

ISSN 0030 - 9885  
Codon: PSIRAA 34 (9) 321-368 (1991)



# PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 34, No. 9, September 1991

Physical Sciences. Pages 321-341

Biological Sciences. Pages 342-361

Technology. Pages 362-368

Published monthly by

Scientific Information Centre  
PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH  
KARACHI

## Physical Sciences Section

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

### EFFECT OF REDUCING CRUDE FIBRE CONTENT ON THE NUTRITIVE VALUE OF SUNFLOWER MEAL

A.H.K. NIAZI, TASNIM KAUSAR, F.H. SHAH AND WASEEM ISHAQUE\*

*PCSIR Laboratories Complex, Lahore-54600, Pakistan*

(Received March 30, 1991; revised November 12, 1991)

Sunflower seeds contained 22.8 to 27.5% protein 31.1 to 35.5% fat, 11.5 to 14.7% crude fibre, 3.2 to 5.5% ash and 2.4 to 3.1% phytic acid. Reduction of hull fractions of seeds decreased the crude fibre but increased crude protein and phytic acid contents of sunflower meal dehulled and protein concentrate. Complete elimination of hull fractions significantly improved the net protein utilization (45.8 to 64.8%) true digestibility (70.5 to 80%) protein efficiency ratio (1.20 to 2.15) of diets incorporated with sunflower protein concentrate.

*Key words:* Dehulling, Protein concentrate, Nutritive value.

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## A COMPARATIVE STUDY ON THE QUALITY OF FROG MEAL PREPARED BY DRYING FROG WASTE IN SUN AND AT VARIOUS TEMPERATURES IN ELECTRIC OVEN

A. K. M. AMINULLAH BIHUYAN\*, S. GHEYASUDDIN\*\*, M. A. MANSUR AND SHEEMA CHOWDHURY  
*Department of Fisheries Technology, Bangladesh Agricultural University, Mymensingh, Bangladesh*

(Received July 14, 1991; revised November 16, 1991)

Effect of drying the frog waste in sun and at various oven temperatures on the quality of frog meals was studied. Proximate composition, characteristics of lipids in terms of iodine and free fatty acid values and *in vitro* protein digestibility of the meal were used as quality indices. The period of drying reduced considerably with increasing temperature and dehydration was more complete at higher than at lower temperature. Temperatures had considerable effect on the lipid fraction. Extent of rancidity as reflected in iodine and free fatty acid values was much less at higher than at lower temperatures. But the *in vitro* digestibility of protein by pepsin was not affected noticeably in comparison to the changes in lipid quality with temperature difference. Sun dried meal underwent the greatest rancidity and had the lowest protein digestibility.

**Key words:** Frog meal, Drying temperature, Frog meal quality.

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## INFLUENCE OF VARIETAL CHARACTERISTICS AND PACKING MATERIALS ON FREEZING PRESERVATION OF VARIOUS PEA CULTIVARS

AMJAD HUSSAIN, MOHAMMAD SAEED\* AND WAZIR HUSSAIN SHAH \*\*

*Pakistan Agricultural Research Council, Islamabad, Pakistan*

(Received June 20, 1990; revised September 2, 1991)

Moisture and vitamin C content of all the four varieties namely local Bazi Khel, P-35, P-8 and H-57 decreased during storage, while alcohol insoluble solids reducing sugars, total sugars and protein content did not show any significant change. The paper board wrapped with polyethylene gave greater protection to vitamin C than polyethylene only. Colour of frozen P - 8 variety after 6 months storage was rated the highest followed by P-35 and H-57. Local Bazi Khel was ranked the poorest by the panel. Overall acceptability of H-57 after six months storage was rated the highest. P-35 and P-8 did not vary significantly and both were liked by the taste panel. However packing materials did not have any significant effect on colour and overall acceptability of all the four varieties of peas.

*Key words: Pisum sativum, Peas freezing, Packaging.*

**Introduction**

product which will undergo minimum nutritive loss on storage.

