



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.

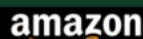
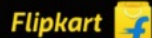


Dr. Amita Dubey

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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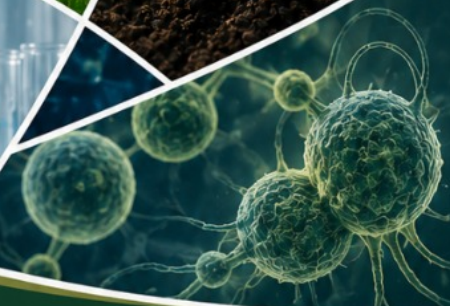


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FRONTIERS IN BIOLOGICAL SCIENCES: RECENT ADVANCES AND INNOVATIONS-VOL I

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

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TABLE OF CONTENTS

Sr. No.	Title of the Chapter	Pg. No.
1.	An update on Cancer Biology <i>Sangeeta Singh</i>	1-13
2.	The role of heat shock protein 90 in Cancer cell death pathways: implications for natural inhibitors in therapeutic strategies <i>Sana Parveen, Mariyam Fatma, Aliya Siddiqui, Snober S. Mir</i>	14-43
3.	Integrating tradition and innovation: the role of <i>Withania somnifera</i> in Cancer therapeutics <i>Sana Parveen, Mariyam Fatma, Snober S. Mir</i>	44-64
4.	Green synthesis of silver nanoparticles and their potential for antimicrobial applications <i>Pooja Mishra, Sheeba Khanam, Faiza Siddiqui, Tooba Nezam, Salman Khan</i>	65-93
5.	Unveiling Antibacterial Attributes of Green Tea, with Focus on Catechins <i>Smita Rai, Sumaiya, Faiza Fiza, Shefali Singh, Swati Sharma, Taiba Saeed, Neha Sami, Tasneem Fatma, Durdana Yasin</i>	94-115
6.	Recent Advances in Sustainable Agriculture: Biochemical Conversion of Agriculture Wastes to Biofuels <i>Ayush Saxena, Fouziya Parveen, Akhtar Hussai, Mohammad Ashfaq</i>	116-147

7. Role of Phytohormones as Elicitors in Plant Secondary Metabolite Synthesis 148-173
Mushfa Khatoon, Shivangi Tiwari, Amita Dubey
8. Drought Stress Tolerance: An Insight into Resistance Mechanism and Adaptation strategies in Plants 174-195
Shefali Singh, Smita Rai, Affan Rais, Swati Sharma, Abdul Mazeed, Nilofer
9. Edible Coatings: A Sustainable Solution for Prolonging fruit and vegetables Shelf Life 196-213
Smita Rai, Swati Pandey, Shefali Singh, Swati Sharma
10. Virus-Induced Gene Silencing (VIGS): A powerful genetic silencing tool for plants 214-230
Mushfa Khatoon, Km Janhvi, Saleena Siddiqui, Amita Dubey
11. Impact of Heavy Metals on Plant Health: Exploring Toxicity and Oxidative Stress 231-259
Taiba Saeed, Durdana Yasin, Asad Ullah

Chapter – 3

Integrating Tradition and Innovation: The Role of *Withania somnifera* in Cancer Therapeutics

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ABSTRACT

Medicinal plants have been integral to healing in local communities for thousands of years and are crucial for approximately 85% of the global population. They are also a major source of drug discovery, with 80% of synthetic drugs deriving from them. *Withania somnifera* (WS), a prominent Rasayana botanical in Ayurveda, is renowned for its immunomodulatory, anti-aging, adaptogenic, and rejuvenating effects. WS exhibits therapeutic potential in cancer management due to its diverse biological activities. Major Phytoconstituent of WS like Withaferin-A (Wi-A) and Withanone has shown notable anticancer properties. Phytoconstituents of WS also have the potential to induce cell cycle arrest by downregulating cyclin B1, cyclin A, Cdk2, and p-Cdc2, while increasing p-Chk1 and p-Chk2 levels. It also affects HPV E6 and E7 oncoproteins, accumulates p53, and enhances p21WAF1 levels. Additionally, decreases STAT3 levels, promotes p53-mediated apoptosis (increasing Bcl2, Bax, caspase-3, cleaved PARP, and Par-4), and disrupts AKT and EMT signaling. These findings underline WS potential as a natural anticancer agent, with reported effects across various cancer types, including oxidative stress-induced mitochondrial dysfunction leading to programmed cell death. In conclusion, while this plant and its phytoconstituents offer immense