

JOURNAL OF RESEARCH AND DEVELOPMENT

VOL. 20

JANUARY, 2020

ISSN 0972-5407



**Centre of Research for Development
University of Kashmir
Srinagar-190 006, J&K, India**

Cite this volume as: J. Res. Dev. 20

Journal of Research and Development is published annually



Director

Centre of Research for Development
University of Kashmir, Srinagar-190 006
J&K, India

Whilst effort is made by the publishers and editorial board to see that no inaccurate or misleading data, opinion or statement appears in this journal, they wish to make it clear that the data and opinions appearing in the articles are the sole responsibility of the contributors concerned. Accordingly, the publishers and the editorial board will not be responsible or liable whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

JOURNAL OF RESEARCH AND DEVELOPMENT

VOL.20

JANUARY, 2020

ISSN 0972-5407

ADVISORY BOARD

- Prof. Münir Öztürk Professor (Emer.) Ecology and Env. Sciences, Ex-Chairman, Botany Department and Founder Director, Centre for Environmental Studies, Faculty of Science, Ege University, Turkey
Ph. No: 00-90-535-3396874
Email ID: munirozturk@gmail.com
- Prof. A. R. Yousuf Former Expert Member, National Green Tribunal, New Delhi; Former Dean Academic Affairs, University of Kashmir, Srinagar, J & K, India.
Ph. No: 919419514446; +919906960993
Email ID: aryousuf@rediffmail.com and aryousuf1951@gmail.com
- Prof. Arif Ali Former Head, Department of Biosciences, Jamia Millia Islamia, New Delhi, India
Ph. No: 9810560205; +91 (11) 26981717/ 55633676
Email ID: aali@jmi.ac.in and aliarif@rediffmail.com
- Prof. A. K. Bhat Former Head, Division of Microbiology, SKUAST-J, Chatha, Jammu, J & K, India
Ph. No: 0941913870
E mail ID: schoolgmm@gmail.com
- Prof. Ravinder Raina Food and Agriculture Foundation, Amity University, Noida, Uttar Pradesh, India
Ph No: +919418108390
E-mail ID: raviraina4@yahoo.co.in; raviraina57@gmail.com
- Prof. Waseem A. Faridi Center of Excellence in Genomic Medicine Research, King Abdulaziz University, Jeddah, KSA
Ph. No: +96612 6401000 Ext.: 25973 – 25226
E-mail ID: waseemahmad2007@hotmail.com
- Prof. Prabir K. Bandopadhyay Division of Parasitology, Department of Zoology, University of Kalyani, Kalyani, West Bengal
Ph. No: 09433214527
E-mail ID: prabir0432@hotmail.com
- Dr. Jasdeep Chatrath Padaria Principal Scientist, Biotechnology and Climate Change Group, National Research Centre on Plant Biotechnology (ICAR-NRCPB), Pusa, New Delhi
Ph. No. 011-25841787 extension 270; Cell: 9818745925
E-mail ID: jasdeep_kaur64@yahoo.co.in
- Dr. Rashid Pervez Principal Scientist, Division of Nematology, IARI (ICAR), Pusa, New Delhi-110012
Ph. No. 011-25842721; Cell: 8218625635
E-mail ID: rashid@iari.res.in

JOURNAL OF RESEARCH AND DEVELOPMENT

VOL.20

JANUARY, 2020

ISSN 0972-5407

LOCAL ADVISORY BOARD

**Patron: Prof. Talat Ahmad, Vice Chancellor,
University of Kashmir, Srinagar**

- Prof. Farooq A Masoodi
Dean Academic Affairs, University of Kashmir
Srinagar-190 006, J & K, India
E-mail: masoodi_fa@yahoo.co.in
Mobile: 9419135876
- Prof. Irshad A Nawchoo
Dean Research, University of Kashmir
Srinagar-190 006, J & K, India
E-mail: deanresearch@uok.edu.in; irshadnawchoo@uok.edu.in
Mobile: 9419094644
- Prof. Zafar A Reshi
Dean, School of Biological Sciences, University of Kashmir,
Srinagar-190 006, J & K, India
E-mail: zreshi@gmail.com
Mobile: 9419043273
- Prof. Anwar Hassan
Dean, School of Physical and Mathematical Sciences,
University of Kashmir, Srinagar-190 006, J & K, India
E-mail: anwar.hassan5@gmail.com
Mobile: 9419426546
- Prof. Shamim A Shah
Dean, School of Earth and Environmental Sciences, University of
Kashmir, Srinagar-190 006, J & K, India
E-mail: deaneesc@uok.edu.in; shamimcrocus@uok.edu.in
Mobile: 09906577395
- Prof. Nahida Tabassum
Dean, School of Applied Science and Technology, University of
Kashmir, Srinagar-190 006, J & K, India
E-mail: nahida@uok.edu.in; n.tabassum.uk@gmail.com
Ph.No. 9419906868
- Prof. Fayaz Ahmad
Head, Department of Environmental Science, University of Kashmir,
Srinagar-190 006, J & K, India
E-mail: rajafayazali@gmail.com
Mobile: 7006725416
- Prof. Raies A Qadri
Head, P. G. Department of Biotechnology, University of Kashmir,
Srinagar-190 006, J & K, India
E-mail: raies@kashmiruniversity.ac.in
Ph.No. 9419001315
- Prof. Zahoor A Kaloo
Head, P. G. Department of Botany, University of Kashmir, Srinagar-
190 006, J & K, India
E-mail: zakallu@yahoo.com
Ph.No: 9906535867
- Prof. Syed Tanveer
Head, P. G. Dept. of Zoology, University of Kashmir, Srinagar-190
006, J & K, India
E-mail: syedtnv@gmail.com
Ph.No. 7298661392
- Prof. M. A. K. Baig
Head, P. G. Department of Statistics, University of Kashmir, Srinagar-
190 006, J & K, India
E-mail: baigmak@gmail.com
Ph.No. 9419090826

