Dr. Ashish Sharma

Scientist,
Biotechnology Division
CSIR-Central Institute of Medicinal and Aromatic Plants P.O. CIMAP, Lucknow 226015, U.P., India
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Area of specialization

Dr. Ashish's core research area is plant molecular biology with a focus on enhancing low-yield and high-value molecules of medicinal and aromatic plants. His lab is working in the area of pathway engineering of secondary plant products through functional genomic approaches. He has carried out research on the identification and functional characterization of microRNA, microRNA-encoded peptide (miPEP), and microProtein (miP) regulating plant growth and development, secondary metabolites biosynthesis, transcriptional regulation, and various stress responses.

Education

B.Sc. (Botany, Zoology, Chemistry)

M.Sc. (Biochemistry)

Ph.D. (Biological Science)

Post-doc (Plant Molecular Biology)

Academic scholarship, honor and award

- CSIR-CIMAP Annual Day award, Outstanding research publication by CSIR-CIMAP in 2024
- CSIR-CIMAP Annual Day award, Outstanding research publication by CSIR-CIMAP in 2023

- DST- Inspire Faculty Award- 2022
- Teacher of the Year (2022) in Biological Science at the University of Copenhagen, Plant Science Centre, Denmark.
- Best Oral Presentation in Plant Specialized Metabolism & Metabolic Engineering Virtual Conference- 2020 at CSIR-CIMAP, Lucknow.
- Best Poster Presentation in 4th International Plant Physiology (2018) at CSIR-NBRI, Lucknow.
- CSIR-SRF fellowship in 2018
- ICAR JRF fellowship in 2014
- GATE fellowship in 2013

Research experience

Ph.D. - CSIR-NBRI, Lucknow, India 2016-2020.

Post-Doc - University of Copenhagen, Denmark 2022-2023

DST-Inspire Faculty CSIR-CIMAP, Lucknow 2023-2024

Scientist CSIR-CIMAP, Lucknow July 2024 till date.

Publication

I. **Sharma, A.**, Badola, P.K., Bhatia, C., Sharma, D. and Trivedi, P.K. (2020). Primary transcript of miR858 encodes regulatory peptide and controls flavonoid biosynthesis and development in Arabidopsis. ***Nature Plants,*** *6* (10), 1262-1274.

II. **Sharma, A.,** Anyatama, A., Gautam, H., Gaddam, S.R., Singh, D., Sinha, H. and Trivedi, P.K. (2024) Enhancing Nutritional Quality in Plants using Complementary Peptide for Sustainable Agriculture. ***Plant Physiology***. kiae386.

III. Badola, P.K.[#], **Sharma, A.[#],** Gautam, H. and Trivedi, P.K., (2022). MicroRNA858a, its encoded peptide, and phytosulfokine regulate Arabidopsis growth and development. ***Plant Physiology,*** kiac138, https://doi.org/10.1093/plphys/kiac138. **([#]Contributed equally).**

IV. **Sharma, A.,** Badola, P.K., Gautam, H., Gaddam, S.R. and Trivedi, P.K. (2022). HY5 regulates light-dependent expression and accumulation of miR858a-encoded peptide, miPEP858a. ***Biochemical and Biophysical Research Communications***, 589, 204-208.

V. **Sharma, A.,** Badola, P.K., Gautam, H. and Trivedi, P.K., (2022). Heterologous expression of Arabidopsis miR858 modulates biosynthesis of secondary metabolites and affects drought tolerance in tobacco. **Plant Cell, Tissue and Organ Culture** (PCTOC), 1-12.

VI. Gaddam, S.R., **Sharma, A.,** Bhatia, C. and Trivedi, P.K. (2024). A network comprising ELONGATED HYPOCOTYL5, microRNA397b, and auxin-associated factors regulates root hair growth in Arabidopsis. ***Plant Physiology***, kiae301.

VII. Gaddam, S.R., **Sharma, A.** and Trivedi, P.K. (2024). miR397b-LAC2 module regulates cadmium stress response by coordinating root lignification and copper homeostasis in Arabidopsis thaliana. ***Journal of Hazardous Materials,*** 465, p.133100.

VIII. Gaddam, S.R., Bhatia, C., **Sharma, A.,** Badola, P.K., Saxena, G. and Trivedi, P.K. (2021). miR775 integrates light, sucrose and auxin associated pathways to regulate root growth in Arabidopsis thaliana. ***Plant Science***, 313, 111073.

IX. Gaddam, S.R., Bhatia, C., Gautam, H., Pathak, P.K., **Sharma, A.,** Saxena, G. and Trivedi, P.K. (2022). Ethylene regulates miRNA-mediated lignin biosynthesis and leaf serration in Arabidopsis thaliana. ***Biochemical and Biophysical Research Communications.***

X. Sharma, D., Tiwari, M., Pandey, A., Bhatia, C., **Sharma, A.** and Trivedi, P.K. (2016). MicroRNA858 is a potential regulator of phenylpropanoid pathway and plant development. ***Plant Physiology,*** *171*(2), 944-959.

XI. Edwards, A., Chiurazzi, M.J., Blaakmeer, A., Vittozzi, Y., **Sharma, A.,** Matton, S., Kruusvee, V., Straub, D., Sessa, G., Carabelli, M., Morelli, G. and Wenkel, S. (2024). A shade-responsive microProtein in the Arabidopsis ATHB2 gene regulates elongation growth and root development. eLife. https://doi.org/10.7554/***eLife.***96725.1

XII. **Sharma, A.,** Gautam, H. and Trivedi, P.K. (2023). Genetic manipulation of microRNAs: approaches and limitations. ***Journal of Plant Biochemistry and Biotechnology***, 32(4), 705-717.

XIII. **Sharma, A.,** Badola, P.K. and Trivedi, P.K. (2021). CRISPR-Cas9 System for Agriculture Crop Improvement. ***Genome engineering for crop improvement***, 97-111.

XIV. Gautam, H., **Sharma, A.** and Trivedi, P.K. (2023). Plant microProteins and miPEPs: Small molecules with much bigger roles. ***Plant Science,*** 326, p.111519.

XV. Gautam, H., **Sharma, A.** and Trivedi, P.K. (2023). The role of flavonols in insect resistance and stress response. ***Current Opinion in Plant Biology,*** 73, 102353.

XVI. Kumar, R.S., Sinha, H., Datta, T., **Sharma, A.** and Trivedi, P.K. (2024). Genome-Editing Tools for Engineering of MicroRNAs and Their Encoded Peptides, miPEPs, in Plants. ***Applications of Genome Engineering in Plants***,153-176.

(Ashish Sharma)