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## RELEASE KINETICS OF IRON, ZINC AND MANGANESE FROM SOIL CONCRETIONS

RAIMATULLAI

*Land Resources Section, National Agricultural Research Centre, Islamabad-45500, Pakistan*

(Received July 7, 1990; revised September 7, 1991)

Nodules (2-15 mm) from Gujranwala (Udic Haplustalf) Btc2 (96-130 cm) and Satghara (Typic Natrargid) 2 Btcknob2 (80-108cm) soil horizons were wet ground in acetone, sonicated and passed through a 300 mesh sieve. They were extracted at room temperature by gently shaking with 0.005M DTPA in duplicate at a 1:50 solid: solution ratio for 0.5, 2, 4, 16, 24 and 96 hrs. Cumulative release of Mn, Fe and Zn in Gujranwala was 24, 4 and 12%, respectively of the total composed to 12, 1.2 and 14%, respectively in the Satghara horizon. Release of either Zn, Mn or Fe from mineral matrix in the two samples by diffusion controlled process was suggested by significant coefficients of determination ( $r^2$ ) for parabolic diffusion, power function and Elovich equations. Two different mechanisms controlling the release of Fe and Mn from Gujranwala nodules were suggested by adjustment in  $t_0$ . Initial (intercept a) and time dependent (slope b) release of Zn, Mn and Fe from the two samples in relation to their mineral composition is discussed.

**Key words:** Release kinetics, Trace elements, Soil concretions.

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## THERAPEUTIC EVALUATION OF SURMA (KOHL) FORMULATIONS +

ZAHIER BABAR HASHIMI, ZAFAR ALAM MAHMOOD\* AND S. M. S. ZOHA

*Mohammad Hashim, Tajir Surma, Karachi, Pakistan*

(Received December 31, 1990; revised October 20, 1991)

Six surma (Kohl) formulations or their combinations along with two collyria and an eye embrocation were evaluated for their therapeutic efficacy in four eye ailments, namely conjunctivitis, trachoma, pterygium, and weak eye-sight. In the conjunctivitis group, ten patients were found to be associated with infective type, while five patients were found conjunctivitis of allergic origin. The predominant organism identified in the first two diseases were *Staphylococcus aureus* and *Haemophilus aegyptius* respectively. Patients of both group were treated with two surma formulations, Safaid Kohlul Jawahar Awwal (SKJA) and Safaid Kohlul Jawahar Chaharum (SKJC). The conjunctivitis group was additionally used Arq-e-Gulab( AEG) as collyria and Zamad as an eye embrocation, where as Gulab lotion (GL) as collyria was used only in trachoma group. Success rate was 100% in conjunctivitis group and 98% in trachoma group respectively. Patients in pterygium group were treated with three surma formulations: SKJA or SKJC and AS (Anjal Surkh), success rate was 98% while surma formulations SKJ (Siah Kohlul Jawahar), ZEB (Zoaf-e- Basar), KA (Kohlul Ajeeb) and SKJA or their combinations were found highly effective among patients or weak eye-sight.

**Key words:** Surma, Kohl, Conjunctivitis, Trachoma, Pterygium, Weak eye-sight.

Pak j. sci. ind. res. vol. 34, no. 9, September 1991

## POTASSIUM RELEASE CHARACTERISTICS OF SOILS THROUGH CROPPING

H. NAWAZ KHAN AND M. SAEED

*Atomic Energy Agricultural Research Centre, Tandojam, Pakistan*

(Received February 6, 1991; revised September 4, 1991)

A pot experiment was conducted to study the K release characteristics of five soil series (Sarhad, Shahdara, Sultanpur, Lalian and Pacca) at the Experimental Farm of Atomic Energy Agricultural Research Centre, Tandojam, through cropping, with and without K addition. Results showed a high rate of K release by these series. Non-exchangeable K contributed to the total K uptake upto 95%. Even with addition of 100 kg K/ha, plants utilized 58% of non-exchangeable K. However, part of 200 kg K/ha (soil applied) was fixed by some soils. Amount of K released by soil series studied with no K addition was directly related to clay content and was in the order: Pacca > Sultanpur > Lalian > Shahdara > Sarhad.

