



Vijay Chandra Verna

Microbial Endophytes of Neem

A Biotechnological Perspective



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Microbial Endophytes Of Neem A Biotechnological Perspective

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Microbial Endophytes Of Neem A Biotechnological Perspective:

New and Future Developments in Microbial Biotechnology and Bioengineering Vijai G. Gupta, Anita Pandey, 2019-06-15

New and Future Developments in Microbial Biotechnology and Bioengineering Microbial Secondary Metabolites Biochemistry and Applications examines the areas of biotechnology and chemical engineering covering aspects of plants bacteria and machines and using microbes as factories The book is aimed at undergraduates post graduates and researchers studying microbial secondary metabolites and is an invaluable reference source for biochemical engineers working in biotechnology manipulating microbes and developing new uses for bacteria and fungi The applications of secondary metabolites in biotechnology pharmaceuticals diagnostics and medical device development are also extensively covered The book integrates the aforementioned frontline branches into an interdisciplinary research work to satisfy those working in biotechnology chemical engineering alternative fuel development diagnostics and pharmaceuticals Chapters related to important research work on applications of microbial secondary metabolites are written by specialists in the various disciplines from the international community Biotechnological Applications of Endophytes in Agriculture, Environment and Industry Vijay K. Sharma, George Newcombe, Haiyan Li, Daniela Trivella, Ravindra Soni, 2023-12-08 Endophytes are the plant symbionts that live inside the plant tissue without causing any symptoms of disease for a part of their life cycle as compared to the rhizosphere and phyllosphere microbes that live on the plant's surface and pathogens that cause disease Bacteria and fungi are the two most common groups that are included in endophytes They find their way into plants endosphere to become extremely important plant symbionts that improve metabolite profile fitness and stress tolerance of the host Endophytes are an important untapped reservoir of biological resources During the last few decades endophytes have attracted scientists working in the field of agriculture environment and industry due to the possibilities of diverse biotechnological applications in such fields Endophytes promote plant growth by improving the physiological and metabolic functions of the host plants via nutrient acquisition nitrogen fixation phytohormone production enhancing abiotic biotic stress tolerance and disease resistance These benefits conferred by the endophytes can be used to promote agriculture yield and food quality In addition endophytes are known to produce novel antibiotics secondary metabolites including alkaloids flavonoids steroids phenolic acids quinines siderophores and enzymes such as chitinases and cellulases These natural compounds have use in pharmaceutical food and agricultural industries Endophytes have usage in biodegradation bioextraction or bioaccumulation of environmental pollutants They also have potential application in enhanced phytoremediation More recently endophytic bacteria and fungi have also been used for the green synthesis of nanoparticles for different medical and industrial applications Functional genomics studies of endophytes provided more information and better understanding of network of the complex host endophyte interactions and other associated microbes to harness the biotechnological potential of endophytes more efficiently and sustainably **Endophyte Biotechnology** Alexander

Schouten,2019-10-19 Most plants are colonized by endophytes bacterial and fungal microorganisms without visible disease symptoms With state of the art knowledge on their discovery qualities and roles this book describes endophyte diversity their value exploitation and future challenges It explains how beneficial endophytes colonize plants and how they might help mitigate climate change effects assist pest control and interact with mycorrhizal fungi to boost yield Endophytes can facilitate the access to nutrients produce particular metabolites and change the plant s chemistry physiology and defense responses Endophyte biosynthetic pathways can alone or in combination with the plant s yield novel chemicals with yet to be discovered pharmacological characteristics as well The book describes how functional metagenomics can explore and boost yields of useful endophyte products **Arsenic Toxicity Remediation: Biotechnological Approaches** Nitish

