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PGPR: Biocontrol and Biofertilization - Zaki Anwar Siddiqui 2006-01-19

PGPR have gained world wide importance and acceptance for agricultural benefits. These microorganisms are the potential tools for

sustainable agriculture and the trend for the future. Scientific researches involve multidisciplinary approaches to understand adaptation of PGPR to the rhizosphere, mechanisms of root colonization, effects on plant physiology and growth,

biofertilization, induced systemic resistance, biocontrol of plant pathogens, production of determinants etc. Biodiversity of PGPR and mechanisms of action for the different groups: diazotrophs, bacilli, pseudomonads, and rhizobia are shown. Effects of physical, chemical and biological factors on root colonization and the proteomics perspective on biocontrol and plant defence mechanism is discussed. Visualization of interactions of pathogens and biocontrol agents on plant roots using autofluorescent protein markers has provided more understanding of biocontrol process. Commercial formulations and field applications of PGPR are detailed.

The Complete Technology Book On Bio-Fertilizer And Organic Farming - Niir Board 2004-10-01

Bio-Fertilizers are natural fertilizers which are microbial inoculants of

bacteria, algae, fungi alone or in combination and they augment the availability of nutrients to the plants. The use of bio-fertilizers, in preference to chemical fertilizers, offers economic and ecological benefits by way of soil health and fertility to farmers. In view of the immense potential of bio-fertilizer technology covers all major types of bacterial fertilizers. This book will be of use and interest to consultants, researchers, libraries, entrepreneurs, manufacturers of bio-fertilizer and for those who wants to venture in to this field.

Biofertilizers - Amitava Rakshit 2021-03-24

Biofertilizers, Volume One: Advances in Bio-inoculants provides state-of-the-art descriptions of various approaches, techniques and basic fundamentals of BI used in crop fertilization practices. The book presents research within a relevant theoretical framework to

improve our understanding of core issues as applied to natural resource management. Authored by renowned scientists actively working on bio-inoculant, biofertilizer and bio-stimulant sciences, the book addresses the scope of inexpensive and energy neutral bio-inoculant technologies and the impact regulation has on biofertilizer utilization. This book is a valuable reference for agricultural/environmental scientists in academic and corporate environments, graduate and post-graduate students, regulators and policymakers. Informs researchers on how to develop innovative products and technologies that increase crop yields and quality while decreasing agricultural carbon footprints Focuses on production, protocols and developments in the processing of bio-inoculants, bio-stimulants and bio-fertilizers Summarizes the

biologically active compounds and examines current research areas *Biofertilizers and Biopesticides in Sustainable Agriculture* - B. D. Kaushik 2019-10-23

This new volume, *Biofertilizers and Biopesticides in Sustainable Agriculture*, presents strategies for the management of soil and crop diseases. Microbes have attracted worldwide attention due to their role in disease management and remediation of polluted soils. Taking a sustainable approach, this book explores the means of integrating various microbial management approaches to achieve the desired levels of crop yield under both conventional soils and neglected soils through the use of biopesticides and other botanicals as well as biomolecules. This book also presents a broad and updated view of molecular nitrogen fixation and phosphate-solubilizing and

sulfur-transforming microbes for nutrition of crops in relation to the role of metal tolerant microbes in providing protection to plants grown in metal-contaminated soils. The preparation and application of biofertilizers, utilization of household waste materials, and use of genetically modified microorganisms (GMOs) in plant growth and development are also well discussed in the volume.

Endophytes: Mineral Nutrient Management, Volume 3 - Dinesh Kumar Maheshwari 2021-03-04

The challenges to meet the food requirement of the burgeoning population and stabilized productivity of agriculture lands can only be met by a second green revolution. After steadily declining for over a decade hunger is on the rise again, affecting million people of the global population. Therefore, crop yields must be increased substantially over the coming decades to keep pace with global food

demand. The plant rhizosphere is a multidimensional and dynamic ecological environment of complicated microbe-plant interactions for harnessing essential macro and micronutrients from a limited nutrient pool. This book will showcase naturally-occurring endophyte which can be explored for nutrient mineralization and mobilization for sustainable agriculture. This will cover recent trends, prospects, critical commentaries and advancement in the research area focusing on naturally-occurring beneficial endophytic microbes. Thus, it is proposed to bring out new scientific insights and frontiers of research that have exploration of endophyte for mineral nutrient management in soil and crops. The chapters are contributed by leading scientists across the globe. The book will be useful to agronomists,

microbiologists, ecologists, plant pathologists, molecular biologists, environmentalists, policy makers, conservationists, and NGOs working for the crop production and productivity development and consequently over all agricultural significance. *Microbiota and Biofertilizers, Vol 2* - Gowhar Hamid Dar 2021-03-31

The dependence of present farming on artificial input of “chemical fertilizers” has caused numerous ecological tribulations associated with global warming and soil contamination. Moreover, there is an essential requirement for realistic agricultural practices on a comprehensive level. Accordingly, biofertilizers including microbes have been recommended as feasible environmentally sound solutions for agricultural practices which not only are natural, and cost-effective but also preserve soil environs and important biota of

agricultural land. In addition, it enhances the nutrient quantity of soils organically. Microbial biofertilizers promote plant growth by escalating proficient absorption of nutrients for the plants and by providing an excellent disease-fighting mechanism. Agriculture, the backbone of human sustenance, has been put under tremendous pressure by the ever-increasing human population. Although various modern agro-techniques boosted agricultural production, the excessive use of synthetic fertilizers, pesticides and herbicides have proven extremely detrimental to agriculture as well as to the environment in which it is carried out. Besides this some faulty agricultural practices like monoculture and defective irrigation, further complicate the scenario by eliminating biodiversity, increasing the efflux of nutrients into the water bodies, the formation of algal blooms,

