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SYNTHESIS OF SOME NEW NITROGENOUS DERIVATIVES OF GLYCYRRHETIC ACID WITH POTENTIAL BIOLOGICAL ACTIVITY

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The synthesis of some nitrogenous derivatives from glycyrrhetic acid hydrazides (III) by incorporating its C-30 to form 1', 3', 4'-oxadiazole (V), 4'-acetyl-5-aryl-1'-oxadiazoline (VII), 1',3',4'-triazole (X), carboxymethyl thiotriazole (XII) and 1',3',4'-thiodiazoline-5'-thion (XIII) rings are reported. The reactions of the hydrazide III with aromatic aldehydes, thiocyanates, isocyanates and its 3-acetyl derivative (XVI) with aniline and ethyl glycinate were studied. The antimicrobial activity of some derivatives was tested against some microorganisms.

Key words: Glycyrrhetic acid, Oxadiazole, Triazole, Thiodiazole derivatives.

EQUILIBRIA AND STRUCTURES OF SOME BARBITURATE COMPOUNDS

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(Received June 23, 1992 ; revised December 5, 1994)

Some azobarbiturate and benzylidene barbiturate compounds were prepared. The structural chemistry was investigated based on different spectral and pH-metric methods. The tautomeric equilibria were explained. The electronic character of the substituents affects the mode of dissociation of the organic compounds.

Key words. Barbiturates, Structures, Equilibria, pK's.

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SYNTHESIS AND BIOLOGICAL ACTIVITY OF 1-(4-METHYL-2-OXO-2H-1-BENZOPYRAN-7-YLOXOACETYL)-4-ALKYLTHIOSEMICARBAZIDES; 1,3,4-THIADIAZOLES AND 1,2,4- TRIAZOLES.

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(Received August 7, 1994 ; revised December 1, 1995)

A series of 1-(4-methyl-2-oxo-2H-1-benzopyran-7-yloxoacetyl)-4-alkylthiosemicarbazides, S-triazoles and their methyl derivatives has been synthesized by condensation of 4-methyl-2-oxo-2H-1-benzopyran-7-yloxo-acetyl hydrazine with alkyl isothiocyanates. Subsequent ring closure of the substituted thiosemicarbazides yielded the S-triazoles, and reaction with methyl iodide gave the corresponding methyl derivatives. The substituted 1,3,4-thiadiazoles have been synthesized by cyclodehydration of the substituted thiosemicarbazides with phosphoric acid. The biological activity of some new compounds is reported.

Key words: Substituted 1,3,4-Thiadiazoles, 1,2,4-Triazoles, Biological activity.

Introduction

under reflux for 2 hr. The hot reaction mixture was acidified

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ANION EXCHANGE STUDIES ON HYDROUS ZIRCONIUM OXIDE IN PARTIALLY NON-AQUEOUS SOLVENT SYSTEM

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(Received August 29, 1994 ; revised January 1, 1995)

The anion exchange behaviour of the transition elements, chromium, manganese, iron and cobalt was studied over hydrous zirconium oxide (HZO) dried at 35°C using ethanol/methanol-water mixture containing hydrochloric acid as solvent system. The distribution coefficient (K_d) in ethanol-hydrochloric acid system is found to be higher than that observed in methanol-hydrochloric acid system. The selectivity order in both systems is $\text{Cr(III)} > \text{Fe(II)} \geq \text{Co(II)} > \text{Mn(II)}$. Successful column separation of metal ions has been carried out using such mixtures of suitable composition.

Key words: Anion exchange, Transition elements, Non-aqueous solvent system.

TEXTURAL FEATURES OBSERVED UNDER POLARIZED LIGHT MICROSCOPY

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Polarized microscopy can be used for semi-quantitative determination of crystal orientation. Due to difference in colour or grey contrast, polarized microscopy can be used to identify inclusions, and nucleating grains in the study of deformation and recrystallization processes. The usefulness of polarized microscopy has been demonstrated which shows microstructural features of various levels of grey colour contrast due to orientation differences. An X-ray Orientation Distribution Plot (ODF) is also presented to substantiate the inferenes drawn on the basis of metllographic examination.

Key Words. Polarized light, Microstructural features, Electropolishing.

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A MECHANISM FOR NITRIC ACID INDUCED OXIDATION PRODUCTS OF YOHIMBANE ALKALOIDS

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The oxidation of two yohimbane alkaloids(reserpine and rescinnamine) by nitric acid has been studied [1,2] and mechanisms are now proposed for the oxidation products. The oxidation pattern of these alkaloids appear to be the same in various organic solvents and the rate may be influenced depending upon the solvent characteristics, i.e. dielectric constant, dissociation constant and viscosity of the medium in the range studied.

Key words. Oxidation, Yohimbane alkaloids, Nitric acid.

RESPONSE OF LEGUMES TO SALT STRESS: EFFECT ON GROWTH AND NITROGEN FIXATION OF CHICKPEA (*CICER ARIETINUM* VAR. CM-72)

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(Received October 11, 1988 ; revised February 2, 1995)

In a green house experiment, chickpea (CM-72) was subjected to different salinity levels under un-inoculated and rhizobial inoculation to study effectiveness (nodule formation) and growth of the plant. In a set of inoculated plants, the plants died at 6.0 dS m^{-1} and beyond at flowering stage showing their sensitivity toward salinity. Plant height, dry matter yield (DMY), N-content (mg/plant) decreased with increasing salinity levels in both inoculated and un-inoculated plants at all growth stages. Nodulation was adversely affected due to presence of salinity in the growth medium. Percent crude protein increased with increasing salinity. Percent crude protein comparatively increased in inoculated plants than un-inoculated ones. Chickpea is sensitive to salinity. Seed treatment with rhizobial inoculum may improve the protein content of plant under saline conditions.