Kumar,Sanjeev Kumar,2023-08-29 Arsenic contamination in drinking water and associated adverse outcomes is one of the major health issues in more than 50 countries worldwide The scenario is getting even more detrimental with increasing number of affected people and newer sites reported from all over the world Apart from drinking water the presence of arsenic has been found in various other dietary sources Threatening the health of millions of people due to arsenic s toxicity and carcinogenicity the major routes of arsenic exposure for humans are either through drinking water or crops This edited volume brings together a diverse group of environmental science sustainability and health researchers to address the challenges posed by global mass poisoning caused by arsenic water contamination The book sheds light on this global environmental issue and proposes solutions to aquatic contamination through multi disciplinary sustainable approaches and case studies from different parts of world This book addresses the problem of arsenic by pursuing a holistic approach It presents the status quo in different parts of the world and provides essential information on food related arsenic exposure risks for humans and possible preventive and curative measures for tackling arsenic poisoning The mechanisms of arsenic uptake translocation and distribution in plants and grains are also explained In closing the book reviews a variety of prospective sustainable solutions to the problem of arsenic accumulation in soil and water The book comprises three sections First section describes the routes of exposure to environmental arsenic and its transport in soil and aquatic ecosystems including its source and distribution in specific locations Second section explains the health risks linked to arsenic exposure in food and the environment Third section addresses sustainable arsenic contamination mitigation strategies using the potential applications of recent biotechnological techniques bioremediation phytoremediation genetic engineering nanotechnology and in silico approaches The book is intended for a broad audience including researchers scientists and readers with diverse backgrounds including agriculture environmental science food science environmental management and human health It can also be used as an important reference guide for undergraduate and graduate students university faculties and environmentalists The book may serve as a reference to environment and sustainability researchers students and policy makers **New and Future Developments in Microbial Biotechnology and Bioengineering** Jay Shankar

Singh,2019-07-18 New and Future Developments in Microbial Biotechnology and Bioengineering Microbes in Soil Crop and Environmental Sustainability reviews the exploitation of microbial biodiversity in soil with respect to nutrient use efficiency also discussing the improvement and maintenance of certain physical and chemical conditions in soil that can provide economic and environmental benefits toward agricultural sustainability The utilization of microbes ranges from applications in biotechnology marginal land restoration the formulation of microbial inoculants the enhancement of crop productivity and the mitigation of global warming gases Finally various uses for microbial resources in crop disease management bioenergy production and income based on microbial cultivation are explored Highlights the developments and achievements of microbial resources and their role in the sustainable management of soil fertility and agriculture productivity Outlines the role of microbial resource and biotechnology in sustainability to industry agriculture forest and management of environment Provides up to date information on the application of microbial resources and the role of biotechnology to meet the ever increasing demand of food soil and plant productivity management Outlines enhancement in productivity through interventions of microbial bio agents and eco friendly technology

New and Future Developments in Microbial Biotechnology and Bioengineering Joginder Singh Panwar,Praveen Gehlot,2020-08-19 New and Future Developments in Microbial Biotechnology and Bioengineering Recent Advances in Application of Fungi and Fungal Metabolites Applications in Healthcare presents an account of recent development and applied aspects of fungi and its metabolites in the healthcare sector Chapters are written by eminent researchers emphasizing the incredible role of fungi and its metabolites in the field of medicine This book offers reference material to all mycologists working on the exploration and usage of medicinal aspects of fungi and fungal metabolites Introduces the aspects and advances of fungi and fungal metabolites in healthcare Includes a description of traditional uses and modern practices on how to harness the potential of fungi and its metabolites in healthcare applications Provides details surrounding the use of fungi and its metabolites in medical purposes Describes potential manifold prospects of fungi and fungal metabolites

