkaline hydrolysis of 9-methoxypsoralene-4-sulfonamide derivatives (Ia-d) using potassium hydroxide and dimethyl sulfate, afforded 3-propenoic acid derivative (IIa-d) which in turn were converted to 3-propenoic acid chloride (IIIa-d) by the action of thionyl chloride in boiling toluene. Condensation of the latter compounds with thiosemicarbazide gave the corresponding carbonyl thiosemicarbazide derivatives (IVa-d). Cyclization of the latter compounds using boiling 5% sodium hydroxide solution gave 5-mercapto-1,2,4-triazolyl-3 derivatives (Va-d), using O-phosphoric acid gave 5-amino-1,3, 4-thiadiazolyl-3-derivatives (VIa-d) and using DCC gave 5-amino-1, 3, 4-oxadiazolyl-2-derivatives (VIIa-d), respectively. Also, the antimicrobial and antiaflatoxigenic activities of compounds (Va-d), (VIa-d) and (VIIa-d) were investigated.

Key words: Xanthotoxin-4-sulfonamides, Benzofuran derivatives, 1,2,4-Triazole; 1,3,4-Thiadiazole, Oxadiazole derivatives.

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LIPID STUDIES OF *SAPODILLA PLUM*

MANZOOR AHMAD, AMIR MANZOOR*, M.AKHTAR JAVED, PERVEZ KHURSHID* AND M.Y. RAIE

PCSIR Laboratories Complex, Sharah-e-Jalaluddin Roomi, Lahore-54600, Pakistan

(Received May, 17 1995; revised August 5, 1996)

The air dried seeds of *Sapodilla plum* contain moisture 6.0%, hulls 51.7%, and kernels 42.3%. The hulls contain oil 0.45%, ash 0.77%, protein 2.05% (in defatted hulls) whereas the kernels contain oils 19.8%, ash 6.50% and protein 16.93% (in defatted kernels). The fatty acid composition of dark yellow coloured hull oil is lauric acid (5.38%), myristic acid (3.30%), palmitic acid (26.14%), stearic acid (9.3%), oleic acid (39.46%), linoleic acid (13.93%), and linolenic acid (2.36%) whereas light yellow coloured kernel oil contains palmitic acid (17.24%), stearic acid (10.14%), oleic acid (60.40%), linoleic acid (9.30%), linolenic acid (2.03%) and an unknown fatty acid (0.89%) respectively. The unsaponifiable matter is determined as sterols (23.7% and 20.1%) alcohols (32.5% and 33.3%) hydrocarbons (43.8% and 46.6%) in hull and kernel oil respectively. The hydrocarbons C_{15} - C_{29} (in kernel oil), alcohols C_{12} - C_{18} (in hull oil) and C_{16} - C_{18} (in kernel oil) respectively have been separated, identified and characterized by the application of thin layer and gas liquid chromatography. Palmityl and oleyl alcohols are found to predominate in both the oils.

Key words: *Sapodilla plum*, Hulls, Kernels

DETERMINATION OF TRACE ELEMENTS IN BARLEY, BEET AND PURSLANE OF KALABSHA AREA OF ASWAN IN EGYPT

M. H. ABOU-EL-WAFA, R. M. AWADALLAH,* A. E. MOHAMMED* AND M. N. RASHED**

Chemistry Department, Faculty of Science, Qena, Egypt

(Received November 21, 1992; revised August 27, 1995)

Trace elements Ag, Au, Ca, Cl (Ca and Cl were estimated titrimetrically by EDTA and Cl by ion selective electrode), Co, Cr, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, Sr and Zn in barley, beet and purslane (leaves, stems, tubers and grains) as well as in the soil samples taken from the immediate vicinity of plant roots (10, 30 and 60 cm depths) in Klabsha area, an experimental farm of the High Dam Lake Development Authority, were estimated. The results show that purslane accumulates Ca, Cl, Fe, K, and Na, beet accumulates Au, Ca, Co, Cl, Mg, Mn and Na while Co, Cr, Cu and Zn are more concentrated in grains of barley than in its leaves (Ca, Cl, Fe, Mg, Mn, Na Sr and Ni are more concentrated in leaves than in grains).

