PREFACE

The diversity of microorganisms is the most precious biological resource on the planet earth today, which plays a pivotal role in the function and maintenance of earth's ecosystem of the biosphere. Microbes perform unique and indispensable activities in the circulation of matter in the world on which all other organisms depend. Microorganisms provide the foundation for biotechnology i.e. the basis for new product discovery, bioremediation and genetic manipulation for new products and processes for food, health-care, environment and industry. During the last few years, microbial biotechnology has made tremendous progress and contributed significantly in the field of Agriculture, Industry, Environment and Health.

Intensive farming system during the last century with the application of chemical fertilizers and pesticides coupled with heavy irrigation has resulted in increased production but also caused depletion of soil organic matter and micronutrients associated with non-recycling of organic manures. With ever-increasing population, it is necessary to continue towards increase in productivity per unit area without further deterioration in soil health with maintenance in micronutrient balance. For this it is peremptory to have an integrated nutrient management approach with inclusion of organic manures, appropriate legumes in cropping system, use of biofertilziers, biopesticides, along with discrete use of chemical fertilizers. Kehri and Chandra in their article on "Organic farming and sustainable agriculture" highlighted that organic farming is a system of agriculture that encourage healthy soils and crops through such practices as nutrient-cycling of organic matter such as compost and crop-residues, crop rotations, proper tillage and the avoidance of synthetic fertilizers and pesticides. Microbial inoculants of live and latent cells of efficient strains of nitrogen fixing and phosphate solubilizing microorganisms augment the extent of availability of nutrients in a form, which can be easily assimilated by plants and play an important role in sustainable agriculture. Similarly biopesticides based on microbes and plants alongwith their application in the management of insect, pests and pathogens of plants, has been an area of intensive research during the last few years. All these important area of research along with other areas such as : Allelopathy, Tissue culture, Aflatoxins etc. have been very well covered by the articles included under Agriculture Biotechnology.

Industrial Biotechnology, the technology that involves commercial exploitation of the biosynthetic capabilities of microorganisms, has been very well dealt in an article by Dr. Abhay Despandey, who presented a very succinct account of strengths, weaknesses, opportunities and threats of

commercial biotechnology. An article by Dr. Ganguli highlighted the significance of biodiversity in the discovery of novel secondary metabolites of therapeutic importance. In other articles included under Industrial Biotechnology, Microbes have been shown to be the source of several bioactive compounds which may be of pharmaceutical importance or biosurfactants associated mainly with the problem of substrate transport or enzymes involved in biodegradation of organic substances. An article on *in vitro* production of alkaloid through tissue culture is also included.

In the face of the increasing severity of environmental damage evidenced during this century, there has been a growing awareness among all, that actions are needed to maintain and restore environmental quality. Microbial biotechnology is one of the several competing technologies for the maintenance of environment quality. Articles dealing with environmental biotechnology in this book cover significant areas of research such as Biomining, Bioremediations, Microbial degradation of Petrochemicals and other organic wastes etc. Singh, *et al.*, in an article in Medical Biotechnology highlighted the potential of *Mycobacterium habana*, a Vaccine Candidate for Leprosy.

The articles included in this book have been contributed and presented during the International Symposium, by the scientists of India and abroad, who are actively engaged in the area of research dealing with various aspects of biotechnology. I express my gratitude to all the contributors for their keen interest, support and co-operation. I am also aware that inspite of all care, some of the errors might have appeared in the book for which readers may send their suggestion and comments. I hope the book will be of great help to researchers, teachers and post-graduate students interested in biotechnology in general and microbial biotechnology in particular.

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R.C. Rajak
Professor
Department of Biological Science,
Rani Durgavati University Jabalpur (M.P.)