eutrophication, damaging the water quality and lowering fish stocks. Biofertilizers are the organic compounds applied to crops for their sustainable growth and the sustainability of the environment as the microbiota associated with biofertilizers interact with the soil, roots and seeds to enhance soil fertility. Application of biofertilizers results in the increased mineral and water uptake, root development, vegetative growth and nitrogen fixation besides liberating growth-promoting substances and minerals that help the maintenance of soil fertility. They further act as antagonists and play a pivotal role in neutralising soil-borne plant pathogens and thus, help in the bio-control of diseases. Application of biofertilizers instead of synthetic fertilizers could be a promising technique to raise agricultural productivity without degrading environmental quality. The

present book focuses on the latest research approaches and updates from the microbiota and their applications in the agriculture industry. We believe this book addresses various challenges and shed lights on the possible future of the sustainable agricultural system.

Facts for Liquid

Biofertiliser - Dr. Umesh Chandra Mishra 2015-06-19 Facts for Liquid Biofertiliser is for all those who can help to undertake the greatest communication challenge of all the challenges of empowering far to use today's knowledge to protect today's soil fertility and tomorrow's India and developing world in the new millennium. Every year, a million hectares of land degrades in the developing world, due to degradation of soil health and lower fertility status. A fundamental cause of this tragedy is lack of awareness. Today's knowledge about protecting the health and fertility of soil

has not been put at the disposal of majority of the farmers. Today, there is a worldwide (100) scientific consensus on soil health information. It is the information, which can help to save the million hectares of soil from excess use of chemical fertilizer in the developing world in eco-friendly way. It is information, which can drastically reduce the import of raw materials for chemical fertilizers and help to protect the interest of small and marginal farmers efficiently, cost effectively and economical way. "Facts for Liquid Biofertiliser" is therefore intended for all those who influence or control the principal channels of communication challenge to all head of agricultural universities, colleges, liquid biofertiliser producers, mass, and social media.

Microbes as Bio-fertilizers and their Production Technology - S. G. Borkar
2015-06-02

Microbes as Bio-Fertilizers and their Production Technology is a step forward in the direction of research, testing, and development of new effective strains of beneficial microbes and their production technologies. This book highlights the methods of isolation of several beneficial microbes of different utility, specialization culture media, distinguishing characteristics of these microbes, testing their efficiencies, and large scale production technologies. It is a unique book in which beneficial microbial bio-fertilizers are included.

Biofertilizers and Biofungicides - Ghazala Yaqub 2017-11

Chemical fertilizers are widely used with the purpose to enhance output in various product varieties in agriculture. As, chemical fertilizers are the biggest reason of posing pollution to the water bodies, ground water, and also

bioaccumulates in crops hence badly destroying ecological cycles. Therefore, modern scientists are focusing to switch completely from chemical farming to organic farming in order to encourage sustainable agriculture. In organic farming crops are not polluted as they grow through use of manures, biofertilizers and biopesticides which not only provides optimum nutrients to plants but also keep pests and pathogens in control. Biofertilizers are actually "microorganisms which bring roughly nutrient enrichment of soil through enhancing the availability of nutrients to plant crops". These micro-organisms who exhibit the ability to act as bio-fertilizers are the bacteria, cyanobacteria and mycorrhizal fungi. Biofertilizers provides considerable potent benefits to agriculture as well as public health programmes. Both developing and developed countries have a

vast potential for biofertilizers. However, their adoption by farmers especially in developing countries needs education for maximizing benefits. The stress on organic farming as well as on residue free materials would certainly merit enhanced adoption of biofungicides by the farmers. The use of fungicides reduces crop productivity loss because the chemically synthesized pesticides are no doubt quick in their effect but on the other hand they cause so many environmental and health just as revival of new pests, fungal resistance, loss of soil fertility and persistence of toxic substances when they are consumed by animals and humans. All these problems call for an eco-friendly and sustainable approach in order to decrease the usage and dependence of chemically synthesized fertilizers and pesticides. Similarly, there are so many natural fungicides that can

be best alternatives to control fungi and enhancing plant life. Thus, the purpose of this book is to provide that knowledge about recent advancements in the emerging fields of Biofertilizers and Biofungicides as both of them are considered to be ecofriendly as well as sustainable substitutes to chemical fertilizers and fungicides respectively. Chapter 1- 10 discusses all aspects of biofertilizers with special focus on recent advances in this technology while Chapter 11- 14 are about Biofungicides, their applications and recent advances in this field of organic farming.

Biofertilizers, Potentialities and Problems - S. P. Sen 1988

New Perspectives and Approaches in Plant Growth-Promoting Rhizobacteria Research - P.A.H.M. Bakker 2010-04-02
In the context of increasing

concern for food and environmental quality, use of Plant Growth-Promoting Rhizobacteria (PGPR) for reducing chemical inputs in agriculture is a potentially important issue. This book provides an update by renowned international experts on the most recent advances in the ecology of these important bacteria, the application of innovative methodologies for their study, their interaction with the host plant, and their potential application in agriculture.

