

**Bisma Malik**

MSc, Mphill,Ph.D, Women Scientist

## *Department of Bioresources*

## *School of Biological Sciences*

*Govt. Degree College, Bijbehara*

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**Personal Data:**

Sex: Female

Nationality: Indian

Marital Status: Married

D.O.B: 04-12-1987

**CURRENT STATUS:** Working as Assistant Professor in the departments of Bioresources, Govt. Degree College, Bijbehara, Jammu and Kashmir, India.

**RESEARCH INTERESTS**

Plant-Heavy Metal Dynamic Interactions; Proteomics; Metabolomics; genetic diversity

**EDUCATIONAL PROFILE**

**2020-2022** Woking as Research Scientist in the department of Research and development, Chandigarh University, Mohali Punjab (upto June).

**2017-2019** Women Scientist Poject (WOS-A), Department of Science and Technology, New Dehli.

* **Project title-** “Cultivation, Genetic diversity and Active Principle segregation of different accessions of *Cichorium intybus* L. (Chicory) growing in Kashmir Himalay”.

**2013-2017** Ph.D (BioResources); Department of BioResources, University of Kashmir, Hazratbal, Srinagar-India

* **Thesis title**- studies on antioxidant potential and abiotic stress tolerance of *Cichorium intybus* L. (chicory) grown in Kashmir

**2011-2013** M. Phil (Biotechnology) Topper; School of Biotechnology and Biosciences, Lovely Professional University, Phagwara, Punjab-India

* **Dissertation title**-*in vitro* evaluation of antioxidant potential of *Mentha* species.

**2009-2011** M. Sc (BioResources) Topper; Department of BioResources, University of Kashmir, Hazratbal, Srinagar-India

* **Major Papers:** Bioenergy and Biofuels, Microbial Technology, Bioprospection, BioResources Management, Animal cell and Tissue Technology, Bioinformatics

**2005-2008** B.Sc Rank First; University of Kashmir, Hazratbal, Srinagar-India

* **Major Papers:** English, Industrial Chemistry, Chemistry and Zoology

**RESEARCH EXPERIENCE**

* Plant Stress Physiology (Proteomics and Metabolomics)
* Phytoremediation and Phytomining
* Genetic diversity (Molecular Markers)

**SCIENTIFIC SKILLS**

* Proteomics: Extraction of proteins; 1st and 2nd dimensional run on Immobilised pH Gradient (IPG) strips (on IEF Cell, protein focusing) and SD-PAGE, respectively followed by image analyses of Coomassie and silver stained gels, protein spot identification, tryptic digestion of proteins, data interpretation using advanced bioinformatic tools, ultimately leading to identification of stress responsive proteins.
* More than three years’ experience of experimental designing and working with growth and stress Physio-chemistry of plants (*Cichorium intybus*) under abiotic stress such as, Lead, Aluminium and Mercury employing hydroponics or sand culturing.
* Hand-on experience in DNA isolation, PCR using molecular markers (RAPD, ISSR, SSR).
* Expertise in secondary metabolite extraction from different plant parts; quantification of secondary metabolites employing GC-MS.
* Biochemical Assays (DNA Damage, changes in activities superoxide dismutase, ascorbate peroxidase, glutathione reductase, catalase, proteases, nitrate reductase; and phytochemical assays such as soluble protein, proline, lipids, chloroplastic pigments, ascorbate, glutathione, MDA, H2O2, sulphur, lead, Aluminium, mercury, cadmium, etc. contents in different plant tissues)
* Expertise in operating computers using windows MS-Office (all versions), Internet explorer, Graph Pad Prism, PDQuest, PoPGENE, GenALEx and Darwin.

**AWARDS**

* Merit Scholarship during MSc from the Department of Bioresources, University of Kashmir, Srinagar, India
* Merit Scholarship during PhD from the Department of Bioresources, University of Kashmir, Srinagar, India
* Award of Academic honour for standing first in the order of merit during Mphill Biotechnology from the school of biological science, lovely professional university, Phagwara, Punjab, India
* Recipient of Women Scientist Project (WOS-A) funded by Department of Science and Technology, New Dehli, India. (File No: SR/WOS-A/LS-1278/2015).
* Recipient of Women Scientist Project (WOS-B) funded by Department of Science and Technology, New Dehli, India (Project id: 732) (2021).