Integrated Organic Farming Systems: Approach for Efficient Food Production and Environmental Sustainability Subhash Babu,Sanjay Singh Rathore,Vinod Kumar Singh,Raghavendra Singh,2023-10-24 Researchers and policy planners are in search of a solution to address the twin challenges of maximizing agricultural production while maintaining improving ecosystem sustainability Enhancing farm productivity is needed in certain regions of the world to satisfy local food consumption and farmers needs Linear economy based input intensive conventional agriculture CAPS has increased production output but has not made agriculture more sustainable Henceforth a farming system that aims to reduce the adverse impact on the environment as well as enhance agricultural productivity by reducing environmental footprint and improving soil health and economic wellbeing is needed in the present day Integrated organic farming systems IOFS involve residue recycling bio intensive cropping high tech horticulture mushroom dairy poultry fishery apiary etc can improve the ecosystem health and augment the income and

livelihood security of the growers Worldwide IOFS are gaining popularity due to improved ecosystem services and improving farm productivity and livelihood security Hence IOFS a circular economy based reuse recycle repair agricultural production system can be alternatives to energy intensive inputs based on CAPS Hence there is an urgent need to select suitable IOFS models with proper resource optimization for productivity maximization and better ecosystem sustainability Undoubtedly IOFS reduces energy use from synthetic agrochemicals but food production in IOFS is highly dependent on fossil fuel energy that must be addressed urgently Despite the enormous positive outlooks there are several challenges in the adoption of IOFS models The IOFS is a multiproduct oriented production system that needs multi specialties and marketing Capacity building and infrastructure development are also great challenges in adopting IOFS Moreover the development of IOFS models is highly individualistic and location specific production systems need proper resource optimization and characterization Hence the development of site specific IOFS models to maintain food quality with productivity improvement is a genuine issue to the researchers which needs to be addressed Papers original research review letter to the editors spanning across the discipline related to the IOFS development in sustainable ways are encouraged for inclusion in this research topic Papers should explicitly cover ecosystem restoration farm productivity and profitability and could have a specific focus on the following areas the IOFS models for enhancing productivity and environmental quality through an integrated management approach aiming at the maximization of use efficiencies the management of biomass waste to restore the soil fertility and ecosystem services the effect of integrated management practices on greenhouse gas emissions and energy use Critical approaches for climate smart food production systems

Fungal Endophytes in Plants Gary A. Strobel, 2018-10-11 This book is a printed edition of the Special Issue Fungal Endophytes in Plants that was published in JoF

Recent Advancement in White Biotechnology Through Fungi Ajar Nath Yadav, Shashank Mishra, Sangram Singh, Arti Gupta, 2019-03-08 White

biotechnology or industrial biotechnology as it is also known refers to the use of living cells and or their enzymes to create industrial products that are more easily degradable require less energy create less waste during production and sometimes perform better than products created using traditional chemical processes Over the last decade considerable progress has been made in white biotechnology research and further major scientific and technological breakthroughs are expected in the future Fungi are ubiquitous in nature and have been sorted out from different habitats including extreme environments high temperature low temperature salinity and pH and may be associated with plants epiphytic endophytic and rhizospheric The fungal strains are beneficial as well as harmful for human beings The beneficial fungal strains may play important roles in the agricultural industrial and medical sectors The fungal strains and their products enzymes bioactive compounds and secondary metabolites are very useful for industry e g the discovery of penicillin from *Penicillium chrysogenum* This discovery was a milestone in the development of white biotechnology as the industrial production of penicillin and antibiotics using fungi moved industrial biotechnology into the modern era transforming it into a global industrial technology Since then

white biotechnology has steadily developed and now plays a key role in several industrial sectors providing both high value nutraceutical and pharmaceutical products The fungal strains and bioactive compounds also play an important role in environmental cleaning This volume covers the latest developments and research in white biotechnology with a focus on diversity and enzymes

Endophytes of Forest Trees Anna Maria Pirttilä,A. Carolin Frank,2018-06-19 Endophytes are commonly known as microorganisms mainly bacteria and fungi which live inside plant tissues without inducing symptoms Considering the long lived trees endophytes have a fundamental role in preparing their hosts to face extreme weather conditions drought heat cold and pathogen and herbivore attacks The current knowledge clearly demonstrates the importance of endophytes in shaping the plant diversity in a forest Endophytes have an important capacity for biocontrol of forest diseases Considering endophyte diversity and the range of various compounds and enzymes they can produce endophytes can be used for various biotechnological applications