Biofertilizers - Inamuddin 2021-08-02

Great attention has been paid to reduce the use of conventional chemical fertilizers harming living beings through food chain supplements from the soil environment. Therefore, it is necessary to develop alternative sustainable fertilizers to enhance soil sustainability and agriculture productivity. Biofertilizers are the substance that contains

microorganisms (bacteria, algae, and fungi) living or latent cells that can enrich the soil quality with nitrogen, phosphorous, potassium, organic matter, etc. They are a cost-effective, biodegradable, and renewable source of plant nutrients/supplements to improve the soil-health properties. Biofertilizers emerge as an attractive alternative to chemical fertilizers, and as a promising cost-effective technology for eco-friendly agriculture and a sustainable environment that holds microorganisms which enhance the soil nutrients' solubility leading a raise in its fertility, stimulates crop growth and healthy food safety. This book provides in-depth knowledge about history and fundamentals to advances biofertilizers, including latest reviews, challenges, and future perspectives. It covers fabrication approaches, and various types of biofertilizers

and their applications in agriculture, environment, forestry and industrial sectors. Also, organic farming, quality control, quality assurance, food safety and case-studies of biofertilizers are briefly discussed. Biofertilizers' physical properties, affecting factors, impact, and industry profiles in the market are well addressed. This book is an essential guide for farmers, agrochemists, environmental engineers, scientists, students, and faculty who would like to understand the science behind the sustainable fertilizers, soil chemistry and agroecology.

Bioformulations: for Sustainable Agriculture -
Naveen Kumar Arora
2016-06-06

More than a century has passed since the first bioformulations were introduced to the market. But there is still much to be done, explored and developed. Though

bioformulations offer green alternatives and are important for sustainable agriculture, they make up only a small fraction of the total additions used to enhance crop yields or protect them from pests. There is a great need to develop bioformulations that can promote confidence among end users; accordingly, it is imperative that bioformulations to replace chemicals be reliable and overcome the shortcomings of the past. Bioformulations: for Sustainable Agriculture discusses all the issues related to the current limitations and future development of bioformulations. It examines in detail those bioformulations that include biofertilizers and biopesticides (also commonly known as bioinoculants), presenting a global picture of their development. Further chapters address diverse microbes that are already

being or could be used as bioformulations. The book also discusses the techniques, tools and other additions required to establish bioformulations as trustworthy and global solutions. It assesses the types of bioformulations currently available on the market, while also considering the future roles of bioformulations, including the reclamation of marginal and polluted soils. Further, it discusses the current legislation and much-needed amendments. Overall the book provides a comprehensive outlook on the status quo of bioformulations and the future approaches needed to improve them and achieve sustainable agriculture and food security without sacrificing the quality of soils. This will be extremely important in offering chemical-free foods and a better future for generations to come.

Biomolecular Engineering Solutions for Renewable

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Specialty Chemicals - R.

Navanietha Krishnaraj

2021-12-09

Discover biomolecular engineering technologies for the production of biofuels, pharmaceuticals, organic and amino acids, vitamins, biopolymers, surfactants, detergents, and enzymes In Biomolecular Engineering Solutions for Renewable Specialty Chemicals, distinguished researchers and editors Drs. R. Navanietha Krishnaraj and Rajesh K. Sani deliver a collection of insightful resources on advanced technologies in the synthesis and purification of value-added compounds. Readers will discover new technologies that assist in the commercialization of the production of value-added products. The editors also include resources that offer strategies for overcoming current limitations in biochemical synthesis, including purification. The articles within cover topics like the rewiring of

anaerobic microbial processes for methane and hythane production, the extremophilic bioprocessing of wastes to biofuels, reverse methanogenesis of methane to biopolymers and value-added products, and more. The book presents advanced concepts and biomolecular engineering technologies for the production of high-value, low-volume products, like therapeutic molecules, and describes methods for improving microbes and enzymes using protein engineering, metabolic engineering, and systems biology approaches for converting wastes. Readers will also discover: A thorough introduction to engineered microorganisms for the production of biocommodities and microbial production of vanillin from ferulic acid Explorations of antibiotic trends in microbial therapy, including current approaches and future prospects, as well as

fermentation strategies in the food and beverage industry Practical discussions of bioactive oligosaccharides, including their production, characterization, and applications In-depth treatments of biopolymers, including a retrospective analysis in the facets of biomedical engineering Perfect for researchers and practicing professionals in the areas of environmental and industrial biotechnology, biomedicine, and the biological sciences, Biomolecular Engineering Solutions for Renewable Specialty Chemicals is also an invaluable resource for students taking courses involving biorefineries, biovalorization, industrial biotechnology, and environmental biotechnology.

Biofertilizers Technology

- Kannaiyan, S. 2010-06-01 Rice based cropping system is the major cropping system practised in India which includes the rotation

of crops involving rice, pulses, oil seeds, cotton, sugar cane, green manures etc., The rice based cropping system offers lot of scope for the effective utilization of a wide range of biofertilizers such as Azolla, BGA, Azospirillum, Rhizobium Gluconacetobacter diazotrophicus and other heterotrophic N₂ fixing bacteria which help to increase the yield by reducing the cost of cultivation. It thus has dual advantages of being sustainable without endangering the environment and being highly cost effective. This book 'Biofertilizer Technology for Rice Based Cropping System' deals with the current developments in the basic and applied aspects of biofertilizers used in the rice based cropping including the novel endophytic diazotrophs viz., Azorhizobium caulinodans, Gluconacetobacter diazotrophicus, Pink

Pigmented Facultative Methylo trophs (PPFM) etc. The role of P, Zn and Si solubilizers in the nutrient dynamics of the rice ecosystem has also been covered. The strategies for production and distribution of quality inoculants for rice based cropping system has been given due importance with a focus on the molecular approaches for rapid and reliable quality control of biofertilizers. This book can be considered as a monograph on the usage of biofertilizers in rice based cropping system. It will be very useful for the scientists, researchers, students and extension workers involved in the management of crops in rice based cropping system .