**PUBLICATIONS**

**Research Articles**

Malik B, Pirzadah TB, Dar FA, Rehman RU (2022) Genetic Diversity and Population Structure Assessment of *Cichorium intybus* L. from diverse Agro-climatic zones of Kashmir Region.Plant Growth Regulation. (Under review)

Malik B, Pirzadah TB, Tahir I, Hakeem KR, Rehman RU (2021) Lead and aluminium-induced oxidative stress and alteration in the activities of antioxidant enzymes in chicory plants. Scientia Horticulturae. <https://doi.org/10.1016/j.scienta.2020.109847>

Malik B, Pirzadah TB (2020) Lead induced changes in biomarkers and proteome map of Chicory (Cichorium intybus L.). Current Botany. 11: 111-116. Doi: doi:https://doi.org/10.25081/cb.2020.v11.6182.

**Pirzadah TB,** Malik B (2020)Pseudocereals as super foods of 21st century: Recent Technological Interventions. Journal of Agriculture and Food Research.2, 100052. Doi: <https://doi.org/10.1016/j.jafr.2020.100052>.

**Malik B**, Pirzadah TB, Tahir I, Rehman RU. (2019). Growth and physiological responses in chicory towards mercury induced in vitro oxidative stress. Plant Physiology Reports. 24(2): 236-248. (ISSN No. 2662-2548) (**SCI; SCOPUS-Indexed**)

Pirzadah TB, **Malik B**, Tahir I, Hakeem KR, Rehman RU. (2019). Aluminium stress modulates the osmolytes and enzyme defense system in *Fagopyrum* species. Plant Physiology and Biochemistry. 144: 178-186.

Pirzadah TB, Malik B, Tahir I, Hakeem KR, Rehman RU (2020) Lead toxicity alters the activities of antioxidant defense machinery and modulate the biomarkers in Tartary buckwheat plants. International Biodeterioration & Biodegradation.Volume 151, 104992. doi.org/10.1016/j.ibiod.2020.104992.

**Malik B**, Pirzadah TB, Tahir I, Rehman RU. (2017). Chemo-profiling, Antioxidant potential and Ionomic analysis of *Cichorium intybus* L. Pharmacognosy Journal 9 (6): 917-928.

**Malik B**,Pirzadah TB, Abdin MZ, Rehman RU. (2017).Somaticembryogenesis pattern and embryoid formation in chicory (*Cichorium intybus* L.).International Journal of Agricultural Technology. 13 (1): 91-104.

**Malik B**,Pirzadah TB, Tahir I, Abdin MZ, Rehman RU. (2016). Phytochemical studies on *Cichorium intybus* L. (chicory) from Kashmir Himalaya using GC-MS. Journal of Pharmacy Research. 10 (11): 715-726.

**Malik B**, Soni G, Raj NR (2013). Influence of agro-climatic conditions on antioxidant potential of **Mentha** species. Journal of Pharmacy Research 7 (5): 427-432.

Pirzadah TB**,Malik B**, Tahir I, Rehman RU.(2019). Buckwheat Journey to Functional Food Sector.Current Nutrition & Food Science 14: 1.

PirzadahTB, **Malik B**,Tahir I, Qureshi MI, Rehman RU. (2018).Characterization of mercury-induced stress biomarkers in *Fagopyrum tataricum* plants. International Journal of Phytoremediation, 20 (3): 225-236.

Pirzadah TB, **MalikB**, Tahir I, Rehman RU. (2018).Antioxidant potential and Ionomic analysis of two buckwheat species from Kashmir region.Pharmacognosy Journal. 10(6) Suppl:s83-s88.

Pirzadah TB, **Malik B**, Tahir I, Qureshi MI, Rehman RU. (2017).Metabolite Fingerprinting and Antioxidant Potential of Tartary Buckwheat- an Underutilized Pseudocereal crop from Kashmir Region.Free Radicals and Antioxidants. 7(1): 95-106.

Pirzadah TB, **Malik B**, Tahir I, Rehman RU. (2017) Metabolite profiling of tartary buckwheat-an underutilized neutraceutical crop of Kashmir Himalaya.Journal of Phytology. 8: 49-54.

