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Professional and Academic Background

- ✓ Professor, Department of Biotechnology (2023-Present)
- ✓ Associate Professor, Department of Biotechnology (2017-2023)
- ✓ Assistant Professor, Department of Biotechnology (2007-2017)
- ✓ CSIR Pool Officer, School of Life Sciences, Jawaharlal Nehru University, New Delhi (2005 – 2007)-
- ✓ Principal Investigator, DST Young Scientist, School of Life Sciences, Jawaharlal Nehru University, New Delhi (2002- 2005)
- ✓ Guest Researcher, Dept. of Pharmaceutical Biology, University of Wuerzburg, Germany. (April 2002 - June 2002)
- ✓ CSIR Research Associate, National Botanical Research Institute, Lucknow (1997- 2002)
- ✓ Ph.D., National Botanical Research Institute, Lucknow
- ✓ Bachelor of Science (B.Sc) and Master of Science (M.Sc.), Banaras Hindu University, Varanasi .

Awards and Achievements:

National:

Fellow-National Academy of Sciences, Allahabad, India, 2021
Fellow- International Society of Environmental Botanists, 2018
Awarded NASI membership, 2018
Awarded DST-fast track Young Scientist-2002
Awarded Research Associate (with higher slab) from CSIR, New Delhi, India, 1997
Awarded JRF and SRF from CSIR, New Delhi, India, 1992 & 1994

International:

Awarded Guest Research Fellowship at University of Wuerzburg, Germany, 2002

Research Area: Ecotoxicogenomics / Plant Molecular Biology

Research Interest: Understanding metal transport and its regulation through physiological, biochemical and molecular mechanisms.

Our group is interested in understanding the metal transport and its regulation through physiological, biochemical and molecular mechanisms. Plants develop different mechanisms to cope up with different metal toxicity throughout their life span. Arsenic (As) is classified as a metalloid having properties of both metals and non-metals, and can undergo in a wide range of chemical interactions. Bioavailability, uptake and phyto-toxicity of As to plants are influenced by various factors such as As concentration in soil/water, As species, plants species and soil/.water properties. As-contaminated ground water irrigation is one of the major factors that affect all organisms live in term of health and food safety. In India, West Bengal, Jharkhand, Bihar, Uttar Pradesh, Assam, Manipur, the flood plain of Ganga, Brahmaputra and Imphal rivers, and Rajnandgaon village in Chhattisgarh are reported to have very high amount of As. Rice and Indian mustard are two plants we are using to identify the behavior of As in plant system. Our main focus is to deal with the following topics:

- Interaction of As with other metals, having similar chemical properties, and share same transport system, mainly in rice and mustard plant
- Cellular/molecular mechanisms involved in As stressed plants under submerged and drought condition.
- How auxin redistribution and nitrogen signalling pathways regulates root architecture under As stress.
- Identification and utilization of genes and miRNA for development of As tolerant plants.
- Unravelling the protein-protein interaction during arsenic-iron coupling in rice varieties.

Projects Completed/Ongoing as PI from JMI : Three

1. **From University Grant Commission, India for a period of three years from 2009. (Completed)**
2. **From Ministry of Environment and Forest (MoEF), Govt. of India for a period of three and a half years from 2009. (Completed)**
3. **From SERB-DST for a period of three years (2018-2022, Completed)**

Projects Guided at PG Level (last 5 years): 20

Group members:

Present :

- Medha Panthri (Ph.D student, submitted)
- Zainab Mirza (Ph.D student)
- Priyanka Bhatia (Ph.D student)
- Himanshu Saini (Ph.D student)
- Asna Khan (Ph.D student)
- Narjis Saba (Ph.D student)

Past:

- Mohd. Anwar Ahmad (Ph.D awarded, 2012)
- Rashmi Gaur (Ph.D awarded, 2013)
- Shikha Gupta (Ph.D awarded, 2016)
- Chandana Pandey (Ph.D awarded, 2017)
- Ehsanullah Khan (Ph.D awarded, 2019)
- Afsana Parveen (Ph.D awarded, 2019)
- Dr. Seema Sahay (UGC-Post-Doc, completed)
- Dr. Amit Kumar (DST-NPDF, completed)

Participation in different Departmental activities:

- Nodal Officer, M.Sc. Course Coordinator, Member of Syllabus, Equipment, Space, purchase, moderation committee and Board of studies.
- Worked as Co-organizing secretary in conference (NCBOE-2017) hosted by Department of Biotechnology, JMI

Selected Publications from JMI as corresponding author(Impact factor 5-14)

