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Physical Sciences Section

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BEHAVIOUR OF SOME 3-FORMYL-4-HYDROXY CARBOSTYRILS TOWARDS AMINES, HYDRAZINES AND HYDROXYLAMINE

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(Received June 10, 1990; revised May 12, 1993)

The action of the above titled nucleophiles on 1-hydroxybenzo(f) quinolin -3(4H)-one-2-carbaldehyde has been studied under different conditions and ratios, giving rise to various heterocyclic systems containing carbostyril moiety. The structures of the newly obtained compounds were confirmed by chemical reactions, elemental analysis, ^{1}H-NMR and IR spectroscopic studies.

Key words: Nitrogen compounds, Formylcarbostyril, Action.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

SOME REACTIONS OF 2-(α-NAPHTHYL METHYL)-(4H)-3, 1-BENZOXAZIN-4-ONE

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(Received May 4, 1992; revised May 18, 1993)

Synthesis and reactions of 2-(α-naphthyl methyl)-4 (3H)quinazolone (2) with benzamide and succinimide was considered. Alkylation with ethyl chloroacetate, benzoylation and the effect of P_2S_5 on compound (2) were investigated. Reactions of the titled compound (1) with ethyl chloroacetate and active methylene compounds were studied. Beside the effect of aromatic hydrocarbons under Friedel-Crafts condition and Grignard's reagents on compound (1) were also considered.

Key words: Benzoxazin-4-one, Quinozol-4-ones, Active methylene compounds.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

DETERMINATION OF Zn, Cd, Pb AND Cu IN SOIL AND SLUDGE SAMPLES BY VOLTAMETRY

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(Received August 15, 1992; revised February 3, 1993)

A rapid and reliable analytical procedure has been developed for the simultaneous determination of traces of Zn, Cd, Pb and Cu in soils, after digestion with aqua regia, by differential pulse anodic stripping voltametry using a microprocessor controlled polarograph. Procedure was tested by analysing standard reference materials and comparing results with atomic absorption spectrometry. Soil and sludge samples from polluted and unpolluted areas were analysed. Soil samples from the road side showed the effects of vehicular traffic.

Key words: Soil and sludges, Voltametry, Pollution.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

ACTIVATED CARBON FROM RICE HUSK
Part - I. Activating Agent Selection

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(Received June 7, 1992)

The effect of different acidic and alkaline activating agents on the physical and chemical properties of activated carbons from high and low ash rice husk has been studied. The optimum deashing of rice husk was acheieved by leaching it with 1% sodium hydroxide solution. It was also observed that recovery in case of alkaline activating agents was comparatively better. It has further been noted that acidic and alkaline activating agents contribute best in developing micro and macro pores respectively. Among the different activating agents studied, zinc chloride has shown better results for high ash and potassium carbonate for low ash rice husk carbons.

Key words: Activated carbon, Rice husk, Activating agents, Ash content, Adsorptive properties.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

ACTIVATED CARBON FROM RICE HUSK
Part-II. Impregnation Ratio, Temperature and Time Influence

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(Received November 10, 1992)

The effect of variation of different parameters *viz.* impregnation ratio, temperature and time on the physical and chemical properties of activated carbons from high and low ash rice husk has been studied and optimum working conditions for their preparation established. Potassium carbonate (K_2CO_3)used as activating agent in low ash rice husk has been found to be effective in creating micro and mesopores, whereas zinc chloride ($ZnCl_2$) has given quite good results in developing macroporosity in high ash rice husk. It has also been found that although surface area of alkali activated products is higher but their yield is low as compared to acid ones.

Key words: Activated carbon, Rice husk, Chemical activation, Activating condtions.