Microbial Biofertilizers and Micronutrient Availability - Shams Tabrez, Khan
2021-12-06

This volume addresses various issues related to micronutrient deficiency, especially zinc, and discusses the possible

approaches for combating mineral deficiency among humans and plants. The book mainly focuses on the zinc biofortification of vegetable and cereal crops and highlights the consequences of zinc deficiency and the health risks associated with zinc deficiency, especially in children and expecting mothers. The authors discuss different types of food that are rich in zinc and other minerals, how diets can be designed to meet the daily zinc requirements, and the impact of zinc deficiency on plant health and quality of agricultural products and the role of micronutrients in abiotic stress tolerance. The book also covers sustainable approaches to zinc biofortification in crops, such as the microbial solubilization of zinc in soil to improve zinc uptake by plants, and the formulation of these microbes into biofertilizers. The book will be of interest to dieticians, agricultural scientists,

students and microbiologists.

Biofertilizers in Agriculture - Nanjappa Shamanna Subba Rao 1988

Microbiota and Biofertilizers - Khalid Rehman Hakeem 2021-01-08

An increasing population has put tremendous pressure on agricultural productivity to fulfill the demands of human consumption. Numerous agricultural activities and techniques have been developed to raise annual crop production globally. While agriculture has succeeded in enhancing the yearly crop productivity, this achievement is at the cost of environmental degradation by applying synthetic persistent substances, such as industrial fertilizers, pesticides, herbicides, etc. Chemical fertilizers are nearly as destructive as they are productive, causing monocultures and consequences associated with elimination of diversity,

nutrient pollution as evidenced by algae blooms, eutrophication, water quality issues, lower oxygen levels and dangers to fish stocks. Therefore, the scientific approach to maintain sustainable fertility in soil and plants is to switch over to biofertilisers. Biofertilisers are compounds of organic matter that are applied to crops for growth and health. Their constituent micro-organisms interact in an ecofriendly manner with the soil, root and seeds of plants, promoting the growth of micro-flora that enhances soil fertility. They are known to play a number of vital roles in soil fertility, crop productivity and production in agriculture. Application of biofertilisers results in increased mineral and water uptake, root development, vegetative growth and nitrogen fixation. They liberate growth promoting substances and vitamins and help to maintain soil fertility. They act as

antagonists and play a pivotal role in neutralising the soil borne plant pathogens, thereby assisting in the bio-control of diseases. Application of biofertilisers in lieu of synthetic fertilizers could be the promising technique to raise agricultural productivity without degrading the environmental quality. The present book focuses on the latest research approaches and updates from the microbiota ecosystem and their applications in agriculture industry. It also highlights the great potential and possible future of action of microbiota in the development of sustainable agricultural systems.

Hand Book Of Biofertilizers & Vermiculture - 2007

The Book Hand Book Of Biofertilizers & Vermiculture Covers Various Methods Including The Living Soil, Organic Sources And Dynamics, Vermiculture, Application Of Vermiculture Biotechnology, Composting

Of Agricultural And Industrial Wastes, Biological Fertilizers, Microbial Inoculants For Nitrogen Fixation, Mechanism And Estimation Of Nitrogen Fixation, Biological Mobilization Of Phosphorus, The Cyclic System Of Nutrient Management, Perspectives, List Of Bio-Fertilizers Units In India And Abroad, Plant Economics Of Agrofertilizer From Leaves, Plant Economics Of Biofertilizers From Chicken Refuges, Oil Cakes, Bone Mills, Plant Economics Of Biofertilizers From Cowdung & Other Wastage, Plant Economics Of Biofertilizers (Organic Fertilizers) From Garbage (Msw), Plant Economics Of Organic Manure, Plant Economics Of Sea Weed Liquid Fertilizer, Plant Economics Of Vermicomposting. The Book Has Been Written For The Benefit And To Prove An Asset And A Handy Reference Guide In The Hands Of New Entrepreneurs And Well

Established Industrialists.

Recent Advances in Biofertilizers and Biofungicides (PGPR) for Sustainable Agriculture -

Patricio S. Faylon

2014-11-10

Global concern over the demerits of chemicals in agriculture has diverted the attention of researchers towards using the potential of PGPR in agriculture. This book contains many useful and important research papers pertaining to the use of bio-fertilizers and bio-fungicides for sustainable agriculture. This volume is presented in an easy-to-understand manner, with well-illustrated protocols on the production to commercialization of PGPR. The chapters on commercial potential, trade and regulatory issues among Asian countries are worthwhile additions. As such, this book will prove useful for students, researchers, teachers, and entrepreneurs in the area of PGPR and its allied fields.

Biofertilisers in Action - Ivan R. Kennedy 2002

Microbiota and Biofertilizers - 2021

The dependence of present farming on artificial input of chemical fertilizers has caused numerous ecological tribulations associated with global warming and soil contamination. Moreover, there is an essential requirement for realistic agricultural practices on a comprehensive level. Accordingly, biofertilizers including microbes have been recommended as feasible environmentally sound solutions for agricultural practices which not only are natural, and cost-effective but also preserve soil environs and important biota of agricultural land. In addition, it enhances the nutrient quantity of soils organically. Microbial biofertilizers promote plant growth by escalating proficient absorption of nutrients for the plants and by providing