1. Himanshu Saini, Medha Panthri, Biswaranjan Rout, Ashutosh Pandey and **Meetu Gupta (2023)** Iono-metabolomic guided elucidation of arsenic induced physiological and metabolic dynamics in wheat genotypes. **Environmental Pollution**.
2. Medha Panthri and **Meetu Gupta (2022)** An insight into the act of iron to impede arsenic toxicity in paddy agro-system. **Journal of Environmental Management**; 316, 115289
3. Priyanka Bhatia and **Meetu Gupta (2022)** Micronutrient seed priming: new insights in ameliorating heavy metal stress. **Environmental Science and Pollution Research**; 29, 58590-58606
4. Seema Sahay, Ehasanullah Khan, Afsana Praveen, Medha Panthri, Zainab Mirza and **Meetu Gupta (2020)** Sulphur potentiates selenium to alleviate arsenic-induced stress by modulating oxidative stress, accumulation and thiol-ascorbate metabolism in *Brassica juncea* L. **Environmental Science and Pollution Research**, 27 (11), 11697-11713
5. Afsana Parveen, Chandana Pandey, Ehasanullah Khan, Medha Panthri and **Meetu Gupta (2020)** Silicon-mediated genotoxic alterations in *Brassica juncea* under arsenic stress: A comparative study of biochemical and molecular markers. **Pedosphere**, 30(4), 517-527
6. Medha Panthri and **Meetu Gupta (2019)** Facets of iron in arsenic exposed *Oryza sativa* varieties: A manifestation of plant's adjustment at morpho-biochemical and enzymatic levels. **Environmental Pollution**, 255, 113289
7. Afsana Praveen, Ashutosh Pandey and **Meetu Gupta (2019)** Nitric oxide alters nitrogen metabolism and PIN gene expressions by playing protective role in arsenic challenged *Brassica juncea* L. **Ecotoxicology and Environmental Safety**, 176, 95-107
8. Afsana Praveen and **Meetu Gupta (2018)** Nitric oxide confronts arsenic stimulated oxidative stress and root architecture through distinct gene

- expression of auxin transporters, nutrient related genes and modulates biochemical responses in *Oryza sativa* L. "**Environmental Pollution**", 240, 950-962,
9. Chandana Pandey, Rehna Augustine, Medha Panthri, Ismat Zia, Naveen C. Bisht, and **Meetu Gupta**. (2017) Arsenic affects the production of glucosinolate, thiol and phytochemical compounds: A comparison of two *Brassica* cultivars. **Plant Physiology and Biochemistry** 111: 144-154.
 10. **Meetu Gupta** and Shikha Gupta (2017) "An Overview of Selenium Uptake, Metabolism, and Toxicity in Plants." **Frontiers in Plant Science**, 7,
 11. Chandana Pandey, Ehsanullah Khan, Medha Panthri, Rudra Deo Tripathi, **Meetu Gupta** (2016) Impact of silicon on Indian mustard (*Brassica juncea* L.) root traits by regulating growth parameters, cellular antioxidants and stress modulators under arsenic stress. **Pl. Physiol. Biochem.** 104, 216-225.
 12. Chandana Pandey and **Meetu Gupta** (2015) Selenium and auxin mitigates arsenic stress in rice (*Oryza sativa* L.) by combining the role of stress indicators, modulators and genotoxicity assay. **J. Hazard. Mat.** 287, 384-391
 13. **Meetu Gupta** and Mohd. Anwar Ahmad (2014) Arsenate induced differential response in rice genotypes. **Ecotoxicology and Environmental Safety**. 107, 46-54.
 14. Mohd. Anwar Ahmad and **Meetu Gupta** (2013) Exposure of *Brassica juncea* (L.) to arsenic species in hydroponic medium: comparative analysis in accumulation and biochemical and transcriptional alterations. **Environ. Sci. Pollu. Res.** 20(11), 8141-8150
 15. Mohd. Anwar Ahmad, Rashmi Gaur and **Meetu Gupta** (2012) Comparative biochemical and RAPD analysis in two varieties of rice (*Oryza sativa*) under arsenic stress by using various biomarkers. **J. Hazard. Mat.** 217-218, 141-148.
 16. **Gupta M.**, Sharma P., Sarin N.B. & Sinha A.K. (2009) Differential response of arsenic stress in two varieties of *Brassica juncea* L. **Chemosphere** (74): 1201-1208.
 17. **Gupta Meetu** and Sarin N.B. (2009) Heavy metal induced DNA changes in aquatic macrophytes: RAPD analysis and identification of SCAR marker. **J. Env. Sci.** Vol. 21 (5), 686-690.