Biological Sciences Section

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

RESPONSE TO ENVIRONMENTAL CHANGES OF THE COMPONENTS OF VARIATION AND OTHER GENETIC PARAMETERS IN MAIZE

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(Received July 16, 1990; revised May 21, 1993)

Twenty five varieties of maize (*Zea mays* L.) were tested under four environments to evaluate the nature of response of the components of variation and their genetic parameters to genotype x environmental interaction. The characters studied were days to pollen shed, days to silk, plant height, ear height and grain yield. The evidence has been there for the occurrence of genotype x environmental interaction. Genetic components and different parameters were reduced after elimination of the interaction component from the total variance. This drop varied in degree between the components characters. The relative importance of the genotype x environmental interaction in determining genetic parameters and the needs for their elimination to arrive at precise estimates have been discussed.

Key words: Maize, Genotype x environmental interaction, Genetic parameters.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

STUDIES OF LIPASE AND PHOSPHOLIPASE PROCURED FROM THE MEAL OF *CARUM CAPTICUM*

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(Received February 6,1993; revised July 18, 1993)

The lipase extracted from the meal of mature seeds of *Carum capticum* show optimum activity at 40° and pH 5 in aqueous media, whereas the phospholipase activity is maximum at pH5 under the same conditons. N-heptane was found to be the most satisfactory media solvent to maximize activiteis of lipase and phospholipase. The activity of lipase, extracted from germinatd seeds, increases proportionally with stage of seeds development but the reverse was observed for phospholipase activity.

Key words: Lipase, Phospholipase and *Carum capticum*.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

STUDY ON SALT TOLERANCE OF *HIPPOPHAE RHAMNOIDES* L. DURING GERMINATION

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(Received December 31, 1990 ; revised April 6, 1993)

The present investigation is an attempt to elucidate the salt tolerance of *H. rhamnoides* L. during germination. Salts of sodium, calcium and magnesium with their species anions chloride and sulphate were applied at various treatment levels. *H.rhamnoides* was found less tolerant of the salts of sodium, calcium and magnesium and sulphate salts of Na and Mg affected germination more than chloride salts.The interaction of sodium chloride and sodium sulphate with calcium chloride showed pronounced enhancement of seed germination in sodium sulphate treatment. This was possibly as a result of supression of sodium uptake and replacement of sulphate ions with that of chloride ions which showed less inhibitory effect when supplied individually.Germination of seeds also improved in magnesium chloride treatments on addition of calcium chloride. This was possibly due to an interference mechanism, where ions interfere directly with each other for the same uptake site.*H.rhamnoides* seeds were found equally tolerant to isotonic concentrations of sodium chloride or mannitol (non-electrolyte).It appreared that *H.rahmnoides* seeds can tolerate up to 20% salinity of sea water dilutions during germination.

Key words: Salt tolerance, Specific ion effect, Sea water, *Hippophae rhamnoides.*

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

FORAGE YIELD AND QUALITY POTENTIAL OF VARIOUS CULTIVARS OF OATS (*AVENA SATIVA* L.)

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(Received December 14, 1991; revised May 9, 1993)

Fifteen exotic and indigenous cultivars and interspecific hybrids of forage oats were evaluated for plant height, number of tillers per plant, number of leaves per tiller, leaf area, green fodder yield, dry matter yield, crude protein and crude fibre content at the National Agricultural Research Centre (NARC), Islamabad during 1985 and 1986. Cultivar No. 725 proved its superiority over all the cultivars/hybrids. This cultivar produced taller plants, a greater number of tillers per plant, more leaves and leaf area, highest green fodder and dry matter tonnage and high quality forage as compared to all the other entries. Therefore, cultivar No. 725 is recommended for general cultivation for maximum quality forage production.

