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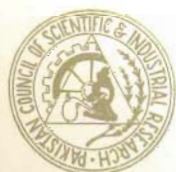
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Physical Sciences Section

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SYNTHESIS OF SOME NEW SULPHONANILIDES

M. Ikram Qureshi and M. Khurshid Alam Khan

PCSIR. Laboratories, Karachi – 39

(Received January 26, 1985; revised, February 4, 1986)

Condensation of various *ortho* substituted anilines (Ia-f) with methyl sulphonyl chloride gave *o*-substituted disulphonyl anilides (IIa-f). Cautious hydrolysis of the disulphonyl derivatives gave the corresponding *ortho*-substituted sulphonylanilides (IIIa-f). The structure of the anilides has been confirmed through infrared spectroscopy and elemental analysis. These *o*-nitrosulphonanilides did not undergo base catalysed cyclisation to the expected novel heterocyclic N – oxides.

COMPARISON OF SODIUM SULPHATE WITH GYPSUM AS GLASS REFINING AGENT

Ahmad Din, M. Aslam Chaudhury, M. Rashid Sheikh and M. Afzal Khan

PCSIR Laboratories, Lahore-16

(Received October 22, 1984; revised October 2, 1985)

The refining action of sodium sulphate with respect to gypsum has been studied in a Sodalime-silica glass composition. The sulphate radical concentration was maintained at 21.2 g/1000 g of glass. It has been experimentally shown employing bubble count technique that gypsum is a better refining agent as compared to sodium sulphate. The advantage in using gypsum lies in its abundant occurrence and availability.

4-(3-METHYLBENZOFURAN-2-Y1)-2-HYDROXYTETRONIMIDE AND ITS DERIVATIVES: ARYL ANALOGUES OF IMINO-L-ASCORBIC ACID

Hassan M. Mokhtar and J. Wojtanis*,

Chemistry Department, Faculty of Science, Alexandria University, Egypt

(Received March 13, 1985; revised January 13, 1986)

The synthesis of 4-(3-methylbenzofuran-2-yl)-2-hydroxytetronimide (I), its monoacyl derivatives (III), and hydrazone (VI) is described. The oxidation of the tetronimide (I) with nitrous acid yielded 2,3-dioxo-4-(3-methylbenzofuran-2-yl)butyro-1,4-lactone (VII). Reaction of the lactone (VII) with acylhydrazines afforded bis acylhydrazones (VIII). In the case of arylhydrazines, it gave the corresponding bis-aryl-hydrazones (IX) which were cyclized to 1-aryl-4-aryl-hydrazono-3-[hydroxy (3-methylbenzofuran-2-yl)methyl] pyrazole-5-ones (X). Furthermore, the reaction of compound (VII) with *o*-phenylenediamine gave a quinoxaline derivative (XI).

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**CHELATING BEHAVIOUR OF SUBSTITUTED 3-ARYLHYDRAZO PENTANE-2, 4-DIONE (SBHP)
LIGANDS**

**Part VI*. Complexes of Nickel II with *o*-, *m*-, *p*- and 4-Me-*o*-Sulphonic Benzene Hydrazo-Pentane
2, 4-Dione**

G.A. El-Inany, K.A.R. Salib** and A.A. Taha

Chemistry Department, Faculty of Education, Ain-Shams University, Heliopolis, Cairo, Egypt

(Received April 5, 1983)

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**PREPARATION AND CHARACTERIZATION OF COMPLEXES OF
ALUMINIUM-SORBITOL; SORBITOL-CITRIC ACID-SORBITOL-DEXTRIN
AND CITRIC ACID-SUCROSE-GLUCOSE AND DEXTRIN**

I.H. Siddiqui, J. Jafri, R. Jafri and S.A.H. Zaidi

P.C.S.I.R. Laboratories, Karachi

(Received July 4, 1985; revised January 13, 1986)

Preparation and characterization of the complexes of aluminium with sorbitol; sorbitol-citric acid; sorbitol-dextrin and citric-acid; sucrose; glucose and dextrin have been studied. With the exception of Al-sorbitol complex which is unstable below pH 8.0 showing precipitation with acid, the complexes are stable between pH 4.5 and above.