Pirzadah TB, **Malik B**, Tahir I, Rehman RU. (2016). Vivipary in *Fagopyrum esculentum*.Folia Biologica ET Geologica. 57 (2): 5-59.

Bilal T, **Malik B**, Rehman RU, Kumar M. (2015). Influence of various parameters on cellulase and xylanase production by different strains of *Trichoderma species.* Austin Journal of Analytical Chemistry and Pharmaceutical Science.2 (1): 1034.

Pirzadah TB, **Malik B**, Tahir I, Rehman RU. (2013). Buckwheat: An introspective and future perspective with reference to Kashmir Himalayas. Proc. 12th Intl. Symp.Laško,Slovania. pp. 212-215. (Proceedings of International Symposium 21-25 Aug. 2013).

**Pirzadah TB,** Malik B, Dar FA. (2019). Phytoremediation potential of Aromatic and Medicinal Plants: A way Forward for Green Economy. Journal of Stress Physiology and Biochemistry. (2019). 15 (3): 62-75.

**Pirzadah TB**, Malik B, Sheikh Tanveer Salam, Pervaiz Ahmad Dar, Seema Rashid.(2019). Impact of Heavy Metal Stress on Plants and the Role of various Defense Elements.Iranian Journal of Plant Physiology. 9(4): 2883- 2900.

Pirzadah TB, **Malik B**,Hakeem KR. (2018).Metagenomicanalysisofuncultured microorganismsandtheirenzymaticattributes. Journal of Microbiological Methods. 155: 65-69.

**BOOK CHAPTERS**

**International**

Pirzadah TB, Malik B, Hakeem KR (2021) Nature Sucks up Explosives. In: Phytoremediation: Biotechnological Strategies for Promoting Invigorating Environs. Elsevier, USA. ISBN No.: 978-0323885966.

Malik B, **Pirzadah TB,** Hakeem KR (2021) Phytoremediation of persistent organic pollutants. In: Phytoremediation: Biotechnological Strategies for Promoting Invigorating Environs. Elsevier, USA. ISBN No.: 978-0323885966.

Dar FA, **Pirzadah\* TB**, Malik B (2020) Accumulation of Heavy Metals in Medicinal and Aromatic Plants.Aftab T, and Hakeem KR (eds). In: Plant Micronutrients: Deficiency and Toxicity Management. Springer Nature Publications.

**Pirzadah TB**, Pirzadah B, Jan A, Dar FA, Hakeem KR, Rashid S, Salam ST, Dar PA, Fazili MA. (2020). Development of Nano-formulations via Green Synthesis Approach. In: **Pirzadah TB** and Hakeem KR (eds). Nanobiotechnology in Agriculture: An Approach towards Sustainability. Springer Nature Switzerland.**ISBN No.** 978-3-030-39978-8.**DOI:** [https://doi.org**/**10.1007/978-3-030-39978-8](https://doi.org/10.1007/978-3-030-39978-8)

Pirzadah B, **Pirzadah TB**, Jan A, Hakeem KR. (2020).Nano-Fertilizers: A Way Forward for Green Economy. In: **Pirzadah TB** and Hakeem KR (eds). Nanobiotechnology in Agriculture: An Approach towards Sustainability. Springer Nature Switzerland.**ISBN No.**978-3-030-39978-8.**DOI:** [https://doi.org**/**10.1007/978-3-030-39978-8](https://doi.org/10.1007/978-3-030-39978-8)

Jan A, **Pirzadah TB**, Malik B. (2020). Nanotechnology: An innovative tool to enhance Crop Production. In: **Pirzadah TB** and Hakeem KR (eds). Nanobiotechnology in Agriculture: An Approach towards Sustainability. Springer Nature Switzerland.**ISBN No.** 978-3-030-39978-8.**DOI:** [https://doi.org**/**10.1007/978-3-030-39978-8](https://doi.org/10.1007/978-3-030-39978-8)

Malik B, **Pirzadah TB**, Kumar M, RehmanRU. (2017). Biosynthesis of Nanoparticles and their application in pharmaceutical industry.In: Prasad R, Kumar V, Kumar M. (eds) Nanotechnology. Springer, Singapore, pp. 235-252. **ISBN No.** 978-981-10-4678-0.**DOI:** <https://doi.org/10.1007/978-981-10-4678-0_13>

**Malik B**, Pirzadah TB, Tahir I, Murtaza I, Rehman RU. (2017).Phenomics Science: An integrated inter-disciplinary approach for crop improvement. In: Zargar SM, Vandna R (eds) Plant Omics and Crop Breeding Apple. Academic Press Inc. 9 Spinnaker Way Waretown, NJ 08758 USA, pp 1-30.