(Impact factor 2-5)

18. Zainab Mirza, Mohammad Mahfuzul Haque, **Meetu Gupta** (2022) WRKY transcription factors: a promising way to deal with arsenic stress in rice. **Molecular Biology Reports**. 49, 10895-10904
19. Seema Sahay, L Robledo-Arratia, K Glowacka, **Meetu Gupta** (2021) Root NRT, NiR, AMT, GS, GOGAT and GDH expression level reveal NO and ABA mediated drought tolerance in *Brassica juncea* L. **Scientific Reports** 11 (1), 1-15
20. Afsana Praveen, Ashutosh Pandey and **Meetu Gupta** (2020) Protective role of nitric oxide on nitrogen thiol metabolism and amino acids profiling during arsenic exposure in *Oryza sativa* L. **Ecotoxicology**, 29(7), 825-836. [IF: 2.32]
21. Seema Sahay, Eulogio De La Cruz Torres, Luis Robledo-Arratia, **Meetu Gupta** (2020) Photosynthetic activity and RAPD profile of polyethylene

- glycol treated *B.juncea* L. under nitric oxide and abscisic acid application. **Journal of Biotechnology**, 313, 29-38
22. Seema Sahay, Ehasanullah Khan and **Meetu Gupta (2019)** Nitric oxide and abscisic acid protects against PEG-induced drought stress differentially in Brassica genotypes by combining the role of stress modulators, markers and antioxidants. **Nitric Oxide**, 89, 81-92
 23. Ehasanullah Khan and **Meetu Gupta (2018)** Arsenic–silicon priming of rice (*Oryza sativa* L.) seeds influence mineral nutrient uptake and biochemical responses through modulation of Lsi-1, Lsi-2, Lsi-6 and nutrient transporter genes. “**Scientific Report**”, 8 (1), 1-16
 24. Afsana Praveen, Ehasanullah Khan, Serena Ngiime D, Mohammad Perwez, Meryam Sardar and **Meetu Gupta (2018)** Iron oxide nanoparticles as nano-adsorbents: A possible way to reduce arsenic phytotoxicity in Indian mustard plant(*Brassica juncea* L.). **J. Plant Growth Regulator**, 37(2),612-624.
 25. Seema Sahay and **Meetu Gupta (2017)** "An update on nitric oxide and its benign role in plant responses under metal stress." **Nitric Oxide**, 67, 39-52.
 26. Chandana Pandey, Badmi Raghuram, Alok Krishna Sinha and **Meetu Gupta (2015)** miRNA plays a role in the antagonistic effect of selenium on arsenic stress in rice seedlings. **Metallomics** , 7, 857-866
 27. Shikha Gupta and **Meetu Gupta (2015)** Alleviation of selenium toxicity in *Brassica juncea* L.: salicylic acid mediated modulation in toxicity indicators, stress modulators, and sulphur related gene transcripts. **Protoplasma**.253, 1515-1528
 28. Rashmi Gaur, Sabhyata Bhatia and **Meetu Gupta (2014)**. Generation of expressed sequence tags under cadmium stress for gene discovery and development of molecular markers in chickpea. **Protoplasma** 251, 955-972
 29. Rao K.P., Vani G., Kumar K., Wankhede D.P., Misra M., **Gupta M.** and Sinha A.K. (2011). Arsenic stress activates MAP kinase in rice roots and leaves. **Arch. Biochem. Biophys.** 506, 73-82.

BOOK PUBLISHED:

Fundamentals of Environmental Biology (2018): (Publisher ik.International)

BOOK CHAPTERS:

1. Afsana Parveen and **Meetu Gupta (2019)** Quantitative Trait Loci Mapping of Heavy Metal Accumulation and Resistance in Crop Plants. In “Genomics Assisted Breeding of Crops for Abiotic Stress Tolerance”, Vol. II. (Ed: V.R. Rajpal, D.Sehgal, A. Kumar & S.N. Raina), published by Springer, pp 21-30;
2. Medha Panthri and **Meetu Gupta (2018)** Plausible strategies to reduce arsenic accumulation in rice. In “Advances in Rice Research for Abiotic Stress Tolerance” (Ed: M. Hassanuzzaman, M. Fujita, K. Nahar & J.K. Biswas), published by Elsevier, pp 371-384.
3. **Meetu Gupta**, Chandana Pandey, and Shikha Gupta (2016) Plant Response to Arsenic Stress and Role of Exogenous Selenium to Mitigate Arsenic-Induced Damages. In “Abiotic Stress Response in Plants”(Edt. Tuteja & Gill), published by Wiley-VCH, Germany, pp 261-274..

4. **Meetu Gupta** and Ehsanullah Khan (2015) Mechanism of Arsenic toxicity and Tolerance in Plants: Role of Silicon and Signalling Molecules. In "Stress Responses in Plants" (Edt. Tripathi & Muller) published by Springer, Switzerland, pp 143-157.
5. Monika Jaggi, **Meetu Gupta**, Narendra Tuteja and Alok Krishna Sinha (2012) Mitogen activated Protein Kinases in Abiotic Stress Tolerance in Crop Plants: Omics Approaches. In "Improving Crop Productivity in Sustainable Agriculture" published by Wiley-Blackwell, Germany pp 109-132.
6. Dhamprakash P Wankhede, **Meetu Gupta**, and Alok Krishna Sinha (2013) Arsenic Toxicity in Crop Plants: Approaches for Stress Resistance. In "Crop Improvement Under Adverse Conditions" published by Springer, New York, pp 347-360.