Short Communication

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**THE ELECTROCHEMICAL NATURE OF REACTIONS TAKING PLACE AT
SOLIDIFYING CR-NI STEEL AND GREEN SAND MOULD INTERFACE**

Parvaiz Habib Ullah*

Ferro – Alloys of Pakistan Ltd., Lahore

(Received March 14, 1983; revised December, 18, 1985)

Short Communication

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**SOME REACTIONS OF 2-CINNAMYLDENE AND 2-BENZYLIDENE-1,
3-INDANDIONE**

H. H. Hassan, A. A. Fadda, M. M. Yousif and E.M. Afsa

Chemistry Department, Faculty of Science, Mansoura Universtiy, Egypt

(Received October 24, 1982; revised December 8, 1985)

Biological Sciences Section

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BIOSYNTHESIS OF PROTEASES BY SUBMERGED CULTURE FERMENTATION

A.H. Hafiz and M.A. Qadeer

P.C.S.I.R. Laboratories, Lahore-16

(Received April 4, 1984)

Evaluation of wheat bran, soybeans meal, maize bran, rice bran or rice husk as substrate was carried out for the synthesis of both alkaline and neutral proteases by *Bacillus subtilis* in shake flasks. Of all these substrates, however, wheat bran was found to be an ideal substrate for enzyme formation. Partial replacement of wheat bran by rice bran or soybeans meal resulted in reducing enzyme production. The initial pH of the fermentation broth showed great influence on the biosynthesis of both neutral and alkaline proteases.

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ESSENTIAL OILS OF THE SPECIES OF LABIATAE

Part. II. Studies on the Eessential oil of *Ocimum sanctum*

M. Shafiq Malik, M. Rafique, Rafi Ahmed, Shahid Mahmud, S.A. Khan and M.K. Bhatti

P.C.S.I.R. Laboratories, Lahore-16

(Received January 10, 1985)

The essential oil from the leaves and stalks of *Ocimum sanctum* (N.O. Labiatae) grown in Pakistan has been studied with respect to its physico-chemical values and chemical composition. The percentage composition of the oil has been recorded to be as caryophyllene (1.6%), carvacrol (30.4%), methyl eugenol (1.8%), eugenol (61.2%) and an unidentified compound (3.7%).

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THE GROWTH AND YIELD OF A FEW SEMI-DWARF WHEAT VARIETIES AS AFFECTED BY SEED RATES

M.A. Islam, M.A. Shahid and M.I. Ali*

*Department of Agronomy, Bangladesh Agricultural University
Mymensingh, Bangladesh*

(Received August 22, 1983; revised November 11, 1985)

An experiment was conducted at the Agronomy Field laboratory of the Bangladesh Agricultural University, Mymensingh, representing the non calcareous dark grey floodplain soils of Bangladesh in order to evaluate the effect of seed rate on the yield and yield contributing characters of various wheat varieties. The yield produced by Inia 66 and Sonalika differed significantly from Kalyansona. Inia 66 produced the highest grain yield (2.81 tons/ha) which was identical to that of Sonalika (2.68 tons/ha). Seed rates used in the study was 80, 100, 120, 140, 160 and 180 kg/ha. The medium seed rates of 120 to 140 kg/ha were found to perform better in the production of wheat grain.

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YIELD AND QUALITY OF CHICKPEA AS INFLUENCED BY PLANT NUTRITION

Shamshad Hussain Shah, Muhammad Shabbir and Rana Muhammad Iqbal

Agronomy Department, University of Agriculture, Faisalabad (Pakistan)

(Received August, 1983 ; revised October 31, 1985)

Investigations to determine the effect of N,P and K on grain yield and quality of chickpea grown on a sandy clay loam soil revealed that the application of 20 kg N + 60 kg P_2O_5 /ha was the best with regard to seed yield. The increase in seed yield was due to increased number of pods per plant and heavy seed weight. Moreover, the N,P and K contents of the grain were also improved by the addition of 20 kg N + 60 kg P_2O_5 /ha over control.