Nanotechnological Approaches in Food Microbiology Sanju Bala Dhull,Prince Chawla,Ravinder Kaushik,2020-12-27 Nanotechnology has gained attention in all aspects of modern science having vital applications in the food chain storage quality monitoring processing preservation and packaging The global population is increasing rapidly therefore there is a requirement to produce food products in a more proficient non toxic and sustainable way Food scientists and microbiologists are interested in food safety and quality assurance to produce excellent quality food free of food pathogens Nanotechnological Approaches in Food Microbiology provides a systematic introduction and comprehensive information about practical approaches and characteristic features related to the significant applications of nanotechnology in food microbiology including nano starch films nanoemulsions biogenic nanoparticles and nanocapsules The book will explore details about metal nanoparticle synthesis characterization mathematical modeling kinetic studies and their antimicrobial approaches Key Features Includes comprehensive knowledge on metal nanoparticle synthesis characterization mathematical modeling kinetic studies and their antimicrobial approaches Lays out concepts of essential oil nanoemulsion and their potential antimicrobial applications Deals with the latest development in nano starch composite biofilms containing bioactive constituents to inhibit pathogenic microbes Explores the nanocapsules as potential antimicrobial agents in food Provides information regarding new biogenic nano antimicrobials developed for the food safety and quality assurance This book will educate readers on the aspects of nanotechnology in food safety and quality assurance Nanoemulsions nanohydrogels metal nanoparticles nano starch films nanocapsules and nano antimicrobials are the emerging essentials of nanotechnology that are used to preserve the food at greater extent This book should be of interest to a large and varied audience of researchers in academia industry food processing preservation packaging microbiology and policy regulations

Biocontrol Mechanisms of Endophytic Microorganisms E.K. Radhakrishnan,Ajay Kumar,R. Aswani,2021-11-23 Biocontrol Mechanisms of Endophytic Microorganisms introduces endophytic microorganisms colonization diversity and distribution describes the isolation and identification of endophytic

microorganisms by traditional cultivation and by next generation sequencing technologies and covers biocontrol mechanisms bacterial priming endophytic based methods the significance on fungi and metabolite based formulations The book concludes with chapters on biofilms microbiota and safety issues of microorganisms The intensive use of chemicals to control these plant pathogens has resulted in negative consequences such as the release of toxic chemicals in the environment reduced soil fertility and human health problems Therefore environmentally friendly and sustainable replacement of chemical fertilizers or pesticides is highly challenging Contains exclusive information about research on immunogenetics going on all over the world Includes all the minute and recent details that will be the prerequisite requirement for any researcher who wants to work on immunogenetics and its applications Comes fully equipped with pictures illustrations and tables delivering the information in a meticulous manner that makes it more attractive to readers

Modern Tools and Techniques to Understand Microbes Ajit Varma, Arun Kumar Sharma, 2017-04-21 This book provides essential molecular techniques and protocols for analyzing microbes that are useful for developing novel bio chemicals such as medicines biofuels and plant protection substances The topics and techniques covered include microbial diversity and composition microorganisms in the food industry mass cultivation of sebacinales host microbe interaction targeted gene disruption function based metagenomics to reveal the rhizosphere microbiome mycotoxin biosynthetic pathways legume rhizobium symbioses multidrug transporters of yeast drug resistant bacteria the fungal endophyte *Piriformospora indica* medicinal plants arbuscular mycorrhizal fungi biosurfactants in microbial enhanced oil recovery and biocontrol of the soybean cyst nematode with root endophytic fungi as well as microbe mediated drought tolerance in plants

