Physical Sciences Section

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PRODUCTION OF FRAGRANCE ESTERS FROM FUSEL OIL BY MYCELIAL LIPASE OF *RHIZOPUS ARRHIZUS*

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The properly dried and defatted mycelium of *Rhizopus arrhizus* constitutes a naturally immobilized lipase. The mycelium was used to synthesize flavouring esters from fusel oil by esterification in organic solvents. Different parameters like reaction medium, temperature, substrate concentration and moisture level were optimized for the synthesis of butyrate esters of fusel oil. The mycelium was repeatedly used in batch reactions and was found to have high efficiency and good operational stability. The half life of the mycelial lipase was greatly influenced by the concentration of substrates, i.e. the residual activity remained about the same after 20 cycles with low concentrations of substrates (0.1 M each). However, when concentrations of butyric acid and fusel oil were high, the mycelium rapidly lost its activity.

Key words: Esters, Esterification, *Rhizopus arrhizus*.

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COMPLEXES OF SOME BIVALENT METAL IONS WITH 4-(4-METHOXYPHENYL) -1-(2-PYRIDOYL) THIOSEMICARBAZIDE

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A series of complexes of VO^{2+}, Co^{2+}, Ni^{2+}, Cu^{2+} and Pd^{2+} ions with a new ligand 4-(4-methoxyphenyl)-1-(2-pyridoyl) thiosemicarbazide (MPT) have been synthesised and characterized by elemental analysis, magnetic and infrared studies. Their elemental analyses indicate that two MPT molecules are attached with each of VO^{2+}, Co^{2+} and Ni^{2+} while 1:1 complexes are formed with Cu^{2+} and Pd^{2+} ions. These complexes are paramagnetic with magnetic moments between 1.29-2.03 B.M. except $Pd_2O(MPT)_2$ which is diamagnetic. The lower values of magnetic moments and poor solubility of these complexes is indicative of their polynuclear nature. Their infrared studies indicate that MPT is coordinated through its amide oxygen and hydrazine nitrogen while pyridine nitrogen is weakly bonded to neighbouring metal atoms.

Key words: Metal complexes, 4-(4-Methoxyphenyl)-1-(2-Pyridoyl) Thiosemicarbazide, Synthesis & Characterization.

Pak. j. sci. ind. res., vol. 37, no.11, November 1994

EFFECT OF SOME PARAMETERS ON THE PRODUCTION OF RIFAMYCINS B AND SV BY *AMYCOLATOPSIS MEDITERRANEI*

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The effect of different parameters on the production of rifamycins B and SV were studied. The optimum production was obtained after four days. The concentration ratio of starch to glucose at 20 : 10 g/L was favourable for the antibiotic production. The effect of nitrogen compounds indicated that the phenylenediamine, potassium phthalimide and uracil have a stimulating effect on the production of rifamycin B by *Amycolatopsis mediterranei* similar to the barbital; specially uracil at 2 g/L.

Key words: *Nocardia mediterranei* CBS 42575, Rifamycins B and SV. $NaNO_2$, Uracil, Phenylenediamine.

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TALC DEPOSITS OF JURAGH AREA, DISTRICT SWAT, PAKISTAN

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Good quality talc occur in the Juragh area of district Swat. The deposits lie in the western part of the suture (Lesser Himalayas, exposed in Pakistan) of the Indo-Pak plate in tectonic interaction with Eurasia in the north. The deposit is comprised of talc and antigorite while the country rocks are quartz-mica and dolomitic schists. The talc may have been developed by secondary processes undertaken by the action of hydrothermal solutions on metamorphosed calcareous sediments and impure marbles as well as retrogression during the Himalayan orogeny. The talc is suitable for utilization in a range of industries.

Key words: Talc,Juragh,Swat.

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THERMAL ANALYSIS OF Fe (II), Ni (II) AND Cu (II) CHELATES OF SOME TRIAZINE DERIVATIVES

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The thermal analysis of Fe(II), Ni(II) and Cu(II) complexes with 1, 3, 5- trimethyl hexahydro-triazine (TMAZ) and 1, 4, 7- triazacyclononane (TACN) were studied by microanalysis, TG and DTA techniques. Metal - TMAZ complexes show somewhat similar TG and DTA profiles when heated in N_2 atmosphere. An endothermic peak appears in the range 60-130°C which attributed to liberation of the organic ligand. TACN complexes show exothermic peak in the range 200-245°C proceded to endothermic peak for dehydration of metal chelates in the range 125-155°C. The exothermic peak, corresponding to rapid mass-loss in TG curves, which may be due to oxidation reduction reaction. A relative thermal stability of metal complexes is reported.

Keywords: Thermal analysis, Fe(II), Ni(II), Cu(II), Triazine derivatives.

Biological Sciences Section

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INHIBITION OF MYCOFLORA AND ZEARALENONE ON RICE BY SELECTED ESSENTIAL OILS

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Effect of natural products *viz,* anise, cinnamon, clove, marjoram and peppermint on the inhibition of mycoflora and zearalenone production on rice grains was studied. Population of fungi significantly reduced by spice oils used as 0.1, 0.3, 0.5 and 1.0% and completely inhibited at 1% cinnamon. *Fusarium graminearum* grown in sterilized liquid medium and on cooked and uncooked rice grains showed complete inhibition of zearalenone production where anise, cinnamon and clove as 0.5% were used. Marjoram and peppermint oils as 0.5% on uncooked and as 1% on cooked rice showed inhibitory effects. In rice extract liquid medium, cinnamon and anise oils had most pronounced effect and significantly reduced zearalenone production at 0.02 and 0.05% respectively.