**Malik B**,Pirzadah TB, Islam ST, Tahir I, Kumar M, RehmanRU. (2015).Biomass pellet technology: A green approach for sustainable development. In: Hakeem K, Jawaid M, Alothman OY (eds) Agricultural biomass based potential material.Springer Switzerland, pp 403-433.

**Malik B**, Pirzadah TB, Tahir I, Reiaz ul Rehman, Hakeem KR, Abdin MZ. (2014). Plant signaling: response to reactive oxygen species. In: Hakeem KR, Rehman RU, Tahir I (eds) Plant Signalling: Understand molecular cross talk.Springer India, pp 1-38.

**Malik B**,Pirzadah TB, Tahir I, Rehman RU. (2015). Recent trends and approaches in phytoremediation. Publisher: Soil remediation and plants. In: Hakeem KR, Sabir M, Ozturk MA, Mermut AR (eds) Soil remediation and plants Elsevier London, pp 131-146.

**Pirzadah TB**, Malik B, Maqbool T, Rehman RU. (2019). Development of Nano-bioformulations of nutrients for Sustainable Agriculture. In: Prasad R, Kumar V, Kumar M, Choudhary D (eds). Nanobiotechnology in Bioformulations.Nanotechnology in the Life Sciences.Springer, Cham pp. 381-394.**ISBN No.** 978-3-030-17061-5.**DOI:** <https://doi.org/10.1007/978-3-030-17061-5_16>

**Pirzadah TB**, Malik B, Rehman RU. (2019). Integration of ‘Omics’ Approaches to Unravel the Heavy Metal Tolerance in Plants. In: Hakeem K, Shaik N, Banaganapalli B, Elango R (eds) Essential of Bioinformatics, Volume III, Springer International. **ISBN No.**978-3-030-19318-8.**DOI:** <https://doi.org/10.1007/978-3-030-19318-8_4>

Dar FA, Pirzadah TB, **Malik B**, Tahir I, Rehman RU.(2018). Molecular genetics of buckwheat and its role in crop improvement.In:ZhouM, Kreft I, Tang Y, SuvorovaG (ed) Buckwheat germplasm in the world,Ist edn. Elsevier Publications USA, pp 271-286.

Pirzadah TB, **Malik B**, Kumar M, Rehman RU. (2017). Cellulases: Industrial workhorse in bioenergy sector.In: Kalia V, Saini A, (eds) Metabolic Engineering for Bioactive Compounds International. Springer, Singapore, pp 143-153.

Farooq S,Rehman RU, PirzadahTB**,Malik B**, Dar FA, Tahir I. (2016). Cultivation, Agronomic practices and growth performance of Buckwheat.In:Zhou M, Kreft I, Woo SH, ChrungooN, WieslanderG (eds) Molecular Breeding and Nutritional Aspects of Buckwheat. Elsevier USA, pp 299-319.

Kumar M, Bhadrecha P, Pirzadah TB, **Malik B**, RehmanRU, PrasadR,PachouriUC. (2015).Power Reservoirs of Jumble based Biomass in Asia.In: Hakeem K, Jawaid M, Alothman OY (eds) Agricultural biomass based potential material.Springer Switzerland, pp 455-470.

Pirzadah TB, **Malik B**, Tahir I, Kumar M, Rehman M. (2015). Phytoremediation: An eco-friendly green technology for pollution prevention, control and remediation. In: Hakeem KR, Sabir M, Ozturk MA, Mermut AR (eds) Soil remediation and plants Elsevier London, pp 107-122.

Pirzadah TB, **Malik B**, Kumar M, Rehman RU. (2014).Lignocellulosic biomass: As future alternative for bioethanol production. In: Hakeem KR, Jawaid M, Rashid U (eds) Biomass and Bioenergy. Springer USA, pp 15-163.