**Key words:** Potassium release, Potassium uptake, Soil series.

# Biological Sciences Section

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## A NEW SPECIES OF THE GENUS *EYSARCORIS* HAHN (HETEROPTERA: PENTATOMIDAE) FROM THE MALAYAN SUBREGION

SYED AZIAR HASAN

*Zoological Sciences Division, Pakistan Museum of Natural History, Islamabad, Pakistan*

(Received August 5, 1990; revised August 10, 1991)

*Eysarcoris sumatrana* is described as a new species of the genus *Eysarcoris* Hahn from the Malayan subregion. The genus *Eysarcoris* is redescribed with special reference to some of its unknown characters like metathoracic scent apparatus and genitalia. A key to the species recorded from this subregion is also given.

**Key words:** *Eysarcoris sumatrana*, Metathoracic, Scent apparatus.

Introduction

chamber usually larger than proximal chamber proximal



## LIPID FRACTIONS AND FATTY ACID COMPOSITION OF DIFFERENT VARIETIES OF BASIL SEED OIL

M. RIAZ, M. RASHID KHALID AND F. M. CHAUDHARY

*PCSIR Laboratories Complex, Lahore - 54600, Pakistan*

(Received, February 2, 1990; revised October 16, 1991)

Basil seed oil (10.56 - 15.55%) has been examined for its physico-chemical characteristics and fatty acid composition. Thin layer chromatography of the oil into lipid classes resulted into polar lipids (2.2%) and neutral lipids (97.8%). Fractionation of the neutral lipids afforded hydrocarbons (2.1%), wax esters (2%), triglycerides (87.9%), free fatty acid (1.8%), diglycerides (0.8%), sterols (3%), and monoglycerides (0.2%). The fatty acid composition of various lipids classes ranged from  $C_{16}$  to  $C_{22}$  acids in different amounts.

**Key words :** Lipids, Basil seed, Varieties.

**FURTHER NOTES ON THE CHARALES OF PAKISTAN**

FAZLI MALIK SARIM

*Department of Botany, University of Peshawar, Peshawar, Pakistan*

(Received May 6, 1990; revised August 18, 1991)

This paper deals with three genera of Charales, namely *Tolypella*, *Nitella* and *Chara* with their species have been described and their ecological distributions have been mentioned. In all seven species of *Chara* one species of *Tolypella* and one species of *Nitella* have been identified, according to the older classification of A. Braun which was further developed by Prescott 1951, Hoek 1959, Pal 1960. The monograph of Wood and Imahori (1964/65) is taken into account in the key to the species of *Chara*. Woods nomenclature in parantheses.

**Key words:** Charales, Taxonomy, Pakistan.

## THE EFFECTS OF CROSS-BREEDING ON INDIGENOUS WOOL WITH SPECIAL REFERENCE TO ITS PHYSICAL CHARACTERISTICS

TAUFEEQ KHAN, TAJ ALI KHAN AND ASADULLAH JAN

*PCSIR Laboratories Complex, Lahore-54600, Pakistan*

(Received February 28, 1988; revised November 19, 1990)

The physical characteristics of crossbred wools between indigenous Kaghani and Rambouillet have been investigated. The improvement, regarding quality and increase in production of crossbred wool, has been explained. The relationship between fibre diameter and quality of wool has been determined. The co-relation between crimp per inch and staple length has also been found out. The possible influence of pasture and climatic conditions on the quality of crossbred wools has been discussed.

*Key words:* Crossbreeding, Indigenous wool, Physical characteristics.

## COMPARATIVE OBSERVATION ON THE TOXICITY OF SOME COMMONLY USED PESTICIDES AGAINST LABORATORY-REARED AND WILD STRAINS OF *Aedes aegypti* (L.)

SILAMS MOHIUDDIN, Z. AHMED AND SALEEM A. QURESHI  
*PCSIR Laboratories Complex, Karachi-75280, Pakistan*

(Received May 18, 1991; revised November 16, 1991)

Five randomly selected pesticides (cypermethrin, monocrotophos, dimethoate, malathion and DDT) were tested against laboratory-reared (PCSIR strain) and the wild strain of *Aedes aegypti* (L.) to see if there was any degree of resistance/tolerance in the wild strain against these pesticides. Resistance ratios (R/S) were calculated by dividing the  $LC_{50}$  for the wild strain by the  $LC_{50}$  for laboratory-reared strain. These ratios (R/S) were X 1.33, X 1.36, X 2.18, X 2.83 and X 5 for monocrotophos, cypermethrin, dimethoate, malathion and DDT respectively. These data have shown some degree of tolerance in the wild strain in the following order.

