
Preface

Microbial communities have potential to play a vital role in solving many if not all problems of present-day agriculture and environment and can be equally beneficial for crop production and protection management, food security, public health, and societal well-being. Microbes are the key living components crucial for the ecological harmony, ecosystem function, agricultural sustainability, environmental wellness, and human and livestock health. They are the most important components of soil biodiversity contributing to the valued agroecological services with their vast functional gene pool and metabolic capabilities. In the era of huge chemicalization and industrialization of agricultural ecosystems, microbes are fundamentally important for natural ecological functioning and balance, biotic and abiotic stress management, mineralization and nutrient recycling, bioconversion of complex animal and plant residues and bioremediation of soil contaminants, and, therefore, support of plant growth and development. Very close interactive mechanisms have been observed within the root rhizosphere of plants with microbial communities that survive on root exudates and strengthen plants in terms of growth, immunity, and resistance against abiotic and biotic stresses. This is why the task of identification, characterization, judicious exploitation of microbes and their communities, and finally utilization of an array of their functional characteristics has been taken at priority in the past several decades. The whole exercise is to come up with such efficient microbial systems that can offer their services at the farming level. Such microbial systems can be termed as “microbial inoculants” that provide beneficial agricultural services like plant growth promotion, nutrient use efficiency, bioremediation, and control of pests/phytopathogens.

Our understanding of the microbial communities, their specific functions, responses of plants and soils to such communities, and ecological impacts of such communities on other biotic and abiotic mechanisms has increased in the past to a greater extent. With the advent of technological advancements in the area of molecular biology and biotechnology, new avenues have been established to identify and characterize microbes and their communities and in assigning functions to them. Cumulatively, all these studies have led to the identification of several microbial species that were proved potential candidates for offering plant growth promotion, soil fertility management, biological control of pests and diseases, and bioremediation of environmental pollutants. The book *Microbial Inoculants in Sustainable Agricultural*

Productivity Vol. I Research Perspectives presents a holistic view of analyzing microbes and their communities and describing their functional role during the endeavor of developing microbial inoculants for the benefit of agricultural productivity. While going through the book, readers can find a detailed account of all such aspects that are required for making a microbe “microbial inoculant.” The views of the authors are thorough and authoritative and based on their long research experience in the subject area. We are thankful to all the contributing authors for making their efforts to provide their valuable inputs in this volume. We hope that this Volume of the book will be very useful for all those who are actively involved in the endeavor of developing microbial inoculants for reaping their benefits in sustainable agricultural productivity.

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