*Coden:* PSIRAA 31(6) 385-458 (1988)

# PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH



Vol. 31, No. 6, June 1988



Published monthly by

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

# Physical Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

## RELEASE OF THEOPHYLLINE FROM DRIED DOWN HYDROGELS BASED ON HYDROXYETHYL METHACRYLATE AND ACRYLAMIDE

M. Hafeez Khan, M. Amin and M. Zulfiqar*

*Faculty of Pharmacy, University of the Punjab, Lahore*

(Received June 6, 1988)

Hydrogels were chosen to assess their utilization for sustained release medication. The hydrogels based on hydroxyethyl methacrylate were synthesized and the maximum water uptake was varied by copolymerizing acrylamide and hydroxyethyl methacrylate. Methylene-bis-acrylamide was used as a crosslinking agent. Theophylline, used as the model drug, was incorporated in the hydrogels. The influence of selected hydrogel compositions and temperature effects on the release of theophylline from dried down drug loaded hydrogels was studied. The effect of storage on drug release was also investigated. No significant evidence of thermal instability was found on the drug after aging drug loaded polymer at $45^{O}$.

*Key words :* Hydrogels, Hydroxyethyl methacrylate, Acrylamide, Water, Theophylline, Hydrogel compositions, Temperature.

Pakistan J. Sci Ind. Res., Vol. 31, No. 7, July 1988

# SYNTHESIS OF XANTHOTOXIN AND THIOXANTHOTOXIN SULPHONAMIDES WITH EXPECTED BIOLOGICAL ACTIVITIES

Z.M. Nofel, E.A.M. El-Khrisy, S.A. Meshaal, A.A. Khattab and E.A. Abu-Mustafa

*National Research Centre, Dokki, Cairo, Egypt*

(Received May 17, 1987)

A variety of xanthotoxin sulphonamides were prepared via reaction-4-sulphonyl chloride with amines. The preparation of thioxanthotoxin-4-sulphonyl chlorides and its reactions with amines was described.

*Key words:* Xanthotoxin, Thioxanthotoxin.

Pakistan J. Sci Ind. Res., Vol. 31, No. 7, July 1988

# STUDIES IN CYCLODIPHOSPH (V) AZANES:

## Some Relations of Hexachlorocyclodiphosph (V) Azanes (I) with Ethylenediamine and *0*-Phenylenediamine

I.M. Abd-Ellah and A.N. El-Khazandar

*Chemistry Department, Al-Azhar University, Nasr City, Cairo, Egypt*

(Received December 11, 1986; revised June 19, 1988)

Interaction of diaryl-hexachlorocyclodiphosph(V)-azanes(Ia-g) with ethylenediamine and o-phenylenediamine are described. The structure of the obtained aminocyclodiphosph(V) azanes (IIa-c and IIIa-f) were proposed on the basis of microanalytical data, IR, UV, $^1$Hnmr and mass spectra.

*Keywords:* Cyclodiphosph (V) azanes, Reactions, Hexachlorocyclodiphosph, Ethylenediamine.

## INTRODUCTION

Pakistan J. Sci Ind. Res., Vol. 31, No. 7, July 1988

# CHELATING BEHAVIOUR OF SOME AZO COMPOUNDS DERIVED FROM HETEROAROMATIC AMINES AND PYRAZOLIN-5-ONES

M. T. El-Haty, F. A. Adam and N.A. Abdalla

*Chemistry Department, Faculty of Science, Aswan, Egypt*

(Received January 1, 1988; revised June 27, 1988)

The complexes of 3-pyridyl-5-hydroxy (HAP), thiazolyl (TAP) and benzthiazolyl (BAP) azo of 5-pyrazolones with some heavy metal ions have been prepared and investigated. The formation of 1:1 and 1:2 species were inferred from electronic spectra, conductivity measurements and pH-titrations. The probable structure of each compound and its metal chelates are examined based on X-ray, IR, NMR spectra. It is concluded that the (HAP) compound acts as tridentate, while (TAP) and (BAP) act as bidentate ligands. The bonding sites are the oxygen of C=0 group and the nitrogen of aryl azo, all ligands and the complexes are existed in the azo-hydrazones structure.