Key words. Salt stress, Nitrogen fixation, Chickpea.

EFFECT OF DIFFERENT MULCHES ON THE GROWTH AND YIELD OF LATE PLANTED GARLIC (*ALLIUM SATIVUM* L.)

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(Received October 25, 1993 ; revised February 23, 1995)

The use of water-hyacinth root, rice straw and dried grass as mulches was evaluated for their effects on the growth and yield of late planted garlic at Bangladesh Agricultural University farm during 1990-91 growing season. Plants treated with any kind of mulches under study significantly increased plant height, number of leaves per plant, length of leaf, length of pseudostem, number of roots per plant, bulb and neck diameter over the control. These mulches significantly influenced both on chlorophyll-a and chlorophyll-b contents. Bulb length, bulb diameter, clove length, clove diameter, clove number per bulb, 100 clove weight and yield were also significantly higher in plants treated with mulches. All mulches provided weed control as well. Among the treatments, water-hyacinth root was proved to be superior as mulching material in producing garlic. All types of mulches in this study highly compensated the reduction of yield of garlic due to late planting.

Key words: Garlic, Mulches, Growth.

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DESCRIPTION OF A NEW SPECIES OF BLACKFLY (DIPTERA: NEMATOCERA: SIMULIIDAE) FROM PAKISTAN

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(Received June 17, 1990 ; revised March 1, 1995)

A new species *Simulium* (*Wilhelmia*) *pindiensis* was recorded from Potwar. This species was described in detail with special reference to the male and female genitalia. This species was also compared with the other known species of the genus.

Key words: Nematocera, *Simulium*, Blackfly

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ANATOLIONE : A NEW DITERPENE FROM *MARRUBIUM PARVIFLORUM* OLIGODON

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(Received July 26, 1994; revised March 1, 1995)

Chemical constituents of *Marrubium parviflorum* have been investigated. Thus a new diterpeneic compound has been isolated and its structure is elucidated on the basis of spectral studies which shows it is hitherto an unreported diterpene.

Keywords: *M. Parviflorum*, Labiatae, Diterpene, Anatolione.

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ESSENTIAL OILS OF THE FAMILY GRAMINEAE WITH ANTIBACTERIAL ACTIVITY Part 2. The Antibacterial Activity Of A Local Variety Of *Cymbopogon Citratus* Oil And Its Dependence On The Duration Of Storage

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(Received October 2, 1994 ; revised March 9, 1995)

Fresh oil, as well as two, seven and twelve years old oils of a local variety of lemon grass (*Cymbopogon citratus*) were distilled and redistilled and tested against *Escherichia coli*, *Staphylococcus aureus*, *shigella flexneri*, *Salmonella typhi*, *para-A* and *Klebsiella pneumoniae*. The oil that has been kept for 2 years, exhibited after redistillation, maximum activity. due to its high citral content. *S. flexneri* and *S. typhi* were inhibited effectively at low doses of the oil. The inhibition seemed to be affected greatly by citral content of the oil.

Key words: *Cymbopogon citratus*, Essential oil, Antibacterial citral.

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PROLONGING OF SHELF LIFE OF FRESH VEGETABLES WITH THE HELP OF EMULSION

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(Received March 13, 1993 ; revised December 5, 1994)

Attempts were made in the present investigation to develop a suitable emulsion and easy method for extending the shelf life of vegetables. Vegetable oil based emulsion developed after necessary trial was applied on different vegetables. Change in moisture, respiration and appearance of vegetables treated with emulsion were determined and compared with those of untreated vegetables. It was observed that shelf life of vegetables which can normally be kept for three days, can be extended to three to five days with the help of emulsion.

Key words: Vegetable, Shelf life, Emulsion.

Technology Section

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A NUMERICAL MODEL FOR THE TIDES OF THE PAKISTANI COASTAL WATERS

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Tidal processes in the Pakistani coastal area are studied by using the mathematical tools. A two-dimensional explicit finite difference hydrodynamical numerical technique is used for reproduction of harmonic constants of the tidal constituents M_2 , S_2 , K_1 and O_1 -Tide, in the area. A variable finite difference method is discussed. The area of interest is being covered with a finer grid, whereas a coarser grid is taken in the rest of the model. The results are presented in the form of co-range and co-tidal charts. Values of amplitudes and phases at important coastal points are given in form of a table.

Key words: Numerical model, Tidal dynamics, Pakistani coastal.

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STUDIES ON REHYDRATION OF VEGETABLES

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(Received February 23, 1994 ; revised January 9, 1995)

Rehydration capacities of cabbage, potato, turnip and onion, when dehydrated at 37°C to various levels of hydration, were studied. None of the vegetables, dehydrated to any degree, exhibited 100% rehydration. The greater the degree of dehydration, the less complete was the degree of rehydration. There seems to exist a critical point during dehydration of each vegetable beyond which a significant loss in rehydration capacity is apparent. These points for cabbage, potato, turnip and onion were respectively 43, 31, 63 and 45% of their fresh weight. Dehydration to more than 40% of the fresh weight inactivated the reducing enzyme of respiring system. Reasons for the failure of dehydrated tissue to regain the original weight have been discussed in terms of events that affect the structure and function of cellular components.

Key Words. Dehydration, Rehydration, Vegetable.

Short Comm

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Age and Sex Dependence of Copper, Nickel, Lead and Zinc Levels in Scalp Hair of Urban Pakistani Population

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