

PREFACE

In the past few decades, the rapid and vast development of advanced microbial bioresources and metagenomic techniques has completely transformed the area of research across the biological sciences. Microbiology is one of the most influential fields and attracts researchers from all over the globe. Our understanding of microbial diversity, evolutionary biology, and microbial interaction with their animal and plant hosts at molecular level has been revolutionized.

In this volume, various applications of microorganisms have been covered broadly and have been appropriately reflected in depth in different chapters. This book covers four major sections: (i) applied microbiology in agriculture, (ii) microbes in the environment, (iii) microbes and human health, and (iv) microbes in nanotechnology. The book provides insights into the diverse microorganisms that have been explored and exploited in the development of various applications for improvements in agriculture. It also looks at the utilization of microorganisms to improve the desired traits for achieving optimal production of microbials.

Applications of microbes for the removal of pollutants and for the recovery of metals and oils have also been discussed for environmental purposes. The book also includes information on the synthesis and applications of nanoparticles derived from plants and microbes, their uses and applications in agri-food production, pathogen diagnostics, contaminant removal, and the antimicrobial and pharmacological properties. We have also included chapters that discuss nanotechnology and biosensors applications for human health.

The volume provides a holistic look at applications of microorganisms and other multidisciplinary approaches for improvement of agriculture, environment, human health, and biomedicine. The book is written in simple and clear text, and we also used many figures and tables to make the book easier to understand.

This volume is the culmination of the efforts of several researchers, scientists, graduate students, and postdoctoral fellows across the world who are well-known and respected in different frontiers of biotechnology

and microbiology research. This book caters to the needs of the graduate and postgraduate students pursuing their study in branches of life sciences, microbiology, health sciences, and environmental biotechnology. It will also be of interest to researchers and scientists working in laboratories and industries involved in the study and research in the fields of microbiology, environmental biotechnology, and allied areas.

We express our appreciation to all of the contributing authors who helped us tremendously with their contributions, time, critical thoughts, and suggestions to put together this peer-reviewed edited volume. The editors are also thankful to Apple Academic Press and their team members for the opportunity to publish this volume. Lastly, we thank our family members for their love, support, encouragement, and patience during the entire period of this work.

Pradeep Kumar

NERIST, Arunachal Pradesh, India

Jayanta Kumar Patra

Dongguk University, Goyang-si, South Korea

Pranjal Chandra

IIT Guwahati, Assam, India