

PGPR: BIOCONTROL AND BIOFERTILIZATION

PGPR: Biocontrol and Biofertilization

Edited by

ZAKI A. SIDDIQUI

*Department of Botany,
Aligarh Muslim University,
Aligarh, India*

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Printed in the Netherlands.

Dedicated
to
(Late) Prof. Abrar Mustafa Khan
(Professor Emeritus)
and
(Late) Prof. Syed Israr Husain
(My Research Supervisor)

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Preface

Plant growth promoting rhizobacteria (PGPR) are indigenous to soil and plant rhizosphere. These microorganisms are the potential tools for sustainable agriculture. They enhance the growth of a root system and even of an entire plant and often control certain plant pathogens. It is a fascinating subject, multidisciplinary in nature, and concerns scientists involved in plant health and plant protection. There have been marked advances in this field during the last few decades. This area has been the subject of several reviews, but there is no exclusive text on the subject. This book stresses the need to document the information, developing a unifying theme which treated PGPR in a holistic manner. It deals with biocontrol of plant diseases by PGPR and their role in plant growth promotion, biofertilization and phytohormone production. Since PGPR are the centre of the theme, the book limits itself to the use of PGPR in biocontrol, biofertilization, phytohormone production and their formulations.

The book has eleven chapters and attempts to present balanced information on various aspects of PGPR. Chapter 1 describes the mechanisms of action of different PGPR groups. Physical, chemical and biological factors which affect colonization and the interactions of PGPR with other soil microorganisms and their ecology are dealt in detail. Other chapters deal with PGPR mediated induced resistance, and the biosynthesis of antibiotics by PGPR and role of PGPR in biocontrol of plant pathogens and biofertilization. PGPR action is also considered in phytohormone production and as a potential alternative of plant productivity. Chapter on visualization of interactions of pathogens and biocontrol agents on plant roots using autofluorescent protein markers has provided better understanding of biocontrol process. Proteomics perspective on biocontrol and plant defence mechanism has a separate chapter. An independent chapter has been devoted to formulations of PGPR. Current and future prospects of biocontrol of plant diseases by genetically modified microorganisms are discussed in the last chapter.

The book is not an encyclopedic review. However, an international emphasis has been placed on trends and probable future developments. The chapters incorporate both theoretical and practical aspects, and may serve as base line information for future research through which significant developments can be expected. This book will be useful to students, teachers and researchers, both in universities and research institutes, especially working in areas of agricultural microbiology, plant pathology, and agronomy.

With great pleasure, I extend my sincere thanks to all the contributors for their timely response, excellent and up to date contribution

and consistent support and cooperation. My gratitude to late Prof. Abrar Mustafa Khan, well known Plant Pathologist of India is immense. He along with his students established the section on Plant Pathology in the Department of Botany at Aligarh Muslim University, Aligarh, India. I also express my deep sense of gratitude to late Professor Syed Israr Husain. Prof. Husain was my research supervisor and a student of Prof. Abrar M. Khan. He initiated me into this discipline and was a great source of inspiration to me. I am also thankful to Dr. W. G. Dilantha Fernando, Department of Plant Science, University of Manitoba, Canada, for his encouragement and help during this project. I acknowledge with thanks the valuable assistance from my teachers, friends, well wishers and students. Special thanks are extended to Professors Ainul Haq Khan, Aqil Ahmad, R. P. Singh, Department of Botany, A.M.U. Aligarh, John Robert Pichtell, Ball State University, USA, and also to Drs. Mashiat Ullah Siddiqui, Department of Biochemistry, J.N.M.C, Syed Mashhood Ali, Department of Chemistry, Shamsul Hayat and Lamabam Peter Singh, Department of Botany, A.M.U. Aligarh, India for their encouragement, courtesy and help as this book progressed.

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Finally, I must be gracious to Almighty God who helped me develop and complete a book on **PGPR: Biocontrol and Biofertilization**.

Zaki A. Siddiqui

Contributors

Akutsu, Katsumi

School of Agriculture,
Ibaraki University,
Ami-machi, Ibaraki, 300-0393,
Japan

Antoun, Hani

Department of Soil Science and
Agriculture and Agri-Food Engineering,
Faculty of Agriculture and Food science,
Laval University Quebec, Canada G1K 7P4

Bakker, P.A.H.M.

Faculty of Biology,
Section Phytopathology,
Utrecht University,
P.O.Box 800.84, 3508 TB Utrecht,
The Netherlands

Bolwerk, Annouschka

Institute of Biology,
Leiden University,
Wassenaarseweg 64, 2333 AL Leiden,
The Netherlands

Caballero-Mellado, Jesús

Programa de Ecología Molecular y Microbiana, Centro de Investigación
sobre Fijación de Nitrógeno;
Universidad Nacional Autónoma de México,
Apdo. Postal No. 565-A, Cuernavaca, Morelos,
México

Chinnasamy, Gurusamy

Proteomics Laboratory, Molecular Genetics Section,
Cereal Research Centre,
Agriculture and Agri-Food Canada,
195 Dafoe Road, Winnipeg, Manitoba, Canada R3T 2M9

Fernando, W. G. D.

Department of Plant Science,
University of Manitoba
Winnipeg, Manitoba, Canada R3T 2N2

Fuentes-Ramírez, Luis E.

Lab. de Microbiología de Suelos, Centro de Investigaciones
Microbiológicas, Instituto de Ciencias;
Universidad Autónoma de Puebla. Apdo. Postal No. 1622, Puebla,
Puebla, México

García de Salamone, Inés E.

Department of Applied Biology and Foods,
Faculty of Agronomy,
University of Buenos Aires,
Argentina

Hynes, Russell K.

Agriculture Agri-Food Canada.
Saskatoon, Saskatchewan,
Canada

Lugtenberg, Ben J. J.

Institute of Biology,
Leiden University,
Wassenaarseweg 64, 2333 AL Leiden,
The Netherlands

Nakkeeran, S.

Department of Plant Science,
University of Manitoba
Winnipeg, Manitoba, Canada R3T 2N2

Nelson, Louise M.

Department of Biology,
University of British Columbia
Okanagan, Kelowna, British Columbia,
Canada

Niranjan Raj, S.

Downy Mildew Research Laboratory,
DOS in Applied Botany and Biotechnology,
University of Mysore,
Mysore-570 006,
India

Prevost, Danielle

Soil and Crops Research Development Centre,
Agriculture and Agri-Food Canada
Sainte-Foy, Quebec, Canada G1V 2J3

Reddy, M.S.

Department of Entomology & Plant Pathology,
Auburn University, AL 36849
U.S.A.

Shetty, H.S.

Downy Mildew Research Laboratory,
DOS in Applied Botany and Biotechnology,
University of Mysore,
Mysore-570 006,
India

Siddiqui, Zaki A.

Department of Botany,
Aligarh Muslim University,
Aligarh-202002,
India

Someya, Nobutaka

National Institute for Agro-Environmental Sciences,
Tsukuba, Ibaraki, 305-8604,
Japan

Van Loon, L.C.

Faculty of Biology,
Section Phytopathology,
Utrecht University,
P.O.Box 800.84, 3508 TB Utrecht,
The Netherlands

Zhang, Yilan

Department of Plant Science,
University of Manitoba
Winnipeg, Manitoba, Canada R3T 2N2