

PAKISTAN ACADEMY OF SCIENCES

Founded 1953

President: Prof. Dr. Atta-ur-Rahman, N.I., H.I., S.I, T.I.

THE PROCEEDINGS OF THE PAKISTAN ACADEMY OF SCIENCES is an international publication and is the official journal of the Academy published quarterly. It publishes original research papers and reviews on a broad range of topics in basic and applied sciences. All papers are refereed externally. Authors are not required to be members or fellows of the Academy.

EDITOR-IN-CHIEF: Prof. Dr. M.A. Hafeez

EDITORS

Life Sciences

Prof. Dr. S. Irtifaq Ali

Medical Sciences

Prof. Dr. Iftikhar A. Malik

Physical Sciences

Prof. Dr. M. Iqbal Choudhary

Engineering Sciences & Technology

Prof. Dr. Abdul Raouf

EDITORIAL BOARD

Local Advisory Board

Prof. Dr. Q.K. Ghori
Prof. Dr. Riazuddin
Dr. N.M. Butt
Prof. Dr. M. Arslan
Prof. Dr. Asghar Qadir
Prof. Dr. M. Suhail Zubairy
Prof. Dr. M. Qasim Jan
Prof. Dr. Aslam Baig
Prof. Dr. M. Anwar Waqar
Prof. Dr. M. Ajmal Khan
Prof. Dr. M. Qaisar

International Advisory Board

Dr. Anwar Nasim, Canada
Prof. Dr. A.K. Cheetham, USA
Prof. Dr. Tony Plant, USA
Prof. Dr. S.N. Kharin, Kazakhstan
Prof. Dr. P.K. Khabibullaev, Uzbekistan
Prof. Dr. H.W. Korf, Germany
Prof. Dr. M.S. Ying, China
Prof. Dr. S.G Ponnambalam, Malaysia
Prof. Dr. E. Nieschlag, Germany
Prof. Dr. M. Ashraf, USA
Prof. Dr. D.L.G Noakes, Canada

Annual Subscription for 2006

Pakistan: Institutions: Rupees 2000/-

Individuals: Rupees 1000/-

Other countries: US\$ 100.00 (Price includes air-lifted delivery overseas)

© *Copyright.* Reproduction of abstracts of papers appearing in this journal is authorised provided the source is acknowledged. Permission to reproduce any other material may be obtained in writing from the Editor.

The articles published in the Proceedings contain data, opinion(s) and statement(s) of the authors only. The Pakistan Academy of Sciences and the editors accept no responsibility whatsoever in this regard.

Published quarterly by **The Pakistan Academy of Sciences**, 3 Constitution Avenue, G-5/2, Islamabad, Pakistan.

Tel:- 92-51-9207140 & 9207789 Fax: 92-51-9206770 E-mail: pasib@yahoo.com

Website of the Academy: www.paspk.org

Proceedings of the Pakistan Academy of Sciences

Contents

Volume 43 No. 4

December 2006

Research Articles

Life Sciences

Taxonomic study of the class Ulvophyceae (Chlorophyta) from certain areas of the Punjab, Pakistan 229

— *A. Zarina, Masud-ul-Hasan and Mustafa Shameel*

Enzyme activities in relation to sugar accumulation in tomato 241

— *M. J. Alam, M. Habibur Rahman, M. A. Mamun, I. Ahmad and K. Islam*

NO_x removal from air by *Nitrosomonas europaea* 249

— *G. M. R. Islam and M. J. B. Alam*

Effect of temperature, pH and metal ions on the activity and stability of alkaline protease from novel *Bacillus Licheniformis* MZK03 257

— *S. M. Abu Sayem, M. J. Alam and Md. Mozammel Hoq*

Physical Sciences

Thermal effects on Rayleigh waves in a rotating transversely isotropic material 263

— *A. Rehman, A. Khan and A. Ali*

On generalizations of Hadamard products of functions with negative coefficients 269

— *H. E. Darwish*

Effect of improving both the auxiliary and variable of interest in ratio and product estimators 275

— *A.A. Adewara*

A dual to variance ratio-type estimator in simple random sampling 279

— *Javid Shabbir*

Classifying a child as labourer: A scientific study for child labor clustering and discrimination 285

— *Ahmed F. Siddiqi and Muhammad Khalid Pervaiz*

Reviews

Life Sciences

Bioinformatics resource development in Pakistan: A review 295
— *Sajid Rashid*

Instructions to Authors 309

Submission of manuscripts: Manuscripts should be submitted in duplicate including the original, **through a Fellow of the Academy** preferably to *Sectional Editors* (see instructions). Authors should consult the ***Instructions to Authors*** on pages 309-310 of this issue and the Website, www.paspk.org.