RIPENING OF RICE AS INFLUENCED BY MICRO-NUTRIENTS, Cu, Zn AND Fe, WHEN THE NITROGEN SOURCE WAS AMMONIUM SULPHATE

Fateh M. Chaudhry and Shaukat Ali

Department of Agronomy, University of Agriculture, Faisalabad

(Received September 21, 1983, revised October 31, 1985)

Studies on the ripening of rice as influenced by the micronutrients Zn, Cu and Fe, were carried out in pots at the University of Agriculture, Faisalabad in the 1982. Micronutrients, Zn, Cu and Fe, were applied at the rates of 10, 10 and 100 ppm respectively. The micronutrients were applied singly and in different combinations at the time of transplanting. The results have shown that Zn, Cu and Fe, when used singly or in combination of twos, had a favourable effect and resulted in substantial increase in per panicle spikelets and per units grain weight. Sterility also decreased with the application of these micronutrients. A combination of all three micronutrients did not affect the grain yield and yield components favourably which may be attributed to the probable antagonistic effect of these elements towards each other.

THE GROWTH AND YIELD OF RICE CULTIVAR IRRI-6 AS INFLUENCED BY PLANTING DENSITY**Muhammad Ayub and Muhammad Siddique Sharar***Department of Agronomy, University of Agriculture, Faisalabad*

(Received August 20, 1985; revised, December 15, 1985)

The rice cultivar IRRI-6 was grown at spacings of 15 x 15, 20 x 20, 25 x 25, 30 x 30 and 40 x 40 cm between hills and rows to evaluate their effects on growth, yield and yield components. Increased spacing significantly increased the number of total as well as panicle bearing tillers per hill and the number of grains per panicle. The plant height, 1000 grain weight and grain yield were not affected significantly by the spacing tried. The maximum grain yield of 62.33 quintals/hectare was obtained by growing rice cultivar IRR-6 at spacing of 20 x 20 cm. between hills and rows.

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NUTRITIONAL AND ORGANOLEPTIC EVALUATION OF WHEAT BREAD SUPPLEMENTED WITH CHICK PEA FLOUR

Sher Akbar, Mohammad Siddiq and Parvez Iqbal

Department of Agricultural Chemistry and Human Nutrition NWFP Agricultural University, Peshawar

(Received June 5, 1985; revised January 13, 1986)

Proximate composition, organoleptic characteristics and the nutritive value of wheat bread supplemented with different levels of chick pea flour were studied. Wheat and chick pea flours were mixed in definite ratios and the breads were baked. Protein, fat and ash contents of control bread were improved with supplementation. Organoleptic study revealed that incorporation of chick pea up to 20% had no adverse effect on the acceptability of the bread. Protein efficiency ratio, net protein utilization and biological value of supplemented breads were higher than the control bread. However, the true digestibility of wheat bread could not be improved.

**GROWTH OF KALLAR GRASS (*Diplachne fusca* (LINN) BEAUV)) AS INFLUENCED
BY VARIOUS LEVELS OF GYPSUM APPLICATION***

Mohammad Yousaf

Inservice Agricultural Training Institute, Rahimyar Khan

(Received June 9, 1985; revised November 21, 1985)

Two saline-sodic soils were equilibrated in the laboratory with 0, 1.0, 2.0, 4.0, 8.0, 12.0 me of calcium per 100 g soil and gypsum requirement levels (gypsum requirement for soils I and II was 16.2 and 12.0 me calcium per 100 g soil). The gypsum potential ($pNa-1/2 pCa$) attained zero value for soils I and II at 7.3 and 6.3 me calcium. The activity ratio of sodium and calcium indicated that at zero gypsum potential, the activity of sodium no long dominated in solution phase. The maximum yield of kallar grass was obtained at 8.0 and 4.0 me calcium per 100 g soil for soils I and II. The minimum yield in soils I and II was obtained at the gypsum requirement levels which revealed that in situations with inadequate drainage, gypsum applied in excessive amount may result in salt concentrations which are detrimental for plant growth. Electrical conductivity, pH and exchangeable sodium in soil media decreased after the harvest of kallar grass compared to that of equilibrated soil before sowing of the crop.

