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Physical Sciences

SYNTHESIS AND ANTICONVULSANT ACTIVITY OF 2-SUBSTITUTED-5-CHLOROBENZOXAZOLE

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The potassium salt(**1**) of 5-chlorobenzoxazole-2-thione was prepared and allowed to react with alkyl chloroacetate and alkyl 3-chloro-propionate to afford $\mathbf{II}_{1\text{-}10}$.Compound $\mathbf{II}_2$ was allowed to react with ammonia and hydrazine hydrate to afford $\mathbf{III}_{11}$ and $\mathbf{III}_{12}$ respectively. The compound $\mathbf{III}_{12}$ was also reacted with the appropiate aldehydes to afford compounds $\mathbf{IV}_{13\text{-}19}$. The potassium salt(**1**) was also reacted with chloro-acetanilides to afford compounds $\mathbf{V}_{20\text{-}39}$. Preliminary pharmacological testing of some of these compounds showed that they exhibit anticonvulsant activity. The structure of these compounds was confirmed by elemental analysis IR, ^{1}HNMR and in some cases by MS spectral data.

Key words: Anticonvulsant activity, Alkylchloroacetate, Hydrazine hydrate.

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TERMINAL SOLID SOLUBILITY OF Gd IN Fe

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The constitutional data on Fe-Gd system do not include precise values of the extent of solid solubility of Gd in Fe. On the basis of investigations on the changes in α–γ iron transition temperature (as a function of Gd contents) it has been established that Gd in concentrations up to 0.2 at % decreases the temperature of α–γ transition and its effect is therefore, as a stabilizer of γ iron. Higher concentration of Gd in iron however, act as "bcc" stabilizer by increasing the α–γ iron transformation temperature. The solid solubility of Gd in α-iron at the peritectoid temperature of 931°C is ~1.0 at %.

Key words: Solid solubility, Fe-Gd system, γ-Stabilizer of iron.

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ELECTRICAL PROPERTIES OF THERMALLY EVAPORATED INDIUM TELLURIDE THIN FILMS

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(Received 10 January 1999; accepted 30 August 2001)

Indium telluride thin films are prepared by thermal evaporation technique onto glass substrate held at room temperature at deposition pressure $2x10^{-4}$ Pa. Electrical studies of the films annealed in air at 400 K shows semiconducting behaviour. Thickness dependent electrical conductivity, activation energy, aging effect are also being investigated. Activation energy is found to decrease with film thickness. Thickness dependent conductivity is found to follow Fuchs-Sondheimer size effect theory. The Hall and thermoelectric measurements show that the films are p-type semiconductor having high carrier concentration of the order $10^{18}/cm^3$.

Key words: Thermal evaporation, Electrical properties, In_2Te_3, Thin films.

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MECHANICS OF LOW TEMPERATURE CRYSTALLIZATION AND RELATED CONSIDERATIONS

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Miers theory, although elucidated satisfactorily the phenomenon of supersaturation and consequent crystallization, nevertheless, failed to explain mechanics of POLTEC (process† of low temperature crystallization) in a batch crystallizer, which has been evolved based on observations made during earlier investigations/logic. It is proposed that because of cooling, the layer in contact with the vessel's wall gets supersaturated and is dispersed in solution and spontaneous adiabatic crystallization occurs in each element of dispersed phase. Subsequent to sprouting of salt from each globule, mixing of the liquid residuals causes smooth cooling of solution. Miers idea of required degree of supersaturation, its mechanics and that of POLTEC in context with fluid dynamics/hydrodynamic of batch crystallizer (stirred tank vessel), has been found instrumental in explaining reasons lying behind the pattern of changes in overall heat transfer coefficient and recovery with agitation observed earlier.

Key words: Supersaturation and spontaneous crystallization, Mechanics of low temperature crystallization, Hydrodynamic/thermodynamics of batch crystallizer.

Short Communication

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SYNTHESIS OF 2, 3-DI (QUINOL-8-YL) 6-METHYLQUINOXALINE

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FUNGICIDE RESIDUES IN APPLE AND CITRUS FRUITS AFTER POST HARVEST TREATMENT

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(Received 2 December 2000; accepted 3 May 2001)

Thiabendazole and benomyl fungicides after post harvest treatment, were monitored in samples of apples and citrus fruits collected from the main fruit markets of Karachi during the year 1998-99 and 1999-2000. A total of 150 samples (75 samples of each commodity) were screened out of which 82 samples were found to contain either of the two studied fungicides. Only in 8 samples, Codex exceeded maximum residue limits (MRL's) while 74 samples contained residues well within permissible limits.