*Key words:* Heterocyclic azopyrazolones chelates, Complexes, Derivatives.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# VAPORISATION KINETICS OF ASSOCIATED AMINES

M. Afzal*, P.K. Butt, M.J. Iqbal and Shakiluddin

*Department of Chemistry, Quaid-i-Azam University, Islamabad, Pakistan*

(Received April 8, 1987; revised June 30, 1988)

The vaporisation rates of various hydrogen bonded amines i.e. ethylene diamine, diethylene triamine and triethylene tetramine were studied in vacuum ($10^{-3}$ torr) at temperatures between 294-325 K. The vaporisation rates were studied by the use of RH Cahn Electrobalance system. From the experimental vaporisation rates ($J_{obs}$), the activation enthalpy of vaporisation, $\triangle H_v^*$, was calculated and compared with the enthalpy of vaporisation, $\triangle H_v$ computed from the well known Langmuir equation using the equilibrium vapour pressure data from the literature. Attempt has been made to correlate $\triangle H_v^*$ with the number of H-bonds broken in the liquids during the vaporisation process. The breaking of the H-bonds between various molecules has been considered to be the rate-limiting in the vaporisation process. The results are interpreted in terms of intra- and intermolecular hydrogen bonding in amines.

*Key words:* Kinetics, Vaporisation, Associated amines.

***Short Communication***

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# EFFECT OF PERFORATION DIAMETER ON THE HYDRODYNAMICS OF A SIEVE TRAY

M. Anwar Ul-Haq

*Fertilizer Research and Development Institute, Faisalabad*

(Received August 16, 1987; revised July 9, 1988)

# Biological Sciences Section

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

## INTRODUCTION AND DEVELOPMENT OF *BRASSICA* SPECIES WITH HIGHER OIL CONTENT

Parveen Aziz and Qaiser Iqbal

*PCSIR Laboratories, Lahore*

(Received November 25, 1987; revised July 12, 1988)

A hybrid of *B. napus* and *B. oleracea* which is claimed to contain 48-50 % oil content was successfully cultivated on the PCSIR Campus, Lahore. It is observed that this crop matured quicker (153 days) had maximum seed yield and higher oil content and it was pest free when sown in the last week of October. Various cultivation parameters and results have also been discussed.

*Key words: Brassica,* Development, Oil content.

## EXPERIMENTAL

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# EFFECT OF TIDAL HEIGHT ON GROWTH OF MUSSELS

Sohail Barkati and Yasmeen Choudhry

*Institute of Marine Sciences, University of Karachi, Karachi-32*

(Received April 24, 1988; revised July 12, 1988)

Growth characteristics of three populations of the green mussels, *Perna viridis*, were studied. Analysis of covariance indicated that mussels occurring at low tidal height or remaining submerged for a long period under water, possessed shells of low weights. Shell length increased faster than height in all populations, but shell width increased faster than length in Buoys mussels reflecting that it is probably the space on the natural beds hindering the growth in shell width of mussels. Relative growth decreased with increasing shell length in all populations.

*Key words:* Tidal height, Growth, Population.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# NUTRITIVE VALUE OF COTTON SEED HULLS AFTER BIOLOGICAL TREATMENTS

F. H. Shah and Zia-ur-Rehman

*PCSIR Laboratories, Lahore*

(Received February 24, 1988; revised July 20, 1988)

*In vivo* dry matter digestibility of cotton seed hulls increased from 15.5 to 26.6 % due to symbiotic effect of *T. viride* and *B. polymyxa.* Further improvement in the digestibility was observed when the mixed cultures of mould and bacteria were propagated on alkali treated hulls. An improvement in the digestibility of cellulose, minerals and organic matter alongwith two to three folds increase in non-protein nitrogen was also observed.

*Key words:* Cotton seed hulls, Biological treatments, Nutritive value.

*Short Communication*

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# STUDIES ON THE FIXED OIL OF THE SEEDS OF *LEUCAENA LEUCOCEPHALA*. Part-I

Munir Ahmed, F.M. Chaudhary and Manzoor Ahmad

*PCSIR Laboratories, Lahore-16*

(Received December 28, 1987; revised May 22, 1988)

# Technology Section

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

## ENVIRONMENTAL PROBLEMS OF KARACHI
## Part II. Noise Pollution Due to Vehicular Traffic

Mirza Arshad Ali Beg and Zafar Iqbal Shams*

*Pakistan Council of Scientific and Industrial Research, Karachi*

(Received March 30, 1988; revised July 3, 1988)

The noise level was measured at 23 different sites of the city. Highest average background noise level and highest average peak values were noted at Numaish and Empress Market while the lowest were at North Karachi. Highest average peak values were due to horns of buses and minimum due to those fitted in cars. Location-wise occurrence of peak noise due to rickshaws was maximum at Tariq Road whereas that due to buses, particularly their horns, was maximum at Empress Market. The average reached the peak 63 % times due to rickshaws, 24 % by buses and the remaining 13 % times by motorcycles, minibuses, trucks and cars. Significant correlation was found between the number of different types of vehicles and the background noise level at non-signal sites except between the number of cars, jeeps and station wagons and the background noise level. The noise level of three public transports showed that the average noise level of rickshaws was the highest.