Key words: Oats (*Avena sativa* L.), Forage yield, Forage quality.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

SITE VARIATIONS IN FORAGE YIELD, DRY MATTER YIELD, CRUDE PROTEIN AND CRUDE FIBRE CONTENTS OF PEARL MILLET CULTIVARS

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(Received March 2, 1992; revised June 19, 1993)

The present study was designed to determine variability in fodder yield and quality of pearl millet as influenced by different locations or sites. Three diverse agroecological sites *viz.* Ayub Agricultural Research Institute (AARI), Faisalabad. National Agricultural Research Centre (NARC), Islamabad and Agricultural Research Institute (ARI), Sariab, Quetta were selected on the basis of diverse environmental conditions. Mean green fodder yields varied from 28.47 to 42.01 t/ha, dry matter yields from 5.35 to 9.12 t/ha, crude protein contents from 5.54 to 10.51% and crude fibre contents from 27.98 to 34.58%. The highest green fodder and dry matter yields and the maximum crude protein and crude fibre contents were obtained at AARI, Faisalabad. The lowest green fodder, dry matter and crude fibre contents were observed at ARI, Sariab, Quetta, while the minimum crude protein contents were observed at NARC, Islamabad. The differences in fodder yield and forage quality at various locations might be due to different soil types, then fertility, temperature, moisture and various agro-climatic conditions prevailing at the three distinct environments.

Key words: Pearl millet, Cultivars, Locations, Forage yields, Forage quality.

Introduction

crude fibre contents of fodder. Hussain *et al.* [3] reported

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

CONTROL OF BRINJAL FRUIT BORER, *LEUCINODES ORBONALIS* GN. WITH SOME INSECTICIDES

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(Received February 17, 1990; revised April 29, 1993)

The incidence of attack by *Leucinodes orbonalis* Gn. was studied under natural conditions in three different localities of Muzaffarabad district. It was found that the percent infestation varied slightly on different localities at the same time of the season. At all the localities, insect damage started in Aug. (19.6%) which increase with passage of time and reached to its maximum in Sept. (71.9%). Three insecticides *viz*., Decamethrin, Metasystox and DDVP were used to control this pest. Sprays were started when first insect larvae appeared boring in fruits. Decamethrin was more effective than the Metasystox and DDVP. These insecticides were applied at two different intervals *viz*. 10 and 15 days. There was no significant difference between the two spray schedules. Similarly, there was also no significant difference between the size of fruit and the yield obtained from the different insecticidal treatments.

Key words: Brinjal, Fruit borer, Insecticides.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

EFFECT OF NUMBER OF SUCKER PER HILL ON GROWTH AND YIELD ON BANANA IN A RATOON CROP

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(Received April 4, 1990; revised June 26, 1993)

To increase banana yield, more than one sucker per hill was planted with proportionate increase of fertilizers. The results showed that the girth of pseudostem decreased at harvest, but the height of individual plant increased significantly with the increase in number of suckers per hill. The yield as well as the sucker production ability of the individual plant diminished markedly as the number of sucker per hill was increased. Days to bunch shooting and harvesting also increased significantly when more than one sucker was retained per hill. The highest yield (45.86 t/ha) was obtained with two suckers per hill which was more than 50% higher than that (30.04 t/ha) obtained from the conventional single sucker planting system. There was no significant difference in the total yield when one and three suckers were retained per hill.

Key words: Banana, Sucker, Ratoon crop, Growth, Yield.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

ISOLATION OF *SERRATIA MARCESCENS* SENSTITIVE TO 6-AMINOPENICILLANIC ACID FROM LOCAL ENVIRONMENT

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(Received January 12, 1992; revised April 24, 1993)

A strain of *Serratia marcescens* has been obtained from water of irrigation channel. The minimum inhibitory concentration for 6-aminopenicillanic acid is nearly 250 µg/ml in nutrient agar medium and the strain could grow well in solid medium in petriplate having 10 mg/ml of penicillin G. The strain is designated *Serratia marcescens* SS91, and is useful in screening penicillin G acylase producing *Escherichia coli* isolates.