Key words: Fungicide residues, Apples, Citrus fruits.

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MICROBIAL SIDE-CHAIN DEGRADATION OF PROGESTERONE I: OPTIMIZATION OF THE TRANSFORMATION CONDITIONS

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The microbial side-chain degradation of progesterone for the production of C-19 androgens was investigated. Thirty seven locally isolated fungal cultures were screened for their ability to degrade the side-chain of progesterone. *Fusarium dimerum* showed the greatest bioconversion efficiency and was selected for further studies. 50% of the substrate was converted to androstenedione after 24 hrs. 72 hrs old culture was able to produce maximum yields of testosterone, androstenedione and androstadienedione. The maximum conversion activities (90%) of progesterone were recorded at pH 7. The capacity of the fungus to degrade the side-chain of progesterone was greatly diminished on using high concentration of progesterone. The bioconversion estimates sharply decreased by using glucose syrup, corn steep liquor and glucose-corn steep media.

Key words: Progesterone, Fusarium dimerum, Bioconversion, Androgens.

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PRELIMINARY SCREENING OF LAXATIVE EFFECT OF CUMIN SEEDS IN RATS

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(Received 8 June 2000; accepted 20 July 2001)

The laxative effect of cumin seeds was investigated. Seeds from the plant, *cuminium cyminium* were obtained from India. Their aqueous extract (Aq. extract) was prepared and phytochemical analysis confirmed the presence of saponins and glycosidic sugars. The extract of cumin, senna suspension and saline solution (as control) were administered to different groups of rats and the cumulative number of wet faeces passed before and after administration were counted for a period of 24 h. Both the extract of cumin and senna suspension increased the number of wet faeces compared to the control. The effect of 4g kg^{-1} Aq. extract was comparable to 2g kg^{-1} senna suspension. The Aq. extract also contracted the guinea pig ileum in a dose dependent manner. The contraction curve was shifted to the right significant by atropine ($P < 0.05$), but was not significantly affected by dibenzyline, hexamethonium or papaverine. The study has thus demonstrated the laxative effect of cumin seeds. It may be suggested that this effect could be mediated by increase in motility through stimulation of muscurinic receptors. However, further work has to be done on this to prove the mechanism of action.

Key words: Cumin seeds, Laxative effect, Saponins, Glycosidic sugar.

Pak J Sci Ind Res 2002 45 (4) 259-261

POST HARVEST PRESERVATION OF FRUITS AND VEGETABLES; STUDY ON CARROTS PRESERVED BY MODIFIED ATMOSPHERE PACKAGING (MAP) TECHNOLOGY

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(Received 1 November 1999; accepted 05 September 2001)

The objective of this study is to note the results of modified Atmosphere Packaging (MAP) Technology for post harvest preservation of carrots (*Daucus carrota L.*). It was observed that peeling treatment, film type and days of storage had a significant effect on CO_2 and O_2 percentages within bags of carrots stored at 7°C. The bags with peeled carrots contained significantly less CO_2, 9.4% and more O_2, 16.1% than non-peeled carrots, 17.6% CO_2 and 14.3% O_2 during the 28 day storage period.

Key words: Post harvest preservation, Carrots, Modified atmosphere packaging.

Pak J Sci Ind Res 2002 45 (4) 262-266

STATUS OF THE CARDIOVASCULAR SYSTEM OF THE FISH (*OREOCHROMIS MOSSAMBICUS*) AFTER DETERGENTS TREATMENTS

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(Received 22 February 2000; accepted 24 September 2001)

The objective of this study was to note the effects of some commercial local detergents such as: chloride bleach, pine disinfectant, powdered soap and bar soap on the fish heart biochemical markers. Firstly, acclimatization fresh fish into seawater, then running different trials to estimate the lethal concentrations, (LD50) and tolerable limits of the fish,was done. This was followed by studying some of the biochemical parameters of these fish such as: total lipids, triglycerides, cholesterol and moisture contents. Then, the same parameters tested were compared to control ones. Fish behaviour were monitored and recorded. The result obtained showed remarkable changes in serum total lipid concentration, cholesterol concentration and triglycerides of fish exposed to different detergents.

Key words: Tilapia (*Oreochromis mossambicus*), Cardiovascular system (CVD), Total lipids, Triglycerides, Cholesterol, Moisture contents.