Pirzadah TB**,Malik B**, Rehman RU, Hakeem KR, Quershi MI. (2014). Signaling in response to cold stress. In: Hakeem KR, Rehman RU, Tahir I (eds) Plant Signalling: Understand molecular cross talk.Springer India, pp 193-226.

**NATIONAL**

Bilal T, Kaur N, Kumar V, Prasad R, Varma A, **MalikB**,Rehman RU, Kumar M. (2016).Heavy Metal Resistance Bacterial Strains from Agricultural Polluted Sites of Northern India.In:Saini AK, Saini RV, Sharma, DK, Kalia VC (eds) Integrative Biology Book SeriesStrategies for Metabolic Engineering in Bioactive compounds and Processes, Kalyani Publishers, India, pp 62-73.

**INTERNATIONAL CONFERENCES**

**Malik B**, Pirzadah TB, Tahir I, Rehman RU. (2016). Phytochemical screening and GC-MS Profiling of Chicory (Cichorium intybus L.). 2ND International Symposium on New processes and Applications for Plant and Microbial Products. India Habitat Center, New Delhi, India 1st & 2nd March, 2016, ISBN: 978-81-7993-589-7.

Bilal T**, Malik B**, Rehman RU.(2018).Physiological and Biochemical responses of Tartary Buckwheat seedlings upon Mercury-Induced oxidative stress. International Conference On Recent Developments in Science, Humanities & Management (ICRDSHM-18)” (April 17-18, 2018), organized by Amar Singh College, Cluster University Srinagar.

Bilal T**, Malik B**, Rehman RU.(2018). Chemo-profiling Analysis and Distributional Map Patterns of *Cichorium intybus* L. (Chicory) from Kashmir Himalaya. International Conference on Recent Developments in Science, Humanities & Management (ICRDSHM-18)” (April 17-18, 2018), organized by Amar Singh College, Cluster University Srinagar.

Bilal T**, Malik B**,Rehman RU.(2018). Biochemical Scanning and Morpho-Physiological Dissection of Component Mechanism in *Fagopyrum* species in Response to Aluminium Stress.International conference on Agribusiness in Emerging Economics organized by TERI school of Advanced Studies, New-Delhi. 03-04 Jan. 2018.

Bilal T, **Malik B**, Tahir I, Rehman RU. (2016). Chemo-Profiling and Nutritional Analysis of Buckwheat (*Fagopyrum tataricum* Gaertn) from Kashmir Himalaya. 2nd International Symposium on New processes and Applications for Plant and Microbial Products. India Habitat Center, New Delhi, India 1st & 2nd March, 2016, ISBN: 978-81-7993-589-7.

Pirzadah TB, **Malik B**, Tahir I, Rehman RU. (2013). Buckwheat: An introspective and future perspective with reference to Kashmir Himalayas. Poster presentation on 12th International symposium on Buckwheat, Slovenia.

**NATIONALCONFERENCES**

**Malik B**, Pirzadah TB, Kumar M, Tahir I, Rehman RU. (2015). Phenomics science: An inter-displinary approach for crop improvement. Poster presentation on National symposium on Biodiversity, Biology and Bioprospecting organized by the Department of Botany University of Kashmir on 1-2 April, 2015

**Malik B**, Soni G, Bilal T, Tahir I, Rehman RU. (2015). Agro-Climatic Influence on the Antioxidant Potential of *Mentha*.Oral presentation on Regional Science Congress & 11Th JK Science Congress” organized by University of Kashmir, 12 -14 Oct. 2015.

**Bisma** (2018). Certificate of Achievement for participating in National Workshop of **"Developmental Biology - Gametogenesis and Fertilization" on 10th Feb. 2018,**Organized by Biotecnika Info Labs Ltd, New Delhi.

**Malik B**, Pirzadah TB, Rehman RU. (2013). *Cichorium intybus* L. (Chicory): A potential perennial Bioresource. Poster presentation on *“*International Day for Biological diversity” Organized by Department of Botany, University of Kashmir, 22nd May, 2013.