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an excellent disease-fighting mechanism. Agriculture, the backbone of human sustenance, has been put under tremendous pressure by the ever-increasing human population. Although various modern agro-techniques boosted agricultural production, the excessive use of synthetic fertilizers, pesticides and herbicides have proven extremely detrimental to agriculture as well as to the environment in which it is carried out. Besides this some faulty agricultural practices like monoculture and defective irrigation, further complicate the scenario by eliminating biodiversity, increasing the efflux of nutrients into the water bodies, the formation of algal blooms, eutrophication, damaging the water quality and lowering fish stocks. Biofertilizers are the organic compounds applied to crops for their sustainable growth and the sustainability of the environment as the

microbiota associated with biofertilizers interact with the soil, roots and seeds to enhance soil fertility. Application of biofertilizers results in the increased mineral and water uptake, root development, vegetative growth and nitrogen fixation besides liberating growth-promoting substances and minerals that help the maintenance of soil fertility. They further act as antagonists and play a pivotal role in neutralising soil-borne plant pathogens and thus, help in the bio-control of diseases. Application of biofertilizers instead of synthetic fertilizers could be a promising technique to raise agricultural productivity without degrading environmental quality. The present book focuses on the latest research approaches and updates from the microbiota and their applications in the agriculture industry. We believe this book addresses various challenges and shed

lights on the possible future of the sustainable agricultural system.

The Complete Technology Book on Biofertilizer and Organic Farming (2nd Revised Edition) - NIIR Board 2012-01-01

Biofertilizers are seen as an important alternative technology, since the negative externalities of chemical fertilizers have become well known. The use of the latter has led to considerable environmental cost. Biofertilizers do not pollute the soil and do not disrupt the ecological balance, and hence are environment friendly. An increasing number of farmers are using biofertilizers, and the numbers of biofertilizer manufacturing units have also grown considerably. Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a

way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco friendly pollution free environment. Organic farming has emerged as an important priority area globally in view of the growing demand for safe and healthy food and long term sustainability and concerns on environmental pollution associated with indiscriminate use of agrochemicals. Going organic may be a clear way of getting back to basics and getting away from the havoc chemicals can wreak on our health and our environment but the basics themselves may not be so clear. This book provides the view of immense potential of biofertilizers as a supplementary nutrient source for the crops and

covers all major types of bacterial fertilizers. The major contents of this book is crop response to biofertilizers, nitrogen fixation, phosphate solubilising microorganisms, application and evaluation techniques, biogas production, pest and disease management system in agriculture, production, promotion, quality control, marketing, future research planning, photographs and details of machineries, list of manufacturers and suppliers of biofertilizers and organic farming in directory section. This book will be of use and interest to consultants, researchers, libraries, and entrepreneurs, manufacturers of biofertilizer and for those who wants to venture in to this field.

Innovative Bio-products for Agriculture - Katarzyna Chojnacka 2019

The presented book describes the results of the research of the project titled Phosphorus Renewable Raw

Materials A Resource Base for the New Generation of Fertilizers attributed to the National Center for Research and Development of Poland. This book is divided into three chapters that are assigned to different stages of the project undertaken by different R&D institutions. The concept and possible options of valorization of waste biomass, such as bones, fish bones, and ashes originated from the incineration of sludge from a waste-water treatment plant from the tertiary stage of biological treatment as resources of phosphorus were described by the team from Wroclaw University of Science and Technology. As a method of by-products valorization, the solubilization process was proposed. Two strategies were proposed: Ex-situ and in-situ. The in-situ manner resulted with suspension fertilizer with a low concentration of P₂O₅ while ex-situ gave the possibility to obtain two solid

formulations with the high content of P₂O₅. All of them could be used in agriculture and horticulture as granular fertilizers or as substrates. The different content of P₂O₅, as well as other nutrients in obtained formulations, were described as an effect of utilization of different raw materials as well as various additional substances such as binders necessary for the stability of final formulations. What is more, the efficiency of obtained formulations was strongly related to the kind of microorganism used as an activator of unavailable phosphorus, which was discussed in details. The technology of production for biofertilizers in pilot-scale was described by the Institute of New Chemical Synthesis in Pulawy with the following issues underlined: Design of installation to produce fertilizers based on renewable raw materials; plant construction and production of the product;

and preliminary economic analysis. The University of Warmia and Mazury in Olsztyn described the utilitarian properties of new fertilizer formulations that were evaluated in field tests with special attention to granular and suspension biofertilizer. In that chapter, the major results of the agronomic evaluation of new suspension and granular phosphorus biofertilizers from secondary raw materials (sewage sludge ash, animal bones, and animal blood) were presented. Biofertilizers contained *Bacillus megaterium* or *Acidithiobacillus ferrooxidans* bacteria. New bioproducts were tested in field experiments in reference to traditional commercial phosphorus fertilizers (superphosphate, phosphorite, etc.). The research confirmed that phosphorus biofertilizers from renewable raw materials were similar to commercial fertilizers in

terms of their crop-enhancing efficiency and did not reduce yield quality and quantity.