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OVIPOSITION PREFERENCE OF *SCIRPOPHAGA INCERTULAS* (WALKER) ON DIFFERENT VARIETIES OF RICE UNDER CAGED CONDITION

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Preference of Yellow Stem Borer (YSB) female for egg deposition on 21 aus and 11 aman rice varieties were observed under caged conditions during 1992, 1993 and 1994. Significant differences in the number of egg mass deposition on different rice varieties were found excepting on aus, 1992 and aman, 1994. The dorsal side of leaf was preferred to ventral side for egg deposition irrespective of the rice variety. Again, the middle portion of leaf was preferred for egg laying to basal and apical portions in all the varieties. Length and width of egg masses deposited on different rice varieties did not differ significantly except the length of the egg mass in aus season. The number of egg masses deposited by the female YSB was positively correlated with leaf blade colour but negatively correlated with plant height, 2nd leaf length and width, number of leaves, number of tillers and leaf hair in both aus and aman rice. So, the leaf blade colour induces egg deposition, while other plant characters reduce it.

Key words: Rice varieties, Plant characters, YSB, Oviposition preference, Egg mass.

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PLANT GROWTH STIMULATION OF LIGNITE HUMIC ACID *PART-II* EFFECT OF LIGNITE DERIVED AMMONIUM HUMATE ON WHEAT (*TRITICUM AESTIVUM*-V)CROP USING DIFFERENT LEVELS OF PHOSPHATE FERTILIZER

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The effect of humic acids (ammonium humate) derived from Pakistani lignite on the growth and grain yield of wheat *(Triticum aestivum*-V) crop in the presence and absence of phosphate fertilizer and in combination with various levels of phosphate fertilizer was studied. Application of humic acids in all doses when applied alone and in combination with various levels of phosphate fertilizer (TSP) has significant beneficial effect on the growth and yield of wheat. An enhanced effect on the growth and grain yield was notified when Humic acids was added alone without using any fertilizer.

Key words: Wheat, Humic acid, Phosphate fertilizer, Grain yeild.

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PHYTOSOCIOLOGY OF MAI DHANI HILL NEAR MUZAFFARABAD, AZAD KASHMIR II. WINTER VEGETATION

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(Received 22 January 2000; accepted 25 April 2002)

Six plant communities viz., *Themeda-Dodonaea-Maytenus, Dodonaea-Maytenus, Phoenix-Cynodon-Micromeria, Dodonaea-Otostegia-Themeda, Dodonaea-Themeda-Mallotus, Pinus-Hypodematium-Dodonaea* were established on the basis of phytosociological attributes on sunside at Mai Dhani Hill, Muzaffarabad in December, 1995. The highest species diversity is shown by *Phoenix-Cynodon-Micromeria* community at 970 m elevation while the lowest species diversity is shown by *Dodonaea-Otostegia-Themeda* community at 980 m elevation. With the increase of an altitude the species diversity decreased. The study area has sandy loam to loam type soil. The pH of the soil in the study area was slightly alkaline in nature. Organic matter varies from 2.0 to 2.65%. The $CaCO_3$ content varies from 15.7 to 23.2% while total soluble salts vary from 0.022 to 0.58%. There was a decrease in soil temperature from lower to higher altitudes.

Key words: Plant communities, Mai Dhani Hill, Species diversity.

Technology

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Evaluation of Efficacy of Formalin Treated *Mycoplasma gallisepticum* Vaccine in Broiler Chickens

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To minimize the local problem of *Mycoplasma gallisepticum* (MG) the potential of two indigenous MG isolates (MI-203 and MI-211) was utilized for vaccine development. Formalin treated vaccines were developed and efficacy was evaluated in female broiler chickens (Cobb). Both the vaccines were found effective in providing protection against MG-S6 challenge that caused 11.5 to 23.3% body weight losses as compared to negative control as well as vaccinated chickens. Besides these inactivated vaccines, the effectiveness of MG-F live vaccine was compared with that of inactivated test vaccines. MG-F live vaccine expressed its seemingly low pathogenic character by exhibiting 5.5 to 9.3% reduced body weight gain as compared to control chickens. The study suggests that vaccines prepared from local isolates (MI-203 and MI-211) are effective in providing protection against challenge with MG-S6 by providing better growth rate and total body weight gain, feed uptake and conversion efficiency, eliminating morbidity and keeping chickens infection free.

Key words: Evaluation, Mycoplasma vaccine, Formalin treatment, Broiler chicken, Bacterin.