Plant Biotechnology: Progress in Genomic Era S. M. Paul Khurana, Rajarshi Kumar Gaur, 2019-11-14 Refinement in sequencing technologies and potential of genomic research resulted in meteoric growth of biological information such as sequences of DNA RNA and protein requiring databases for efficient storage management and retrieval of the biological information Also computational algorithms for analysis of these colossal data became a vital aspect of biological sciences The work aims to show the process of turning bioscience innovation into companies and products covering the basic science the translation of science into technology Due to rapid developments there seems to be no basic difference between the pharmaceutical industry and the biotechnological industry However approved products in the pipeline and renewed public confidence make it one of the most promising areas of economic growth in the near future India offers a huge market for the products as well as cheap manufacturing base for export The book is a sincere work of compilation of new and recent advances in the topic of concern through various innovative researches and scientific opinion therefrom The book is dedicated to the readers who will definitely find it interesting and knowledgeable in carrying out their respective researches in different aspects of applied microbiology and biotechnology

Microbes in Agri-Forestry Biotechnology Gustavo Molina, Zeba Usmani, Minaxi Sharma, Abdelaziz Yasri, Vijai Kumar Gupta, 2022-09-22 This book explores recent advances on the use of microbes for agri forestry biotechnological applications

It provides technical concepts and discussions on the use of microorganisms for processes such as bioprocessing bioremediation soil enhancement aquaponics advances and plant host symbiosis The book provides an overview of the microbial approach to the tools and processes used in agriculture and forestry that make or modify products improve plants for specific uses and make use of livestock in agricultural systems The authors discuss the main process conditions that enhance agri forestry applications with the use of microbes and introduce the use of genetically modified GM microbes in agrobiotechnology Finally the authors explore the main technological advances in the production of secondary metabolites with potential applications in agri forestry This book is intended for biotechnologists biologists bioengineers biochemists microbiologists food technologists enzymologists and related researchers

Microbial Biostimulants for Plant Growth and Abiotic Stress Amelioration Puneet Singh Chauhan, Nikita Bisht, Renuka Agarwal, 2024-06-19 Microbial Biostimulants for Plant Growth Development and Abiotic Stress Amelioration provides readers with insights into the major role of biostimulants in plant growth and development while under abiotic stress The term biostimulants is broadly used to reference a group of diverse substances and microorganisms that stimulate life or that promote favorable plant responses They stimulate natural processes to enhance benefit nutrient uptake nutrient efficiency tolerance to abiotic stress and crop quality Many biostimulants improve nutrition and they do so regardless of their own nutrient contents Further recently microbe based biostimulants have emerged as important plant protectors under a range of adverse conditions Microbial Biostimulants for Plant Growth Development and Abiotic Stress Amelioration is the latest volume in the Biostimulants and Protective Biochemical Agents series Presents the potential for more environmentally sustainable interventions against abiotic stresses Highlights the variety of applications for which biostimulants are proving effective Includes coverage of commercialization and role in addressing Sustainability Development Goals

Endophyte Biology Zahoor Ahmed Wani, Masroor Qadri, Palak Arora, Khalid Rehman Hakeem, 2022-10-27 This volume Endophyte Biology Recent Findings from the Kashmir Himalayas is a unique compilation of the original latest and updated information on endophyte biology of the Kashmir Himalayas The book presents an introduction to and definition of endophytes the endophytic diversity of some important plants of the Kashmir Himalayas bioprospection of endophytes for various drug metabolites sustainable agriculture and more This book discusses the applications of endophytes in the agriculture aroma and pharmaceutical industries Endophyte biology the study of microorganisms often fungi and bacteria which live within living plant tissues is an emerging discipline of science with a multitude of applications in ecology agriculture and industry Despite having huge diversity of plants the information about the endophyte biology is still in its infancy in this part of the world and this book is an attempt to bridge the information gap on endophyte biology pertaining to the Kashmir Himalayas This book will serve as a manual for research scholars as it presents the methodologies and techniques involved in endophyte biology research that can be applied in other regions of the world Supplemented with illustrations figures and tables the volume is a valuable reference

for teachers and students at graduate and undergraduate level in colleges and universities as well as for scientists researchers and others