Key words: Trace elements, Barley, Beet, purslane.

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MAJOR AND TRACE ELEMENTS IN MILLET AND SOILS OF THREE DIFFERENT EXPERIMENTAL FARMS

M.H. ABOU-EL-WAFA, R.M. AWADALLAH* AND M.N. RASHED**

Chemistry Department, Faculty of Science, Qena, Egypt

(Received February 13, 1995 ; Revised August 27, 1995)

The major and trace elements in millet and soil samples of three different experimental farms on the beaches of High Dam Lake (Kalabsha, Gerf Hussein and Allaqi) at 10, 30, 60 cm depths were determined using atomic absorption spectrophotometer (AAS), ion selective electrode (ISE) and titrimetric techniques. The results indicated that in Kalabsha, the soil samples at 30 cm depth exhibited high concentrations of Ca, Co, Cr, Fe, K, Mg, Na, Ni, Pb, Sr and Zn. High concentration of Ca, Cl, K, Mg, and Na were detected at 10 cm depth in soil of Allaqi. Higher concentration of elements were found in millet planted in Allaqi area than that planted in the other two areas. Good correlation coefficient values were found between the elements in millet, soil samples and millet/soil ratio.

Key words: Millet, Trace elements, Soils.

COORDINATION CHEMISTRY OF Zr(IV), Th(IV) AND U(VI) IONS CONTAINING 1,2 DIAMINOCYCLOHEXANE N N N' N' TETRA-ACETIC ACID (DCTA) AND SOME MONODENTATE ORGANIC LIGANDS

S. C. PAL AND M.T.H. TARAFDER

Department of Chemistry, Rajshahi University, Rajshahi-6205, Bangladesh

(Received August 15, 1994; revised October 16, 1995)

Some new mixed ligand complexes of zirconium (IV) containing 1,2 diaminocyclohexane N N N' N' tetra-acetic acid (DCTA) and some monodentate organic ligands have been synthesized and characterized. Complexes of thorium (IV) and uranium (VI) containing DCTA only have also been reported here. DCTA behaves as a hexadentate, quadrinegative ligand in all the zirconium, thorium and uranium complexes. Zirconium and uranium complexes are presumably seven and eight-coordinated respectively whereas thorium complex is octahedral. The complexes have the compositions : $[\text{Zr}(\text{DCTA})\text{L}].n\text{H}_2\text{O}$ (where $n=1, 2$ and 3 ; L = pyridine-1-oxide, triphenylphosphine oxide (Ph_3PO), triphenylarsine oxide (Ph_3AsO), pyridine and aniline), $[\text{Th}(\text{DCTA})].2\text{H}_2\text{O}$ and $\text{H}_2[\text{UO}_2(\text{DCTA})].\text{H}_2\text{O}$.

Key words: Coordination chemistry, DCTA, Zr(IV), Th(IV), U(VI).

SYNTHESIS OF NEW BENZOTHAIAZOLE-2-ACRYLIC ACID DERIVATIVES

EMAD M.M.KASSEM, JOSEPHINE M.MICHAEL AND A.H.EL-MASRY

Department of Medicinal Chemistry, National Research Centre, Dokki, Cairo, Egypt

(Received February 27, 1994 ; revised November 19, 1995)

Benthothiazole-2-acrylic acid IV reacted with thiourea to give the thiazole derivative V which reacted with different aldehydes to give compounds of the type VI. Also, compound IV reacted with some sulfa drugs and some amines to give amide derivatives of the type VII and IX, respectively. The prepared compounds showed potential antimicrobial activity.

Key words: Maleic anhydride, O-aminothiophenol, Benzothiazole-2-acrylic acid.

CHARACTERISTICS AND CHEMICAL COMPOSITION OF THE FIXED OIL OF *ACHRAS ZAPOTA* SEEDS

L.M. KHATRI, M.K.A. NASIR, ROBINA SALEEM AND FATIMA NOOR*

PCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

(Received July 28, 1992; revised December 27, 1993)

The fixed oil from the seeds of *Achras zapota* (*N.O. Sapotaceae*) was extracted to the extent of 8.1% and studied for its physico-chemical properties and fatty acid composition. The oil contained palmitic acid (20.5%), stearic acid (12.0%), oleic acid (58.5%) and linoleic acid (3.9%) as the major fatty acids.

