

Preface

Various groups of beneficial bacteria synthesize a large number of “biomolecules” that allow plants to survive under adverse environmental/abiotic and biotic conditions. Such bacteria govern phytohormone-mediated immune response, manage to regulate hormones, produce biosurfactants which are involved in several important functions for bacteria themselves as well as for the plants and their ecosystem. Thus, bacterial hormones and biosurfactants are identified as effector molecules in plant–microbe interactions, pathogenesis and phytostimulation which can be beneficial either for the bacteria or for the crops so as to warrant sustainability.

The organization of the book is from practice to theory and from basic to applied aspects of bacterial phytohormones and biosurfactants. Some specific bacterial genera, *Azospirillum* and emergence of *Methylobacterium*, in particular, and their potential to support plant growth and development have been documented. To begin with, techniques for isolation and purification of “classical five” microbial phytohormones, namely, auxins, gibberellins, cytokinins, ethylene and abscisic acid are covered here, stressing the need to join the practical with the theoretical thus make the contents alive. Other than these modulators, importance of jasmonic acid and salicylic acid produced by bacteria or plants have also been emphasized. Microorganisms contain over 30 growth-promoting compounds from the cytokinin group and also produce about 100 GAs and other groups of hormones, which are extremely important for plants from seed germination stage to fruit ripening processes.

A scientific linkage and evidence to show bacterial hormones and their impact to act as biofertilizers is also provided. This book provides in-depth insights into bacterial traits required for rhizosphere competence, root colonization and/or endophytic phytohormone secretion which act as a sink of IAA, thus protecting the plants from different environmental stresses.

Some of the chapters emphasized the concepts related to drought and salt tolerance through Abscissic acid and other microbial hormone regulations that provide valuable insight into evolution of microbial interactions with plants under hostile environments. Such suitable strains (consortia) and their application in promoting the growth of healthy and disease-free crops that are eco-friendly in nature.

Biofilm formation and biosurfactant activity of plant-associated bacteria play essential role in bacterial motility, signaling and biocontrol of disease-causing pathogens, their mechanism at both physiological and genetic level is suitably evidenced with the need of green chemicals to study and application of bacteria-mediated biosurfactants has become imperative. Efforts have been made to stress the bioremediation potential of rhamnolipids to eliminate a wide range of pollutants and to promote a sustainable development of our society. The contents lay stress upon microbial world that synthesizes and secretes phytohormones and biosurfactants and emits many volatiles that lead to sustainable agriculture ecosystem.

This book will be useful not only for students, teachers and researchers but also for those interested in biotechnology, microbiology, physiology of plant growth and development, phytoprotection, agronomy and environmental sciences.

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