Key words: Mycoflora and zearalenone, Rice, Spice oils.

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PATH COEFFICIENT ANALYSIS IN WHEAT

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An eight parental diallel cross was made to study the extent of variability, interrelationship, direct and indirect effects between grain yield and its components. Genotypic variability coefficient was higher for grain yield as compared to other studied characters. Heritability estimates ranged from moderate (66.20%) to high values (96.95%). Number of grain per spike 1000 grain weight and plant height were positively and significantly correlated with yield except number of spikes per plant. Path coefficient indicated that except plant height the traits have positive direct effect on grain yield.

Key words: *Triticum aestivum,* Advanced lines, Heritability, Correlation, Path coefficient analysis.

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NEW SPECIES OF THE GENUS *NEPETA* (LABIATAE) FROM PAKISTAN

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(Received September 12, 1990 ; revised July 19, 1994)

A new species of *Nepeta,* viz., *N. gilgitica* Shinwari and Chaudhri is described. This species belongs to section *Spicatae. Nepeta gilgitica* is closley related to *N. kokanica* Regel.

Key words: New species, *Nepeta,* Description.

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IMMIGRATION OF PENAEID POSTLARVAE IN THE KUTUBDIA CHANNEL, BANGLADESH

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Only Penaeid postlarvae are available for coastal aquaculture ponds in Bangladesh, an investigation was made from March 1988 to Feb 1989. The data indicated that immigration of penaeid postlarvae takes place throughout the year in the Kutubdia channel. They were most abundant in April (301.91 indivs./100m^3) when higher salinity condition (25.13%) also prevailed, and the minimum was recorded in Oct (6.17 indivs./100m^3) when the salinity was 13.25%. The postlarval community of penaeid shirmps of this area was dominated by *Penaeus indicus* (15.35%); *P.monodon* (12.60%); *P. scmisulcatus* (8.24%); *P. merguiensis* (6.94%);and *P. japonicus* (4.13%). Their temporal and spatial distribution in the study area are presented here.

Key words: Penaeid postlarvae, Immigration, Channel.

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EFFECT OF FERTILIZATION AND WATERSTRESS ON DOWNY BROME (*BROMUS TECTORUM*) INFESTED WHEAT (*TRITICUM AESTIVUM* L.) GROWN UNDER CONTROLLED ENVIRONMENT

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Two greenhouse studies were undertaken in 1988 and 1989 at University of Wyoming, Laramie, USA to determine the effects of N alone N + P placement methods on downy brome infested wheat grown in pots with normal irrigation and waterstress. Results of the first experiment showed that blend of N and P gave 20% more downy brome tillers than an application of N only. Similarly, surface broadcasting of NP fertilizer produced greater tiller numbers (44%) and dry matter yield (28%) of downy brome compared to the deep placement of the same nutrients. Deep banded NP fertilizer showed promise for greater plant height (13.6 cm), ear length (2.9cm), grain yield (24%) and straw yield (26%) of wheat in comparison with surface broadcast application treatment. In second greenhouse study (1989), water stressed and unstressed treatments differed significantly from each other in downy brome dry matter yield, wheat yield components and wheat dry matter production. Deep banding treatment, compared with broadcasting of NP, afforded relatively lower downy brome dry matter yield and higher grain and dry matter yield of wheat.

Key words: Bromus tectorum, Weeds, Waterstress, NP placement.

Technology Section

Pak. j. sci. ind. res., vol. 37, no. 11, November 1994

NONCATALYTIC ESTERIFICATION OF INDUSTRIAL ALCOHOLIC WASTE

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A noncatalytic esterification of fusel oil was conducted. Studies including the different parameters are investigated to determine the optimum operating conditions for the production of corresponding acetates of the alcoholes of fusel oil, by using the acetic anhydride instead of acetic acid to avoid the use of mineral acid as catalyst. The studied parameters were cited as: molar ratio of reactants and reaction time. The optimum conditions were found to be (2:1/ace.anh.:fusel oil) and 120 min. as molar ratio and time respectively.

Key words: Industrial alcoholic waste, Esterification, Fusel oil.

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STUDIES OF POTASH BEARING EVAPORITE BASINS OF KOHAT KARAK SALT RANGE, NWFP PAKISTAN

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Potash-bearing minerals occur in nature with common salt and usually deposited in the evaporite basin on evaporation of brine water. In view of the huge deposits of common salt in Pakistan, particularly in Kohat-Karak evaporite basin, NWFP; investigations to locate the potash deposits in the common salt of the area were undertaken. The geology of the potash bearing deposits reveal their occurance in the form of lenticular beds associated with rock salts. The present study has successfully brought into focus areas of potash concentration in the above area which after refining may be exploited to meet the requirement of potash for fertilizer.

Key words: Potash, Evaporite basin, Kohat-Karak salt range.

Short Comm

Pak. j. sci. ind. res., vol. 37, no. 11, November 1994

Evaluation of Toxicological Effects of Brown Seaweeds: *Part I*

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Three varieties of brown seaweed *Cystoseira barbata*

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Mass Rearing and Life History Studies of *Drosophila* Under Laboratory Conditions

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Wild *Drosophila* flies can be collected on fermenting