Key words: Fixed oil, *Achras zapota*, Fatty acids, *Sapotaceae*, *Sapodilla*.

Biological Sciences Section

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ALPHA-AMYLASE, PROTEASE ACTIVITIES AND ASSOCIATED CHANGES UNDER WATER STRESS CONDITIONS IN WHEAT SEEDLING

M.Y. ASHRAF*, A.R. AZMI, S.S.M. NAQVI AND A.H. KHAN

Atomic Energy Agricultural Research Centre, Tandojam, Pakistan

(Received January 12, 1994; revised May 17, 1995)

Alpha-amylase, protease, reducing sugars, non-reducing sugars, protein and total amino acids were studied in seedlings of 4 wheat genotypes, for a period of 96 hrs. after sowing, under stressed and non-stressed conditions. It was observed that α -amylase, protease, reducing and non-reducing sugars and total amino acids increased in all the genotypes subjected to -0.6 MPa water stress. The genotypes Chakwal-86 and DS-4 showed the highest α -amylase activity, sugars and total amino acids. On the other hand DS-17 and Pavon showed higher protease activity than the others. The highest reduction in protein content was recorded in DS-17 and Pavon. The significance of these findings is discussed.

Key words: Alpha-amylase, Sugars, Protease, Protein, Amino acids.

EFFECTIVENESS OF SOME CARBAMATE INSECTICIDES FOR REPELLING A PEST BIRD (*LONCHURA STRIATA*) TO REDUCE EAR DAMAGE OF FOX-TAIL MILLET

M.B. UDDIN, M.A. KARIM AND M.Z. ALAM*

Entomology Division, BARI, Joydebpur, Gazipur-1701, Bangladesh

(Received March 10, 1993; revised May 21, 1995)

A field trial was conducted at RARS, Hathazari, Chittagong with three carbamate insecticides, isoprocarb, carbosulfan and carbaryl replicated 3 times during both the 1988-89 and 1990-91 cropping seasons to test their efficacy in repelling the pest bird, *Lonchura striata*, and to reduce ear damage of fox-tail millet. Two applications of these insecticides on ripening millet at 15 and 7 days before harvest reduced bird damage and increased yield significantly as compared to control. Among the insecticides, isoprocarb was the best, followed by carbosulfan and carbaryl in both seasons.

Key words: Repellent, Damage, Millet.

RICE RESPONSE TO PHOSPHORUS IN WETLAND SOIL

S.K. ZAMAN, M.A. RAZZAQUE, S.M.R. KARIM AND N.I. BHUIYAN

Bangladesh Rice Research Institute, Gazipur 1701, Bangladesh

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Field experiments were carried out in a severely P deficient farmer field to evaluate the P response of Boro (dry season irrigated) and T.Aman (wet season) rices. Five levels of phosphorus (0, 25, 50, 75, and 100 kg/ha) as TSP were used. Modern varieties of rices, BR3 for dry season (Boro) and BR11 for wet season were tested. The application of P led to increased plant height, tiller and panicle production. Application of P at the rate of 25 kg/ha increased grain yield by 1.0 t/ha in dry season; increasing the P rate to 50, 75 or 100 kg/ha brought about additional yield benefits. The yield response was, however, much less sharp in the wet season.

Key words: Rice, Phosphorus, Wetland soil.

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INFLUENCE OF SOME ADDITIVES ON THE QUALITY OF COOKED, EMULSION-TYPE BEEF SAUSAGE AND CANNED PRODUCTS

HASSAN A. SHEHATA

Food Science Department, Faculty of Agriculture, Suez Canal University, Ismailia, Egypt

(Received February 2, 1993; revised August 27, 1995)