Microbes in Agriculture and Environmental Development - Chhatarpal Singh 2020-10-27

The collection of essays in *Microbes in Agriculture and Environmental Development* explores the applications of microbes for the improvement of environmental quality and agricultural productivity through inoculants and enzymes. These are useful for the conservation and restoration of degraded natural and agricultural ecosystems, crop yield extension, soil health improvement, and other aspects of agriculture and the environment. It discusses the effective use of microbial technology, wastewater treatment, and recycling of agricultural and industrial wastes. It provides detailed accounts of recent trends in microbial application in plant growth

promotion, soil fertility, microbial biomass and diversity, and environmental sustainability through bioremediation, biodegradation, and biosorption processes

Features: Discusses microbes and their applications for sustainable agriculture and environmental protection in agro-environmental circumstances Presents innovative and eco-friendly approaches for the remediation of contaminated soil and wastewater Focuses on green technologies and sustainability Includes chapters on sustainable agriculture development through increasing soil fertility, physico-chemical properties and soil microbial biomass in nutrient-deprived soils Defines the role of microbial bio formulation-based consortia in the productivity improvement of agricultural crops It will be an invaluable addition to the bookshelves of researchers

and graduate students in agriculture and environmental engineering, soil science; microbiology, sustainable agriculture, and ecosystems. Dr. Chhatarpal Singh is presently the President of Agro Environmental Development Society (AEDS), Majhra Ghat, Rampur, Uttar Pradesh, India. Dr. Tiwari is currently working in the field of methanotrophs ecology (methane oxidizing bacteria), which is sole entity responsible for the oxidation of potent greenhouse gas CH₄. Dr. Jay Shankar Singh is presently working as a faculty member in the Department of Environmental Microbiology at Babasaheb Bhimrao Ambedkar University in Lucknow, India. Dr. Ajar Nath Yadav is currently serving as an assistant professor in the Department of Biotechnology, Akal College of Agriculture, Eternal University, Baru Sahib, Himachal Pradesh, India.

BIOFERTILIZERS AND BIOCONTROL AGENTS FOR ORGANIC FARMING -

Dr. Reeta Khosla 2017-07-07

Organic farming is a new revolution in agriculture on a global scale. This has come in wake of realization of ill effects of Green Revolution. This book has given description of adverse effects of chemicals used in agriculture and the urgent need to switch to organic farming by the use of biofertilizers and adopting biocontrol measures. Organic farming is a sustainable option where cheap and ecofriendly biofertilizers are produced by farmers and scientists using various micro organisms such as bacteria, algae and fungi. Green pest management practices using biocontrol agents for minimising the crop loss due to insect pests is extensively described in this book. The authors have also dealt with the different measures adopted in India to popularize the use of

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biofertilizers and biocontrol agents. The book focuses attention on present day challenge of attaining sustainable agriculture without damaging the environment.

Integrated Nutrient Management (INM) in a Sustainable Rice-Wheat Cropping System - Anil Mahajan 2009-05-07

Agriculture is the main occupation in India and about 75% of its population depends directly or indirectly on agriculture for their livelihood. It is the dominant sector that contributes 18% of the gross domestic product. Thus, agriculture is the foundation of the Indian economy. The maximum share of Indian exports is also from the agriculture sector. As the population of the country is increasing tremendously, approximately at the rate of 19 million every year over the existing population of more than 1 billion (approximately 1.18 billion), the food grain production

must necessarily be increased. This can be done by increasing crop production to match the population growth rate of 2.2% per annum, which is expected to stabilize at 1.53 billion around 2050. There is no doubt that the Green Revolution in India during the late 1960s brought self-sufficiency in food grain production, mainly through the increase in rice and wheat crop yields – the two main crops of the country which play an important role from food security point of view. However, the excessive use of fertilizers and pesticides, and the neglect of organic manures for these crops, has resulted in the deterioration of physical, chemical and biological health of the rice- and wheat-growing soils. Owing to the deterioration of the health of these soils, the productivity of the rice-wheat cropping system has now either got reduced or in some places has become constant for the

last decade.

Biofertilizer Technology -

R.A. Sharma 2004

Aims To Provide The Latest Research Findings With The Aim Of Enabling Scientists, Planners And Farmers To Make Efficient Utilization Of Low Cost Fertilizers In Supplementing The Nitrogen Requirements Of Rice.

Furnishes Latest Know How On The Production Technology, Preservations, Multiplication, Storage, Transportation And The Field Uses Of The Fertilizers. Focuses On Azolla-Blue Green Algal. Furnishes A Useful Glossary.

The Biogas/biofertilizer Business Handbook -

Michael Arnott 1984

Environmental and Agricultural Microbiology -

Bibhuti Bhusan Mishra

2021-09-22

Environmental and Agricultural Microbiology Uniquely reveals the state-of-the-art microbial research/advances in the environment and agriculture

fields Environmental and Agricultural Microbiology:

Applications for

Sustainability is divided into two parts which embody chapters on sustenance and life cycles of microorganisms in various environmental conditions, their dispersal, interactions with other inhabited communities, metabolite production, and reclamation.

Though books pertaining to soil & agricultural microbiology/environmental biotechnology are available, there is a dearth of comprehensive literature on the behavior of

microorganisms in the environmental and agricultural realm. Part 1 includes bioremediation of agrochemicals by microalgae, detoxification of chromium and other heavy metals by microbial biofilm, microbial biopolymer technology including polyhydroxyalkanoates (PHAs) and polyhydroxybutyrates (PHB), their production,

degradability behaviors, and applications. Biosurfactants production and their commercial importance are also systematically represented in this part. Part 2 having 9 chapters, facilitates imperative ideas on approaches for sustainable agriculture through functional soil microbes, next-generation crop improvement strategies via rhizosphere microbiome, production and implementation of liquid biofertilizers, mitigation of methane from livestock, chitinases from microbes, extremozymes, an enzyme from extremophilic microorganism and their relevance in current biotechnology, lithobiontic communities, and their environmental importance, have all been comprehensively elaborated. In the era of sustainable energy production, biofuel and other bioenergy products play a key role, and their production from microbial

sources are frontiers for researchers. The final chapter unveils the importance of microbes and their consortia for management of solid waste in amalgamation with biotechnology Audience The book will be read by environmental microbiologists, biotechnologists, chemical and agricultural engineers. *Biofertilizers in Agriculture and Forestry* - Nanjappa Shamanna Subba Rao 1993