Key words: *Serratia marcescens*, 6-Aminopenicillanic acid.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

INTERCROPPING COTTON WITH MUNG AND SUNFLOWER

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(Received October 6, 1992; revised July 19, 1993)

Cotton intercrop system with mungbean (*Phaseolus aureus*) and sunflower (*Helianthus annuus*) was evaluated for three consecutive years at Cotton Research Institute, Sakrand. Seedcotton yield for cotton alone (non-intercropped treatment) was higher than intercropped cotton (*Gossypium hirsutum* L.). But, the total economic return was higher in the intercropped treatments, in all the years, due to additional yield of intercrops (mung and sunflower). Plant population per hectare of cotton was significantly different in both the intercropped and non-intercropped treatments but the plant height and number of bolls per plant remained unaffected due to intercropping. Cotton, whether sown alone or intercropped, when planted in mid April gave comparatively more economic returns than mid-May sown. Sunflower was comparatively a better intercrop than mung.

Key words: Intercopping, Cotton, Mung, Sunflower.

Pak. j. sci. ind. res., vol. 36, nos. 6-7,June-July 1993

PERFORMANCE OF EXOTIC AND LOCAL STRAINS OF CHINESE MUSHROOM *VOLVARIELLA VOLVACEA* (BULL. EX. FR.) ON DIFFERENT SUBSTRATES

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(Received July 24, 1990; revised July 17, 1993)

An experiment was conducted during May-Aug., 1988 at National Agricultural Research Centre (NARC), Islamabad to determine the relative yield performance of local and exotic strains of Chinese mushroom, *Volvariella volvacea* (Bull. ex. fr.) Sing. with two different substrates: paddy straw and cotton waste. Significant strain differences were observed. Both local as well as exotic strains of Chinese mushroom performed better when paddy straw was used as substrate as compared to cotton waste. The local strain of Chinese mushroom gave significantly higher yield over exotic strain of Chinese mushroom "V 559".

Key words: Mushroom strains, Substrates, Performance.

Short Communication

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

Estimation of Heterosis and Heterobeltosis for Some Allogamic Traits in *Oryza sativa L.*

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(Received March 11, 1992; revised March 30, 1993)

Many researchers have reported varying degree of hetero-

Technology Section

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OILSEED PROCESSING TECHNOLOGY IN PAKISTAN
Part-VIII. Development of Semi-Commercial Expeller

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(Received December 5, 1992; revised April 15, 1993)

An expeller (Model-3) of screw length 56 cm having two reverse worms, at 4th and 6th places of reduced shoulder height, 0.95 cm was designed, developed and tested for its performance on all types of oilseeds. The processing performance was so increased that it can be adopted at semi-commercial level. The design improvements'details and oilseed processing results are described.

Key words: Expeller, Performance, Worm Gash.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

INTRODUCTION OF FROZEN STORAGE TECHNOLOGY IN PAKISTAN: EFFECT OF FROZEN STORAGE ON THE QUALITY OF SPINACH

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(Received February 14, 1990; revised May 26, 1993)

In freezing, preservation is acheived by a combination of low temperature and reduced water activity. Spinach contains significant amounts of nutrients, however its general taste acceptability is usually consdiered to be more important than its nutritional value. Preparation for cooking is time consuming. In this study fresh spinach was prepared in ready-to-cook form and packed in polyethylene bags for frozen storage at -18°. An increase in reducing sugars and drip loss whereas substantial decrease in moisture, ascorbic acid and pH during frozen storage of spinach were noticed. The organoleptic evaluation showed that blanched spinach retained good colour, flavour and taste as compared with unblanched spinach during frozen storage.

Key words: Peroxidase, Blanching, Drip loss.

Pak. j. sci. ind. res., vol. 36, nos. 6-7, June-July 1993

PRODUCTION OF EGG POWDER ON COMMERCIAL SCALE

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(Received December 17, 1989; revised May 11, 1993)

Pilot scale experiments on the production of egg powder from yeast treated pulp were carried out using the foam-mat drying technique. The technological aspects of different unit operations and equipment have been described. Data on bulk dehydration of whole egg melange is included. A comparison has been made between storage at room temperature and under refrigeration. From the results of pilot experiments, cost studies were developed provided a prospective on the feasibility of the production of egg powder in Pakistan.

Key words: Drying, Dehydration, Egg powder.