Cooked, emulsion-type sausage was prepared from 50% lean beef, 33% beef fat tissues and 17% ice. The effects of several additives on the characteristics of the cooked product were examined. The additives included 0.3% sodium diphosphate, 2% soy protein isolate (SPI) emulsion, 2% dry SPI, 2% sodium caseinate (SC) emulsion, 2% dry SC and 2% modified starch (MS). A portion of each batch was canned at 121°C for 90 min. Sodium diphosphate and starch enhanced the absorption of separated fluids during canning when canned products were stored at 37°C for 7 days and no swelling or changes in the overall acceptability occurred during storage. Best treatment was the sodium diphosphate which also had highest organoleptic scores and markedly high red colour intensity when sausages were prepared with other additives. Sausages prepared with dry SPI and SC were acceptable and given higher organoleptic scores than those prepared with SPI and SC emulsions. The lowest organoleptic scores were given for the control sample. The present work was conducted to improve the binding ability, tenderness and texture of cooked, emulsion type sausage. The effect of some common sausages and production of high quality beef sausages and canned products were also studied.

Key words: Emulsion type-sausages, Additives, Canned products.

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IN VITRO PLANT REGENERATION FROM ZYGOTIC EMBRYOS OF *CITRULLUS LANATUS* THUNB

R. ISLAM, A. AHAD, M. A. REZA, A. N. K. MAMUN AND O. I. JOARDER

Department of Botany, University of Rajshahi, Rajshahi-6205, Bangladesh

(Received April 23, 1995; revised October 13, 1995)

A procedure has been developed which allows high frequency plant regeneration from mature zygotic embryos of *Citrullus lanatus*. Prolific shoot regeneration occurred on Linsmaire and Skoog (LS) medium containing BA-IAA combinations. Embryo axes were more responsive explants than cotyledon explants. Regenerated shoots were rooted on Murashige and Skoog (MS) medium supplemented with 1 mg/l NAA.

Key Words: Plant regeneration, Zygotic embryos, *C. lanatus*.

EVALUATION OF SOME PHARMACOLOGICAL ACTIONS OF *SYZYGium CUMINI* SEEDS EXTRACT

SHAHIDA PERVEEN AHMED, MANSOOR AHMED*, S. IQBAL AHMED, RAHEELA NAJAM AND S. JAVAID KHURSHID**

Department of Pharmacology, Faculty of Pharmacy, University of Karachi, Karachi-75270, Pakistan

(Received August 15, 1994; revised November 19, 1995)

Seeds extract of *Syzygium cumini* or *Eugenia jambolana*, commonly known as Jaman was tested for its stress reducing properties. A considerable positive response in general behaviour of test animals was observed. Reduction in locomotion, decrease in aggressiveness of behaviour, dose dependent potentiation of phenobarbitone induced sleeping time, significant analgesic action against acetic acid induced writhing movement and reduction in body temperatures were noted. A significant reduction in the stress induced elevated corticosterone level was observed which is a reliable indicator of stress.

Key words: *Syzygium cumini*, Corticosterone, Stress-induced.

FLUID BALANCE IN CYCLING RATS AND OVARIECTOMIZED RATS TREATED WITH OESTRADIOL BENZOATE IN PHYSIOLOGICAL DOSES (50 µg/RAT)

MUHAMMAD AZHAR KHAN, MISBAHULAIN KHAN* AND MUHAMMAD ASLAM**

Physiology Department, Quaid-i-Azam Medical College, Bahawalpur, Pakistan

(Received May 30, 1994 ; revised November 27, 1995)

Plasma vasopressin concentrations have been shown to vary throughout the rat oestrus cycle. In order to determine how these fluctuations in vasopressin are related to fluid retention, studies have been carried out in ovariectomized female Sprague-Dawley rats injected subcutaneously daily with either vehicle or oestradiol benzoate in physiological doses (50µg/rat) for 14 days. The animals were housed in individual metabolism cages under 12 hr light/12 hr dark regimen with free access to food and water. Urine samples, to determine volume, were obtained and food and water intake recorded at 8-9 and 17-18 hrs. in the oestradiol benzoate treated rats, food and water intake were reduced during both dark and light periods compared to the controls possibly due to the influence of elevated circulating oestradiol levels. Urine output showed a similar pattern of changes which appeared to be related to the vasopressin concentrations. Plasma osmolality decreased in oestradiol benzoate treated rats which was also correlated with the plasma vasopressin levels. The results of this study indicate that water retention in oestradiol benzoate treated rats and oestradiol-induced increase in vasopressin may play a role in this fluid retention.