*Key words:* Noise pollution, Traffic noise, Environmental, Problems.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# A PROCESS FOR THE PILOT PLANT PRODUCTION OF TEMPEH

Surruya Wadud, Saida Kosar, Hussan Ara and Hamida Durrani

*PCSIR Laboratories, Peshawar*

(Received December 23, 1987; revised July 14, 1988)

Pilot plant studies for the production of tempeh have been carried out. A room having specific dimensions has been designed and set up with insulated foam concrete walls, angle iron stands with holding capacity of 100 stainless steel trays producing 100 kg tempeh in 24 hours. The room was fitted with automatically controlled system having electric steam generators, heating and cooling system and proper exhaust. *Rhizopus oligosporus* NRRL-2710 was used for fermentation process. Factors effecting the pilot plant production of tempeh were optimized.

*Key words:* Fermented soy products.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# FORTIFICATION OF PAKISTANI DISHES WITH OYSTER MUSHROOMS

Tasneem Kausar, S.H. Iqbal and F.H. Shah

*PCSIR Laboratories, Lahore-16*

(Received December 15, 1987; revised July 31, 1988)

Oyster mushroom (*Pleurotus ostreatus*) was incorporated into six traditional Pakistani dishes. Protein contents of mushroom fortified dishes increased from 4.29 to 93.33% organoleptic evaluation showed that all mushroom fortified dishes were readily acceptable.

*Key words:* Pleurotus, Nutritive value, Fortification.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# THE CHARACTERISTICS OF THE ELECTRONICS RAHBER WATER COOLER

Z.A. Khan and M. Zamin Hussain

*National Physical and Standards Laboratory, Islamabad*

(Received January 1, 1987; revised July 20, 1988)

The electronic Rahber water cooler, manufactured for decontaminating drinking water (against bacteria) by electrolysis using silver electrodes, is very likely to contaminate the drinking water with AgCl as a result of chemical action between the dissolving silver anode and the chloride ions in water particularly when the chloride ion is present to more than 10 mg/litre in the drinking water. Experiments also show that the silver anode is electrochemically oxidized to $Ag_2O$ and AgO and that these oxides come off the electrode easily. Consequently, after a cooler has been used for some time, it is bound to contaminate the drinking water with silver oxides. The silver chloride and the oxides would generally not be visible because of their low concentrations under normal flow rates from a cooler.

*Key words:* Electronic water purifier, Decontamination device for drinking water, Electrolysis.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# A MODIFIED SOXHLET EXTRACTOR FOR USE IN TOXICOLOGICAL ANALYSIS

T. K. Obidairo

*University of Benin, P.M.B. 1154, Benin City, Nigeria*

(Received January 6, 1988; revised May 22, 1988)

A soxhlet extractor which can be used at room temperature and under reduced pressure has been described. It is used in toxicological analysis and for the extraction of plant materials.

*Key words:* Soxhlet, Continuous, Reduced pressure.

Pakistan J. Sci. Ind. Res., Vol. 31, No. 6, June 1988

# CHEMISTRY, MINEROLOGY AND UTILIZATION OF KOTLI AZAD KASHMIR DOLOMITE FOR MAKING COLOURLESS GLASS

Mohammad Rafique, Mohammad Aslam Chaudhry and M.N. Chaudhry*

*PCSIR Laboratories, Lahore*

(Received April 21, 1988; revised July 14, 1988)

Five dolomite formations of Lateri, Sawar, Kamroti, Nikial and Tattapani of Kotli area of Azad Kashmir have been studied in detail for their use in the manufacture of colourless glass. It has been shown that raw samples due to high iron content (more than 0.1 %) are not suitable for colourless glass making. However, after beneficiation, the iron content is reduced to 0.058 % and 0.08 % which is acceptable for colourless glass making. Experimental glass meltings containing 3.2 % MgO with the beneficiated dolomite samples gave satisfactory results.

*Key words:* Dolomite, Glass raw material, Dolomite for glass making.