Technology Section

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FATTY ACIDS OF INDIGENOUS RESOURCES FOR POSSIBLE INDUSTRIAL APPLICATIONS

Part IX. The Seed Oil of *Euphorbia helioscopia* Linn.

Muhammad Nazir*, Shafiq Ahmad Khan
and M.K. Bhattu

PCSIR Laboratories, Lahore-16

(Received July 8, 1985)

Euphorbia helioscopia seeds contain 28% of fixed oil whose composition, as determined by gas chromatography is lauric acid, 2.85%; myristic acid, 5.49%; palmitic acid, 9.88%; stearic acid, 1.13%; oleic acid, 15.80%; linoleic acid, 22.14%; linolenic acid, 42.71%. The use of this oil in paints, varnishes and alkyd resins and the possibility of *E. helioscopia* as a potential seed crop are discussed.

OIL SEED PROCESSING IN PAKISTAN

Part IV. Comparative Performance of the Existing and the Modified Oilseed Processing Technology

Din Muhammad, A. Wasay Omer, L. Stephen Force* and Shafiq Ahmad Khan

P.C.S.I.R. Laboratories, Lahore-16

(Received October 24, 1985)

The performance of the standard and the modified Lahore oil expeller has been compared. It has been found that the modified expeller yields 3 to 4% more oil per kg of oilseed processed and has 24–40% more processing capacity per hour. The improved expeller provides a reliable and efficient village level technology for hard seeds like sunflower, safflower and soybean which are likely to become the future oilseed crops of the country. The content of oil in the residual cake also decreases from about 13.5 to 8%, which factor improves the quality of the cake as animal feed.

STUDIES ON SOY BEAN TEMPEH

Part 1. Optimization of Factors Effecting Fermentation in Commercial Production of Tempeh with Respect to Pilot Plant Studies

Naseem F. Usmani and Radia Noorani

PCSIR Laboratories, Karachi

(Received March 11, 1985)

Trays with a holding capacity of 25 kg and housed in a chamber, were designed and fabricated for the commercial production of soybean tempeh. *Rhizopus oligosporous* was used for fermentation process and factors effecting pilot plant fermentation were optimized.

STUDIES ON SOYBEAN TEMPEH***Part II. Propagation and Preservation of *Rhizopus oligosporous* spores for Commercial Production of Tempeh from Soybean**

Naseem F. Usmani and Radia Noorani

PCSIR Laboratories, Karachi

(Received March 17, 1985, revised November 11, 1985)

Experiments were carried out to propagate and preserve *Rhizopus oligosporous* spores for the commercial production of tempeh from soybean. It was observed that 18–20 hr. were needed to complete fermentation process and the formation of tempeh. There appears to be no appreciable difference with regard to the fermentation process if processed soybeans are inoculated with sporulation mass or tempeh under a given set of conditions. The sporulation mass stored for different lengths of time did not show any significant decrease in the viability of spores even after a period of 15 months.

PREPARATION AND NUTRITIONAL EVALUATION OF WEANING FOOD BASED ON WHEAT, RICE AND SOYBEAN (*SOYLAC*)

I.A. Sheikh, M. Arshad, M. Aslam and Razia Adil

PCSIR Laboratories, Lahore

and

Fehmida Jalil

Department of Social and Preventive Paediatrics, Mayo Hospital, Lahore

(Received March 28, 1985; revised January 9, 1986)

A weaning food (brand name, *Soylac*) based on a blend of wheat, rice, trypsin inhibitor free soy-been meal and fortified with essential vitamins and minerals was prepared. Chemical and biological evaluation of food showed that it was of high nutritive value and conformed to FAO/WHO/Protein Advisory Group's specification for weaning foods. It is cheaper to produce and has a better nutritive value than that of *Protolfex* [1] and *Protolac* [2].