BIOFERTILIZERS FOR SUSTAINABLE PRODUCTION OF HORTICULTURAL CROPS -

Prof. (Dr.). K. Surendra Gopal 2021-08-17

The book deals with different aspects concerning biofertilizers or microbial fertilizers with 15 chapters. The chapter 1-5 deals with basic aspects of microbial fertilizers, chapter 6 deals with the responses of horticultural crops to biofertilizers and chapter 7 deals with the consortial biofertilizers which is very

important as the biofertilizers consortia provides multiple functions for sustainable production. The chapters 8-10 deals with formulations, quality and constraints in biofertilizers respectively. The chapter 11-12 deals with recent advances and future research perspectives in biofertilizers. The chapters 13-14 covers major manufacturers and the essential equipments required for biofertilizer production. This book will certainly provide basic and useful information on the various role of biofertilizers for horticultural crops and the users may find this book useful. An attempt has been made in this book to include all the basic and applied aspects of biofertilizers

Biofertilizers for Sustainable Agriculture and Environment
- Bhoopander Giri
2019-08-09

This book provides a comprehensive overview of the benefits of biofertilizers as an alternative to

chemical fertilizers and pesticides. Agricultural production has increased massively over the last century due to increased use of chemical fertilizers and pesticides, but these gains have come at a price. The chemicals are not only expensive; they also reduce microbial activity in agricultural soils and accumulate in the food chain, with potentially harmful effects for humans. Accordingly, it is high time to explore alternatives and to find solutions to overcome our increasing dependence on these chemicals. Biofertilizers, which consist of plant remains, organic matter and microorganisms, might offer an alternative. They are natural, organic, biodegradable, eco-friendly and cost-effective. Further, the microbes present in the biofertilizers are important, because they produce nutrients required for plant growth (e.g., nitrogen, phosphorus, potassium), as

well as substances essential for plant growth and development (e.g., auxins and cytokinins). Biofertilizers also improve the physical properties, fertility and productivity of soil, reducing the need for chemical fertilizers while maintaining high crop yield. This makes biofertilizers a powerful tool for sustainable agriculture and a sustainable environment. The book covers the latest research on biofertilizers, ranging from beneficial fungal, bacterial and algal inoculants; to microbes for bioremediation, wastewater treatment; and recycling of biodegradable municipal, agricultural and industrial waste; as well as biocontrol agents and bio-pesticides. As such, it offers a valuable resource for researchers, academics and students in the broad fields of microbiology and agriculture.

Water Resources Management - L. K. Tripathi (M. Sc.) 2007

Recent Trends in Biofertilizers - Bikas R. Pati 2015-12-30

Offers insights into biofertilizer technology, biotechnology-based biofertilizers, and other recent developments. Discussion of the tremendous advances made in the last decade in biofertilizer technology through development of biotic and abiotic stress tolerant microbial strains is one of the highlights of this book.

New Perspectives and Approaches in Plant Growth-Promoting Rhizobacteria Research - P.A.H.M. Bakker 2008-01-24
In the context of increasing concern for food and environmental quality, use of Plant Growth-Promoting Rhizobacteria (PGPR) for reducing chemical inputs in agriculture is a potentially important issue. This book provides an update by renowned international experts on the most recent advances in the ecology of

these important bacteria, the application of innovative methodologies for their study, their interaction with the host plant, and their potential application in agriculture.

Sustainable Crop Production

- Mirza Hasanuzzaman
2020-06-17

This book includes twenty-one comprehensive chapters addressing various soil and crop management issues, including modern techniques in enhancing crop production in the era of climate change. There are a few case studies and experimental evidence about these production systems in specific locations. Particular focus is provided on the state-of-the-art of biotechnology, nanotechnology, and precision agriculture, as well as many other recent approaches in ensuring sustainable crop production. This book is useful for undergraduate and graduate students, teachers, and researchers, particularly in

the fields of crop science, soil science, and agronomy.

Biofertilizers - Inamuddin
2021-08-03

Great attention has been paid to reduce the use of conventional chemical fertilizers harming living beings through food chain supplements from the soil environment. Therefore, it is necessary to develop alternative sustainable fertilizers to enhance soil sustainability and agriculture productivity. Biofertilizers are the substance that contains microorganisms (bacteria, algae, and fungi) living or latent cells that can enrich the soil quality with nitrogen, phosphorous, potassium, organic matter, etc. They are a cost-effective, biodegradable, and renewable source of plant nutrients/supplements to improve the soil-health properties. Biofertilizers emerge as an attractive alternative to chemical fertilizers, and as a promising cost-effective

technology for eco-friendly agriculture and a sustainable environment that holds microorganisms which enhance the soil nutrients' solubility leading a raise in its fertility, stimulates crop growth and healthy food safety. This book provides in-depth knowledge about history and fundamentals to advances biofertilizers, including latest reviews, challenges, and future perspectives. It covers fabrication approaches, and various types of biofertilizers and their applications in agriculture, environment, forestry and industrial sectors. Also, organic farming, quality control, quality assurance, food safety and case-studies of biofertilizers are briefly discussed. Biofertilizers' physical properties, affecting factors, impact, and industry profiles in the market are well addressed. This book is an essential guide for farmers, agrochemists,

environmental engineers, scientists, students, and faculty who would like to understand the science behind the sustainable fertilizers, soil chemistry and agroecology.