DDT > malathion > dimethoate > cypermethrin > monocrotophos.

These studies indicate limited degree of resistance in case of DDT and malathion while no resistance against monocrotophos, cypermethrin and dimethoate which are not used as mosquito larvicides in this country, however, a limited level of tolerance is noticeable against them.

**Key words:** Pesticides, Toxicity, *Aedes aegypti* (L.).

*Short Communication*

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

**Composition of Seed Oils of Gmelina (*Gmelina  
Arborea*) and Teak (*Tectona Grandis*)**

A. ADEYEYE

*Department of Science and Technology, The Polytechnic,  
Ibadan, Iree Campus, Iree, Oyo State, Nigeria*

(Received August 10, 1991)

***Short Communication***

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

**A Direct Method for the Determination of Phenylalanine, Tyrosine, Leucine and Valine in Wheat by Reverse Phase HPLC**

HANIFULLAH KHATTAK, M. IQBAL BHANGER AND  
KHUSHNOOD A. SIDDIQUI\*

*National Centre of Excellence in Analytical Chemistry,  
University of Sindh, Jamshoro, Pakistan*

(Received February 17, 1990; revised November 14, 1991)

# Technology Section

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

## EXTENSION OF SHELF LIFE OF BANANA WITH WAX EMULSION

IFTIKHAR ALI SHAIKH, MUHAMMAD ARSHAD, MUHAMMAD ASLAM, F. N. ALI\* AND A. F. M. EHTESHAMUDDIN  
*PCSIR Laboratories Complex, Lahore - 54600, Pakistan*

(Received July 8, 1990; revised June 20, 1991)

A wax emulsion developed at these laboratories was investigated for its suitability to extend the shelf-life of banana. Freshly harvested green bananas were coated with the emulsion and changes in moisture content, total and reducing sugar, starch, ascorbic acidity, weight ratio of pulp to peel and respiration rate were determined. Results indicated that coating of bananas with the emulsion reduced gaseous exchange between the fruit and the outside atmosphere, thus modifying the atmosphere within the fruit without impeding the ripening process. The major characteristics associated with normal ripening were generally slower for coated fruits than for the fruits without coating. The rate of weight loss in the uncoated bananas was much greater than in the coated fruits under ambient conditions. The treated bananas had a good taste after ripening and no unwanted flavour was detected.

**Key words:** Banana, Shelf life of banana, Preservation of banana.

## EXTRACTION OF CASEIN FROM OUT DATED YOGHURT AND LONG LIFE MILK

RIAZ AHMAD RIAZ, MUHAMMAD MUSHTAQ AHMAD, GHULAM RASOOL AND SAEED BABAR

*Food Technology Department, University of Agriculture, Faisalabad, Pakistan*

(Received September 23, 1990; revised November 9, 1991)

An attempt has been made to prepare caseins from fresh whole milk, expired ultra high temperature (UHT) milk and expired yoghurt by lactic acid precipitation. It was found that fresh whole milk casein was well comparable with standard casein in respect of lactose, protein and fat. Whereas caseins obtained from expired UHT milk and yoghurt had comparatively low lactose and protein but abnormally high fat content. Bulk density, porosity and water sorption power of these caseins were poor as compared to standard casein. Organoleptically the whole casein ranked good, whereas UHT milk and yoghurt caseins were fair. Removal of fat with hexane helped to improve the quality and storage stability of caseins obtained from out dated UHT milk and yoghurt.

**Key words:** Casein, Porosity, Water sorption.



***Short Communication***

Pak. j. sci. ind. res., vol. 34, no. 9, September 1991

**Oxidation of Ethanol to Ethylacetate on Sb-Mo  
Oxide Catalysts**

M. A. WASSEL\*, A. A. RAHIM, N. KH. ALLAHVERDOVA AND  
K. YU. ADJAMOV

*Institute of Oil and Chemistry, Baku, 370601, USSR*

(Received April 2, 1991; revised September 14, 1991)

One of the interesting trends in conversion of ethanol to