



ISSN 0030-9885
Codon: PSIRAA 36 (10) 397-446 (1993)

PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH

Vol. 36, No. 10, October 1993

Physical Sciences. Pages 397-414

Biological Sciences. Pages 415-436

Technology. Pages 437-446

Published monthly by

Scientific Information Centre

PAKISTAN COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
KARACHI

Physical Sciences Section

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

GEOLOGY AND UTILIZATION OF PEGMATITIC ALBITITES AND APLITES OF MANSEHRA AREA, NWFP AS INDIGENOUS RAW MATERIALS FOR POTTERY WARES

M. AYUB, M. YUSAF, SHERJIL A.K. LODHI AND MOHAMMAD ASHRAF*

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received January 15, 1991; revised June 23, 1993)

Various samples of pegmatitic albitites and aplites were collected from Mansehra area of NWFP of Pakistan. It was found that only pegmatitic albitites, albite aplites and albite-microcline aplites were the rocks suitable for making pottery wares. For this purpose petrographic and chemical analysis were carried out. The crushed samples were used for the purpose of making porcelain bodies as well for glazes to be used on their respective bodies. The presence of small quantity of TiO_2 and Fe_2O_3 was successfully used to impart cream to orange cream colour to both bodies and glazes. The studies were carried out to replace conventional feldspar totally and quartz partially.

Key words: Pegmatitic albitites, Aplites, Pottery wares.

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

E2/M1 MULTIPOLE ADMIXTURES OF GAMMA TRANSITIONS IN EVEN-EVEN NUCLEI

G.M. KHAN AND SHAMSUL HAQ

Physics Department, Gomal University, Dera Ismail Khan, Pakistan

(Received July 8, 1992; revised May 26, 1993)

Measurement of E2/M1 multipole mixing ratios of transitions in even-even nuclei have long provided important tests of nuclear models. The available experimental data on E2/M1 multipole mixing ratios of gamma transitions de-exciting levels of beta and gamma vibrational bands to the ground state rotational band in even-even nuclei with $150 < A < 200$ have been reviewed. The results have been compared to the predictions of the dynamic deformation model and the interacting boson model.

Key words: Mixing ratios, Gamma-Gamma (θ), Deduced δ .

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

COMPARISON OF THE RATE OF REDUCTION OF DIFFERENT SPECIES OF IRON GALLIC ACID AND IRON GALLIC ACID METHYL ESTER WITH ASCORBATE

ZAHIDA T. MAQSOOD AND S. ARIF KAZMI

Department of Chemistry, University of Karachi, Karachi, Pakistan

(Received December 24, 1992; revised August 11, 1993)

The rate constants for reduction of iron gallic acid and iron gallic acid methyl ester by ascorbate were studied at different pH (4-5.6). These values were found to be greater in case of iron gallic acid as compared to iron gallic acid methyl ester. It was also observed that there are more than one species present in the solution at these pH. Therefore the individual rate constant for each species were determined by linear regression method or by solving simultaneous equations. The decrease in rate constant of ML and ML2 in iron gallic acid methyl ester was found to be of same magnitude as in MHL and ML2 of iron gallic acid.

Key words: Iron gallic acid, Gallic acid methyl ester, Ascorbate.

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

PEROXO COMPLEXES OF ZIRCONIUM (IV), THORIUM (IV) AND URANIUM (VI) IONS CONTAINING SOME MONODENTATE, BIDENTATE AND TRIDENTATE ORGANIC LIGANDS

M.T.H. TARAFDER, D. KUMER AND P. BHATTACHARJEE

Department of Chemistry, University of Rajshahi, Rajshahi, Bangladesh

(Received May 2, 1993; revised August 22, 1993)

Some new peroxo complexes of zirconium, thorium and uranium containing monodentate, bidentate, tridentate and quadridentate organic ligands have been synthesized and characterized. The complexes have the general formulae $[M(O_2)_2 L]$ and $[U(O)(O_2)_2 \cdot 2L]$ and $[U(O)_2(O_2)L]$ [$M = Zr^{IV}$ or Th^{IV} ; $L =$ pyridine (py), diethylenetriamine (det), ethylenediamine (en) or aniline]. These complexes were all non-electrolytes in DMSO and those containing monodentate co-ligands were effective oxidants. The ν_1 mode of the $M(O_2)$ grouping decreases with the increase in the atomic number of the metals in a group and also with the increase of σ -donor sites of the multidentate organic moieties causing differences in the reactivities of the peroxides.

Key words: Zirconium, Peroxo, Complexes.