Biofertilizers & Organic Farming - Himadri Panda 2007

Increasing Population Levels On A Near Stabilized Agricultural Land Places A Heavy Burden On The Soil Source Particularly Its Nutrient Supplying Power. Chemical Fertilizers Have Come To Increase The Output Of Agricultural Product And To Meet Ever Increasing Demand Of Human Population. The Problem Is Further Compounded In Several Areas Due To Excessive Use Of Chemical Fertilizers Which Resulted Into Considerable Deterioration In The Quality Of Indigenous Soil. Intensive Agriculture With The Use Of Chemical Fertilizers In Large Amount Has, No Doubt, Resulted In Manifold Increase In The

Productivity Of Farm Commodities But The Adverse Effect Of These Chemicals Are Clearly Visible On Soil Structure, Microflora, Quality Of Water, Food And Fodder. Organic Farming Has Emerged As The Only Answer To Bring Sustainability To Agriculture And Environment. Organic Farming Is A Farming Integration Of Biological, Cultural And Natural Inputs Including Integrated Diseases And Pest Management Practices. Integrated Plant Nutrition Can Be Best If It Is Practised On Scientific Facts, Local Conditions And Microeconomics. We Hope This Publication Will Create A Balanced, Objective And Science Based Appreciation For Meeting The Nutrient Needs Of Agriculture. This Book Has Been Written For Agricultural Planners, Soil Scientists, Biologists, Microbiologists, Students, Teachers, Fertilizer Industry, Personnel Research And Development Units,

Organisation Engaged In Biofertilizer Production, Training Centres, All Those Interested In The Efficient Use And Recycling Of Wastes, Resource Management And Sustainable Farming. Contents Chapter 1: Integrated Plant Nutrition Systems; Chapter 2: Organic Manures: Their Nature And Characteristics; Chapter 3: Livestock And Human Wastes: Characteristics And Value; Chapter 4: Potential Of Organic Materials And Plant Nutrients; Chapter 5: Preparation, Processing And Preservation Of Organic Manures; Chapter 6: Biogas Potential From Livestock Wastes And Human Excreta; Chapter 7: Response Of Crops To Organic Manures; Chapter 8: Response Of Crops To Organic Materials In Salt Affected Soils; Chapter 9: Nitrogen Fixation; Chapter 10: Mycorrhizae In Agriculture; Chapter 11: Fertilizers With Organics And Biofertilizers; Chapter 12: Bulky Organic

Manures And Crop Residues; Chapter 13: Green Manuring: Nutrient Potentials; Chapter 14: Biological And Industrial Wastes: Source Of Plant Nutrients; Chapter 15: Role Of Biofertilizers In Crop Production; Chapter 16: Biofertilizers For Flooded Rice Ecosystem; Chapter 17: Production, Distribution And Promotion Of Biofertilizers; Chapter 18: Effect Of Biofertilizers On Growth; Chapter 19: Biofertilizer: A Supplementary Nutrient; Chapter 20: Bioinoculation And Biofertilizer On Growth; Chapter 21: Significance And Azospirillum Brassilense And Pseudomonas On Growth; Chapter 22: Application Of Mycorrhizae And Rhizobium On Biomass Production; Chapter 23: Effect Of Vam Fungi On Banana Plants; Chapter 24: Mungbean With Solubizing Bacteria; Chapter 25: Performance Of Azymbiotic Biofertilizers; Chapter 26: Effect Of Azospirillum On Quality Of Sugarcane;

Chapter 27: Bioinoculants For Recycling Banana Wastes; Chapter 28: Pressmud As Plant Growth Promoter; Chapter 29: Biofertilizer For Multipurpose; Chapter 30: Tree Legumes Seedlings; Chapter 30: Infectivity On Growth Of Cajanus Cajan; Chapter 32: Saline Soil Tolerance; Chapter 33: Importance Of Vam Mycorrhizae; Chpater 34: Biochemical And Genetic Characterisation Of Mineral Phosphate; Chpater 35: Effect Of Phosphobacterium On Growth; Chapter 36: Effect Of Phosphomicrobes; Chapter 37: Recommendations. Handbook of Microbial Biofertilizers - Mahendra Rai 2006-02-28 Sharply focused, up-to-date information on microbial biofertilizers—including emerging options such as Piriformospora indica and Matsutake The Handbook of Microbial Biofertilizers provides in-depth coverage of all major microbial

biofertilizers (rhizobia, arbuscular mycorrhizal fungi, and cyanobacteria) as well as new and emerging growth promoters (endophytes). It examines the role of microbes in growth promotion, bioprotectors, and bioremediators, and presents protocols and practical strategies for using microbes in sustainable agriculture. An abundance of helpful charts, tables, and figures make complex information easy to access and understand. In this first-of-its-kind volume, contributors from 11 countries and several continents address important issues surrounding microbial biofertilizers, including: the rhizobium-host-arbuscular mycorrhizal tripartite relationship mycorrhiza as a disease suppresser and stress reducer mycorrhiza helping bacteria the impact of functional groups of soil

microorganisms on nutrient turnover PBPRs as biofertilizers and biopesticides the potential of wild-legume rhizobia for use as a biofertilizers the expanding role of blue-green algae in sustainable agriculture the role of microbial fertilizers in sustainable plant production new and emerging endophytes the commercial potential of biofertilizers In this young century, the use of biofertilizers is already growing rapidly. It has been recognized that these environment-friendly bioprotectors, growth boosters, and remediators are essential for soil/plant health. The Handbook of Microbial Biofertilizers is designed to fit the expanding information needs of current and future biotechnologists, microbiologists, botanists, agronomists, environmentalists, and others whose work involves sustained agriculture.