Key words: Cycling and ovariectomized rats, Oestradiol benzoate, Physiological doses.

BIOMETRICAL ANALYSIS OF SOME METRICAL TRAITS OF *GOSSYPIMUM HIRSUTUM* L. COMBINING ABILITY

MAZHAR DIN KEERIO, MUHAMMAD SHABAN KALWAR, MUHAMMAD ISHAQUE MEMON AND ZAHEER AHMED SOOMRO

Department of Plant Breeding and Genetics, Agriculture University, Tandojam, Pakistan

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An experiment was conducted to estimate the combining ability in 8 cultivars of *G. hirsutum* L. General combining ability (GCA) mean squares for testers were significant for boll number only, whereas GCA for lines and SCA for hybrids were highly significant for boll number and seedcotton yield. The larger proportion of variance for GCA revealed that the nature of gene action was predominantly additive for these traits. S-12 for boll number and seedcotton yield. CRIS-7A for sympodia, boll number and seed cotton yield, and CYTO-127 and CYTO-130 for seed cotton yield proved to be the best general combiners. The crosses S-12 x CYTO-127 and BH-36 x CRIS-54 manifested highly significant SCA effects for boll number and seedcotton yield per plant.

Key words: *Gossypium hirsutum*, Combining ability, Yield components.

Technology Section

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VEHICULAR CONTRIBUTION TO ROAD TRAFFIC NOISE IN KARACHI CITY, *Part I. Contribution by Motorcycles, Buses and Rickshaws*

G.H. SHAIKH, NASEER AHMAD AND S.S.H. RIZVI

PCSIR Laboratories Complex, Off University Road, Karachi-75280. Pakistan

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Studies on road traffic noise carried out in Karachi city shows that the road traffic noise levels in the city are very high and much beyond the acceptable limits. Therefore, in order to investigate the level of noise contributed by different type of vehicles plying on the city roads and to assess their individual contribution to the high level traffic noise, studies have been carried out on the noise emitted by four types of relatively noisier vehicles as they normally move on the city roads. The results are discussed with reference to L_{v50} , L_{v50} and L_{v10} and present existing motor vehicle rules in Pakistan.

Key words: Vehicular noise, Noise pollution, Surface transportation noise.

AFLATOXINS DETOXIFICATION IN SUNFLOWER MEAL BY AMMONIATION

MANSOOR A. AHMAD, ZUZZER A. SHAMSUDDIN, BUTOOL A. KHAN AND MOBEEN A. KHAN

PCSIR Laboratories Complex, Off University Road, Karachi-75280, Pakistan

(Received December 22, 1994; revised August 30, 1995)

Ammonia has been found to reduce efficiently naturally occurring aflatoxins present in sunflower meal on pilot plant scale. One percent of ammonia detoxified $96.53 \pm 2.52\%$ of aflatoxins in 30 min at $100 \pm 1^\circ\text{C}$ under 10 ± 0.5 psi of steam pressure. The levels of naturally occurring aflatoxins in sunflower meal ranged from 113 $\mu\text{g/kg}$ to 3322 $\mu\text{g/kg}$. Not much variation was observed in the detoxification process with the increase in aflatoxins content. Resultant detoxified product was found to be free of ammoniacal smell with an average ammoniacal nitrogen of 0.1% and average moisture content of 9.37%. The aflatoxins detoxified sunflower meal showed no toxic effect towards egg production in layer when incorporated in the rations at an inclusion rate from 8.5 to 15%, as a vegetable source of protein. The pilot-plant process demonstrated the effective way of destroying aflatoxins in sunflower meal.

Key words: Aflatoxins, Detoxification, Ammonia, Sunflower meal, Egg production.

Short Comm

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Antibacterial and Phytochemical Studies on *Dicoma tomentosa*

S. KHALID, N. AFZA, H.A. RIZVI, AND Y. BADAR

*PCSIR Laboratories Complex, Off University Road,
Karachi-75280, Pakistan*

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Dicoma tomentosa, a member of the compositae family