Introduction

Analyses Carbon, hydrogen and nitrogen analyses were

Biological Sciences Section

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

DIRECT AND INDIRECT EFFECTS OF VARIOUS PROPERTIES OF WATER AND BOTTOM SOIL OF PONDS ON THE PLANKTON PRODUCTION

M. AHSAN BIN HABIB, M. OBAIDULLAH* AND M. ABUL HOSSAIN**

Department of Fisheries Biology and Limnology, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh

(Received April 24, 1990; revised July 8, 1993)

Interactions in nine physico-chemical properties of water were recorded through path analysis. In such cases water temperature and dissolved O_2 had almost significant correlations with other properties. The interaction in various chemical properties of bottom soil of pond (most of the correlation values among them) is insignificant in nature, except a few number of significant correlation values. Transparency, dissolved O_2 , free CO_2 , available N and exchangeable K influenced positively and directly the production of plankton as well as indirectly through other physico-chemical properties of water. But temperature, pH, available P and exchangeable Ca influenced negatively and directly the plankton production as well as indirectly through the physico-chemical factors of water. Again, all the chemical factors of bottom soil influenced positively and directly the production of plankton as well as indirectly through these factors of bottom soil of ponds.

Key words: Water, Soil, Plankton.

CULTIVAR DIFFERENCES OF WHEAT (*TRITICUM AESTIVUM* L.) IN NITROGEN USE EFFICIENCY

F. AZAM, M. ASHRAF, A. LODHI AND M.I. SAJJAD*

Nuclear Institute for Agriculture and Biology, Faisalabad, Pakistan

(Received May 31, 1991; revised September 25, 1993)

Nitrogen (N) use efficiency of 4 commercially cultivated wheats was studied in a pot experiment. The wheat cultivars Lu-26, Sarsabz, Sindh-81 and M-143 were grown to maturity in potted soil without (-N) or with (+N) ^{15}N -labeled ammonium sulphate used as an N source. The cultivars did not differ significantly in total dry matter yield in the absence of applied N. Application on N, however, caused a significant increase in both dry matter and N yield. Although the increase in dry matter and N yield (expressed as g pot⁻¹ and mg pot⁻¹, respectively) due to applied N between cultivars, the percent increase was statistically similar. Of the total plant N, 37-40% was derived from the fertilizer; highest efficiency of fertilizer N uptake being observed in Sarsabz followed by M-143. Application of fertilizer N caused a significant increase in the plant uptake of native soil N as a result of added nitrogen interaction or ANI. This effect was also most marked in Sarsabz and M-143. The uptake of total N by different cultivars differed significantly mainly through ANI.

Key words: Added nitrogen interaction, ^{15}N , N balance, N immobilization, N loss, N uptake, Priming effect, Rhizodeposition, Wheat.

DIFFERENTIAL DEVELOPMENT AND UNIFORM SURVIVAL OF *DIACRISIA OBLIQUA* WALK ON DIVERSE HOST PLANTS

MUHAMMAD AMJAD

National Agricultural Research Centre, Park Road, Islamabad, Pakistan

(Received October 11, 1992; revised September 15, 1993)

The larval development and adult survival of the hairy caterpillar, *Diacrisia obliqua* Walk. was studied on sunflower, soybean, mash and mung in the laboratory at room temperature. Survival was not statistically different on tested host plants. The larvae weight after 6 and 12 days feeding was the highest on sunflower as compared to other three host plants. Larval development was faster on sunflower as compared to other tested plants. For higher larval weight and faster development these host plants could be arranged in order as: sunflower, mung, mash and soybean. The larval duration was also shortest i.e., 16 days on sunflower as compared to mung (24 days) and soybean (30 days), but pupal duration was not statistically different.

Key words: *Diacrisia obliqua* survival, Development sunflower, Soybean.

SPERM PATHWAY AND SPERMATOPHORE FORMATION IN THE HERMAPHRODITE SNAIL *EREMINA EHRENBergi* ROTH, 1839

F. M. BAWAB, S. S. EL-SHERIEF AND H. A. ABD EL- KERIM*

Zoology Department, Faculty of Science, Alexandria University, Egypt

(Received August 9, 1992; revised May 16, 1993)

Storage and transport of sperm and spermatophore formation were studied in the hermaphrodite snail *Eremina ehrenbergi*. Sperm are found in the vesicula seminalis all the year round. At precopulation state, they pass down to enter the sperm-channel of the spermoviduct where they are mixed with three different secretions. At this time, the body of the spermatophore is under formation in the penis proper. At copulation state, single fully formed spermatophore is found in the genital atrium of the copulant. It consists of a very small head, a narrow neck, a comparatively large body and a long tail. The sperm mass is enclosed inside the body of the spermatophore and the empty tail has a highly folded wall.

Key words: Sperm, Spermatophore, Sperm channel, Penis proper.