Prof. Shariefuddin Pirzada Head, P. G. Department of Mathematics, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: pirzadasd@kashmiruniversity.ac.in
Ph. No: 9419077218

Prof. Syed Wajaht A Shah Head, P. G. Department of Chemistry, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: doctorwajaht@gmail.com
Ph.No. 9419054484

Prof. Ghulam Jeelani Head, P. G. Department of Earth Science, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: geojeelani@kashmiruniversity.ac.in
Ph.No. 9419010924

Prof. Basharat A Want Head, P. G. Department of Physics, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: bawant@kashmiruniversity.ac.in
Ph.No. 9419001037

Prof. Mohd Arif Wani Head, P. G. Department of Computer Science, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: arif_wani@yahoo.co.uk
Ph.No 9419013565

Prof. Mubashir H Masoodi Head, P. G. Department of Pharmaceutical Science, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: mubashir@kashmiruniversity.ac.in
Ph.No. 7006167705

Dr. Shajrul Amin Head, P. G. Department of Biochemistry, University of Kashmir, Srinagar-190 006, J & K, India
E-mail:shajrulamin@uok.edu.in: shajrul@rediffmail.com
Ph.No. 9419018174

Dr. Rabia Hamid Coordinator, P. G. Programme in Nanotechnology, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: rabeyams@yahoo.co.in : rabia.hamid@uok.edu.in
Ph. No. 0194-2429870

Dr. Mohd Tariq Banday Head, P. G. Department of Electronics, University of Kashmir, Srinagar-190 006, J & K, India
E-mail:sgrmtb@yahoo.com; sgrmtb@kashmiruniversity.ac.in
Ph.No. 9419548922

Dr. Hummara Azim Director, Institute of Home Science, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: drhumaira@uok.edu.in
Ph.No. 7006064301

Dr. Fouzia Rashid Head, P.G. Department of Clinical Biochemistry
University of Kashmir, Srinagar-190 006, J & K, India
Email: rashid.fouzia@gmail.com
Ph. No. 9469042001

Dr. Manzoor Ahmad Mir Coordinator, P. G. Programme in Bioresources, University of Kashmir, Srinagar-190 006, J & K, India
E-mail: drmanzoor@kashmiruniversity.ac.in
Ph. No. 9622901319

Dr. Adil Gani Coordinator, Department of Food Science & Technology, University of Kashmir, Srinagar-190 006, J & K, India
Email: adil.gani@gmail.com; adilgani@uok.edu.in
Ph No: 919469843334

JOURNAL OF RESEARCH AND DEVELOPMENT

VOL.20

JANUARY, 2020

ISSN 0972-5407

EDITORIAL STAFF

Editor-in-Chief:

**Prof. Bashir Ahmad Ganai, Director, Centre of Research for Development, University of Kashmir, Srinagar-190 006, J & K, India.
E-mail ID: bbcganai@gmail.com
ganaiba@uok.edu.in
Ph. No: 9797247851**

Executive Editor:

**Prof. Md. Niamat Ali, Centre of Research for Development, University of Kashmir, Srinagar-190006, J & K, India.
E-mail ID: mdniamat@hotmail.com
mdniamat@uok.edu.in
Ph. No: 9796754654**

Assistant Editors:

**Dr. Ruqeya Nazir, Centre of Research for Development, University of Kashmir, Srinagar-190 006, J & K, India.
E-mail ID: ruqiaya.du@gmail.com
ruqeyan@kashmiruniversity.ac.in
Ph. No: 9419023191**

**Dr. Bilal Ahmad Wani, Centre of Research for Development, University of Kashmir, Srinagar-190 006, J & K, India.
E-mail ID: wanibilal@uok.edu.in
Ph. No: 9622853721**