



Dr. Swati Sharma

Dr. Swati Sharma is an Assistant Professor in the Department of Biosciences at Integral University, Lucknow, with over a decade of research experience in biological sciences. Her expertise focuses on plant-microbe interactions and postharvest management. She completed her doctoral research at CSIR-National Botanical Research Institute and the Department of Botany, University of Lucknow. Dr. Sharma has a strong publication record, including 24 research papers in international journals, one edited book, 12 book chapters, and two patents. She has successfully supervised nine Ph.D. scholars in microbiology and biotechnology, making significant contributions to research and academic mentorship.

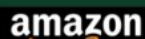
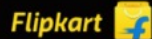


Dr. Amita Dubey

Dr. Amita Dubey is an Assistant Professor in the Department of Biosciences at Integral University, Lucknow. She earned her Ph.D. from CSIR-Central Institute of Medicinal and Aromatic Plants and served as a Women Scientist at CSIR-National Botanical Research Institute. With over a decade of experience in research and teaching, her work focuses on cytochrome P450 monooxygenases and their role in the biosynthesis of therapeutically important secondary metabolites. Her research has advanced the understanding of metabolite pathways in medicinal plants and their application in pathway engineering. She has also contributed to studies on histone acetylation in improving cotton fiber yield and quality. Dr. Dubey has led two projects funded by the


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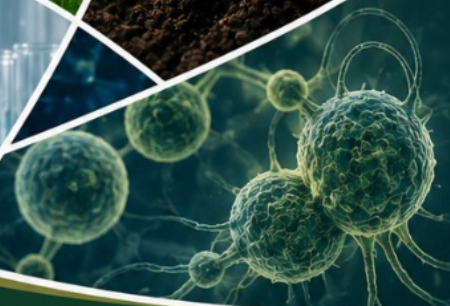


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Frontiers in Biological Sciences: Recent Advances and Innovations

— Vol I —



Dr. Swati Sharma
Dr. Amita Dubey

Frontiers in Biological Sciences: Recent Advances and Innovations-Vol I

Editors

Dr. Swati Sharma

Assistant Professor, Department of Biosciences,
Integral University, Lucknow

Dr. Amita Dubey

Assistant Professor, Department of Biosciences,
Integral University, Lucknow



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Virus-Induced Gene Silencing (VIGS): A powerful genetic silencing tool for plants

Mushfa Khatoon, Km Janhvi, Saleena Siddiqui, Amita Dubey*

Department of Biosciences, Faculty of Science, Integral University, Kursi Road, Lucknow, 226026, India.

****Corresponding author Email Id: amita@iul.ac.in***

Abstract

Virus-induced gene silencing (VIGS) is an RNA-mediated reverse genetics technique that has proven to be instrumental for understanding gene function. VIGS utilizes the plant's post-transcriptional gene silencing (PTGS) machinery to suppress the endogenous gene expression, preventing systemic viral infections. The identification of various VIGS vectors has revealed the functions of genes in cellular signaling, disease resistance, abiotic stress, and secondary metabolite biosynthesis. As a functional genomics tool in plant biology, VIGS is used for genotype identification, breeding, and genetic generation. It has also led to significant advances in creating heritable epigenetic alterations, paving the way for transgene-free genetically modified plants. However, this strategy comes with risks, including viral resistance and transient effects. VIGS may be combined with other functional genomic approaches for agricultural breeding research. For a VIGS system to be effective, it must meet the following requirements: proper viral vector development, an appropriate inoculation technique, optimal inoculum type and concentration, positive controls, and proper plant care. This chapter discusses the mechanism, applications and limitations of the VIGS.