IN-VITRO STUDIES ON VIABILITY AND GERMINATION OF POLLEN IN VARIOUS CITRUS SPECIES

SHAHID JAVED BUTT, AZRA YUSUF, SHAFQAT ALI* AND M. ATIF KHAN*

Barani Agricultural College, Rawalpindi, Pakistan

(Received August 29, 1992; revised August 8, 1993)

Various media containing 0, 5, 10, 15, 20 and 25% glucose + 0.07% bacto agar were tested and acetocarmine test was carried out to evaluate the pollen viability of different species of citrus, i.e., *Citrus sinensis*, *C. reticulata*, *C. limittiodes* and *C. paradisi*. *In-vitro* pollen viability was highest in the acetocarmine test (87.3–96.3%) as compared with pollen germination in different glucose media, i.e., up to 59%. The maximum germination of 59% and longest pollen tube (59.2 microns) in sweet lime were found in the medium having 15% glucose + 0.07% bacto agar failed to induce germination of pollen in all cases. Variety wise, kinnow, Feutrell's Early, grape fruit and pine apple got their place in descending order after sweet lime (55, 43, 38 and 30% respectively). The pollen size was highest in grape fruit (5.44 microns) and smallest in kinnow (3.2 microns).

Key words: In vitro, Pollen, Glucose, Bacto agar, Citrus species.

Short Communication

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

Studies of *Livistona chinensis* Oil

M. AKHTAR JAVED, MANZOOR AHMAD AND M. YAQUB RAIE

PCSIR Laboratories Complex, Lahore - 54600, Pakistan

(Received September 9, 1992; revised September 14, 1993)

Livistona chinensis, commonly known as chinese fan

Technology Section

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

CHARACTERISATION OF PAKISTANI SHEET GLASSES

WAJID ALI SHAH, MOHAMMAD SOHAIL AND MOHAMMAD KHALID FAROOQ

PCSIR Laboratories Complex, Lahore-54600, Pakistan

(Received October 15, 1992; revised September 12, 1993)

A number of glass industries in Pakistan are manufacturing sheet glass. Most of these industries are lacking adequate R&D facilities. Hence no data is available for physicochemical characterisation of their products. In the present study we attempt to characterise three different sheet glasses by determining their viscosities at different temperatures, running differential thermal analysis and analysing the chemical compositions, both by wet and energy dispersive spectrometric analyses.

Key words: Characterisation, Sheet glasses, Viscosity.

PREPARATION OF BUFFALO DUNG WASTELAGE AND ITS UTILIZATION AS PROTEIN SOURCE FOR SHEEP

M. ABBAS SHAH, A.R. ABID, A.R. BARQUE, ARSHAD IQBAL AND M. ATHAR

Department of Animal Nutrition, University of Agriculture, Faisalabad, Pakistan

(Received September 23, 1992; revised August 5, 1993)

An experiment was conducted to study the effect of feeding different levels of buffalo dung wastelage on the digestibility of rations in Lohi sheep. The wastelage was prepared by ensiling buffalo dung, wheat straw and molasses (65:20:15) and whole material was treated with 2% urea and was kept for a period of 21 days. On the basis of chemical analysis of ensiled material this wastelage was used to formulate 4 experimental rations A, B, C and D. Cottonseed cake was incorporated as major source of protein in ration A, while in ration B, C and D wastelage was added at the rate of 25, 50 and 75%, respectively to replace cottonseed cake on nitrogen equivalent basis. The digestion coefficients of dry matter were 61.20, 65.64, 60.02 and 54.92; of crude protein 56.5, 63.96, 63.33 and 62.21; of crude fat 82.59, 79.38, 74.34 and 65.24; of crude fibre 47.17, 53.29, 49.98 and 56.85 on rations A, B, C and D, respectively. It was concluded that dung wastelage could replace 25 - 50% cottonseed cake or other conventional oilseed cakes in the diets of small ruminants for economical production of mutton.

Key words : Buffalo dung wastelage, Protein source, Utilization.

Pak. j. sci. ind. res., vol. 36, no. 10, October 1993

UTILIZATION OF WASTES FROM CHEMICAL AND GALVANIZED INDUSTRIES – PREPARATION OF ZINC CHEMICALS

MAHMOOD A. KHWAJA AND FAUZIA BEGUM*

PCSIR Laboratories, Peshawar-25120, Pakistan

(Received April 5, 1993; revised August 12, 1993)

Developing countries like Pakistan can ill-afford to loose so called "wastes" as sheer wastes. Beside, the dire economic necessity, the utilization of industrial wastes helps not only in minimizing the very likely hazardous impacts of these on our environemt but also in reducing the energy consumption required in shifting the wastes to disposal sites. Studies have been undertaken to prepare zinc chemicals of industrial importance from the wastes of galvanized and chemical indsutries. This paper describes details of investigations carried out into preparation of zinc chloride. Differential thermal (DTA) and thermogravimetric (TGA) analyses data indicated the product to correspond to $\text{ZnCl}_2 \cdot 2\text{H}_2\text{O}$.

Key words: Analysis, Developing countries, Zinc chloride, Industrial wastes, Zinc.