**Malik B**, Pirzadah TB, Tahir I, Rehman RU.(2013).*Cichorium intybus* L. (Chicory): An untapped Bioresource with reference to Jammu and Kashmir. Poster presentation on National conference on “Status and conservation of biodiversity in India with special reference to Himalaya” organized by Centre of Research for Development (CORD) & P.G. Department Of Environmental Science, University of Kashmir, 4-5 Oct. 2013.

**Malik B**. (2015). Participated in “Two day lecture series on Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA)”, 03-04 June, 2015-Organized by Department of Environmental Science, University of Kashmir, Srinagar.

**Malik B** (2014). Three day Science Academies Lecture Workshop on “Himalayan Biodiversity and Bioresources: Mapping, Utilization and conservation” organized by Department of Botany, University of Kashmir, Srinagar from May 8-10. Jointly sponsored by Indian Academy of Sciences (Bangalore), Indian National Science Academy (New Delhi) and National Academy of Sciences (Allahabad).

**Malik B**, Pirzadah TB, Tahir I, Rehman RU. (2013). Biotechnological approaches for the improvement of chicory (*Cichorium intybus* L.).Oral presentation on Regional Science Congress & 9Th JK Science Congress” organized by University of Kashmir, 1st -3rd Oct. 2013.

Rehman RU, Pirzadah TB, **Malik B**, Tahir I. (2013). Buckwheat: A case study in Gurez Valley. Oral presentation on Regional Science Congress & 9Th JK Science Congress” organized by University of Kashmir, 1st -3rd Oct. 2013.

Bilal T, **Malik B**, Rehman RU. (2017). Lead induced phytotoxicity and oxidative stress in buckwheat (*Fagopyrum kashmirianum*) plants. National Conference on Biotechnology and Environment, organized by Department of Biotechnology, Jamia Millia Islamia, New-Delhi and National Environmental Science Academy (NESA), New-Delhi on 10-11th April 2017.

Bilal T, **Malik B**, Tahir I, Rehman RU. (2015). Buckwheat: an Underutilized Crop for Food Security and Measures to Cope with Climate Change. Oral presentation on Regional Science Congress & 11Th JK Science Congress” organized by University of Kashmir, 12 -14 Oct. 2015.

Pirzadah TB, **Malik B**, Kumar M**,** Tahir I, Rehman RU. (2015). Metagenomics: Window To The Microbial World. Poster presentation on National symposium on Biodiversity, Biology and Bioprospecting organized by the Department of Botany University of Kashmir on 1-2

Pirzadah TB, **Malik B**, Rehman RU, Kumar M. (2013). Cellulosic Bioethanol-as future fuel.Poster presentation on “International Day for Biologicaldiversity” Organized by Department of Botany, University of Kashmir, 22nd May, 2013.

Pirzadah TB, **Malik B**, Tahir I, Rehman RU.(2013).Mangrove characteristics in *Fagopyrum esculentum* a member of Polygonaceae family. Poster presentation on National conference on “Status and conservation of biodiversity in India with special reference to Himalaya” organized by Centre of Research for Development (CORD) & P.G. Department Of Environmental Science, University of Kashmir, 4-5 Oct. 2013.

Pirzadah TB, **Malik B**, Kumar M, Rehman RU.(2013). *Trichoderma* species for production of cellulases for the biofuel industry. Oral presentation on Regional Science Congress & 9Th JK Science Congress” organized by University of Kashmir, 1st -3rd Oct. 2013.

**EDITORIAL WORK/BOOK**

**Peer-Reviewer for the following journals**

* African Journal of Biotechnology
* African Journal of Microbiology

**Member of Editorial Board**

* Journal of Plant Stress Physiology (**Online ISSN: 2455-0477)**

<http://updatepublishing.com/journal/index.php/jpsp/editorial-board>

* Reviewer Journal of Plant Sciences. **ISSN: 2331-0723 (Print);**

**ISSN: 2331-0731 (Online)**

**MEMBERSHIPS OF SCIENTIFIC ORGANIZATIONS**

* **Associate Member of World Academy of Sciences**. <http://www.worldacademyofsciences.com/members.html>
* **Member of Board of Studies (2013-Till date):** Department of Bio-Resources

**REFERENCES**

**Prof. Inayatullah Tahir Dr. Raies Qadiri**

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