

Proceedings of International conference on Green Chemistry and Nanotechnology : Health, Environment & Beyond

24&25 July 2025



GreenNano2025

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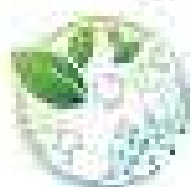
Institute of Innovations
Tiruvannamalai, Tamilnadu



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**International Conference on Green
Chemistry and Nanotechnology: Health,
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24 & 25 July 2025



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PLANT PATHOGEN-BASED BIOLOGICAL CONTROL OF WEEDS: ACHIEVEMENTS AND CONSTRAINTS

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ABSTRACT

Biological control of weeds using plant pathogens has emerged as a promising, eco-friendly alternative to chemical herbicides, aligning with the global demand for sustainable agriculture. Over the past three decades, several plant-pathogenic fungi and bacteria have been developed as bioherbicides, notably *Colletotrichum gloeosporioides* for northern jointvetch and *Phytophthora palmivora* for milkweed. These agents have demonstrated high specificity, minimal impact on non-target species, and potential integration into integrated weed management (IWM) systems, contributing to reduced chemical inputs and enhanced biodiversity. Despite these achievements, large-scale adoption remains limited due to several constraints. Field performance is often inconsistent, influenced by environmental factors such as humidity and temperature. Short shelf life, challenges in mass production, high development costs, and regulatory hurdles further impede commercialization. Moreover, slow weed suppression compared to chemical herbicides and farmer hesitancy hinder widespread acceptance. Future research must focus on improving pathogen formulation, enhancing field stability, and developing synergistic combinations with other control strategies to enhance reliability and adoption. Addressing these constraints will be pivotal in realizing the full potential of plant pathogen-based bioherbicides in sustainable weed management.

Keywords: Biological weed control, plant pathogens, bioherbicides, integrated weed management, sustainability

ABOUT THE BOOK

It is with immense pleasure that we present the Abstract Book for GreenNano2025: International Conference on Green Chemistry and Nanotechnology: Health, Environment & Beyond. This compilation serves as a testament to the vibrant and interdisciplinary research currently shaping the future of sustainable science and technology. The abstracts contained within these pages represent the cutting-edge contributions of scientists, researchers, and scholars from around the globe. They collectively highlight the revolutionary convergence of Green Chemistry and Nanotechnology, showcasing innovative solutions to some of the most pressing global challenges in human health and environmental sustainability. From eco-friendly synthesis of advanced nanomaterials to their applications in medicine, pollution control, and sustainable agriculture, this book offers a panoramic view of the diverse and impactful work being undertaken.

We extend our sincere gratitude to all authors for their invaluable contributions, the reviewers for their diligent efforts, and the organizing committee for their tireless dedication in bringing this conference and abstract book to fruition. May these abstracts inspire new collaborations, spark further inquiry, and accelerate our collective journey towards a greener, healthier, and more sustainable world.

We hope this Abstract Book serves as a valuable resource and a lasting record of the groundbreaking discussions and discoveries at GreenNano2025.

The Organizing Team - GREENNANO2025



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