Endophytes Ravindra H. Patil,Vijay L. Maheshwari,2021-03-25 This book describes the various therapeutic and commercial applications of compounds produced by endophytes Endophytes are microorganisms that reside in the living internal tissues of plants without showing any apparent symptom of their presence During their life cycle they establish a symbiotic or parasitic relationship with the host plant The book discusses different kinds of compounds that these endophytes produce and their potential properties such as antimicrobial anti oxidative anti inflammatory anticancer neutraceutical immunomodulatory etc Other prospects of entophytic biology such as fungi of wild and domesticated crop plants and their applications in sustainable agriculture have also been included The book also provides details about various techniques used in endophyte research metabolite detection and bioactivity based assays to explore endophytes Endophytes with phytohormones producing potential and their role in plant microbial interactions under stress are also discussed The book also highlights novel strategies to tap into the hidden potential of endophytic fungi for the production of novel biomolecules using an integrated approach These microorganisms have attracted a lot of scientific attention worldwide because of their huge potential for novel phytochemicals pharmaceuticals and lead compounds Hundreds of new novel endophytic fungi have been isolated identified and systematically studied in last decade However this is the first of its kind systematic compilation of potential biotechnological applications of endophytic compounds Chapter contributions from groups across the globe make this book very up to date and informative This book is very useful and interesting for students and researchers in the field of microbiology plant sciences mycology and pharmacology It is also helpful for industry experts working on developing novel compounds

Endophytic Fungi Ahmed M. Abdel Azeem,Ajar Nath Yadav,Neelam Yadav,2024-08-07 Endophytic Fungi The Full Story of the Untapped Treasure covers the developments in endophytic fungal research from beginning to the end by the eminent researchers involved in the field It sheds light on the endophytic fungal current research challenges and future possibilities the trending recent topics in the plant fungal endophytes biodynamics for sustainable development of bioproducts and its applications are supported in large scale biosynthesis of industrially and pharmaceutical important biomolecules Endophytic Fungi The Full Story of the Untapped Treasure highlights the bioprospecting and applied aspects of endophytic fungal communities from diverse hosts and discusses the practical applications of such endophytes in detail It also reviews recent strategies on alternative sustainable sources of medicines such as secondary metabolites of fungi instead of over collection of plants under prohibiting of biodiversity conventions The uniqueness of this book is the inclusion of updated bioinformatics based strategies and its importance in bioactive molecules produced by endophytic fungi The book addresses one of the most eminent issues in this field how to translate the potential that endophytic fungi hold in stable practical application Covers major concepts of plant fungi interaction biodiversity of endophytic fungi from diverse and biotechnological applications for sustainable development Is extensively illustrated and

clearly written using easy to understand language sharing the latest developments and potential of fungal products for various applications Sheds light on the endophytic fungal current research challenges and future possibilities **Medicinal Plants as Anti-infectives** Francois Chassagne,2022-03-31 Medicinal Plants as Anti infectives Current Knowledge and New Perspectives provides comprehensive and updated data on medicinal plants and plant derived compounds used as antimicrobials in a range of locations such as the Balkans Colombia India Lebanon Mali Pakistan Southeast Asia South Africa and West Africa It also provides an overview on the most recent innovations and regulations in the field of drug discovery from ethnobotanical sources This book will help readers to better appreciate the role of plants and phytomedicines as anti infectives to better assess the health benefits of plant derived products to help implement new methodologies for studying medicinal plants and to guide future researchers in the field Medicinal Plants as Anti infectives Current Knowledge and New Perspectives is a valuable resource for students academic scientists and researchers from the fields of ethnobotany pharmacy medicinal chemistry and microbiology as well as for professionals working in national or international health agencies or in pharmaceutical industries Provides an overview of new methods and tools developed in the field of drug discovery from ethnobotanical sources e g DNA barcoding metabolomics quorum quenching Contains real world insights from experts in the field Presents specific research program results to inspire further research in additional regions

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