Microbial Enzymes and Biotechniques

Pratyoosh Shukla
Editor

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Interdisciplinary Perspectives

Springer

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Foreword

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This important and timely book provides an interdisciplinary perspective on microbial enzymes and the latest techniques whereby these enzymes can be studied and utilized. Humans have long relied on microbes and their enzymes in the production of fermented foods and beverages, ever since the Neolithic Age. Our increasingly sophisticated use of microbial enzymes will help us address some of the key challenges related to food, carbon-neutral energy sources, human, animal and ecosystem health. The "green chemistry" enabled by microbial enzymes is rapidly growing in importance in sustainable industrial processes, recycling and bioremediation and this will lead to improved prosperity and welfare.

A striking feature of this book is the broad range of microbes that is considered as sources of enzymes. Bacterial enzymes as well as those from fungi and microalgae are extensively covered. I was particularly interested in the strong chapters on microalgal-derived enzymes and products, a particular interest of my own. In addition, there are chapters that cover approaches and techniques such as inoculant development, protein nanostructures and nanoparticles, and enzyme engineering that will be of broad interest and applicability to all working in the burgeoning field of microbial enzymes.

This substantial volume would not have been possible without the intellectual leadership, persistence and diligence of the Editor of this book, Professor Pratyoosh Shukla. I congratulate my friend and colleague Professor Shukla on this major accomplishment and also for his role as author on several key chapters in this volume. All the authors are thanked for their work in moving forward our understanding of microbial enzymes and biotechniques. All researchers working in the dynamic and interdisciplinary field of microbial enzymes will benefit from this volume.

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Preface

The book *Microbial Enzymes and Biotechniques: Interdisciplinary Perspectives* contains an exceptional collection of several new and eye-catching interdisciplinary aspects of microbiology and biotechnology giving insights on such innovative areas of research. This book enlightens the thought-provoking topics on biotechniques perspectives, i.e. sugar-nucleotide providing enzyme for health benefits, protein nanotechnologies with purpose-designed properties for medicine, the techniques for enzymatic and chemical bleaching in pulp and paper industry, the technological overview of next generation microalgae-based products, and microbial bioinoculant technologies for sustainable agriculture in the initial first chapters.

The latter half of this book covers exciting techniques of biopigments from microalgae, revealing the features of the oxidative enzymes, endophytic bacteria for phytoremediation aspects of organic pollutants, the technological perspectives of arbuscular mycorrhizal fungi (AMF)-based biofertilizers, etc. Finally, the book also deciphers the attractive scope of enzyme engineering techniques for biotechnological applications and the technological advances of emerging areas of probiotics and prebiotics. One interesting aspect of this book is a descriptive overview of various techniques for the evaluation of the chemical and microbiological quality of the coastal environment. This is a high demanding area in terms of sustainable environmental goals. A substantial feature of this book is that it gives the most conversant areas of microbial enzymes and biotechniques with a focused overview on cutting edge description on techniques involved in each of the areas described in each chapter.

This book will be a treasured interdisciplinary resource for senior undergraduate and graduate students, related researchers, professionals involved in biotechniques innovations and other interdisciplinary research groups.

Rohtak, India — Pratyoosh Shukla

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Editor and Contributors

About the Editor

Prof. Pratyoosh Shukla is a Professor and Head of the Department of Microbiology, Maharshi Dayanand University, India. His research interests include enzyme technology, protein bioinformatics and microbial biotechnology. He has more than 20 years of research and 18 years of teaching experience at respected Indian universities of India, and was a postdoctoral researcher at Durban University of Technology, South Africa. He also worked as a Research Professor at the University of Cincinnati under Indo-US Science and Technology Forum (IUSSTF) and American Society of Microbiology (ASM) program. He has written 8 books and 26 book chapters, and published more than 135 peer-reviewed papers in respected national and international journals. He has received several awards, including the Prof. S.B. Saksena Award in Life sciences (1999), Danisco India Award in Probiotics & Enzyme Technology (2010), Indo-US Professorship Award (2014) by the Indo-US Science and Technology Forum (IUSSTF) and American Society of Microbiology (ASM), AMI-Alembic Award (2015), and Faculty Research Award for Top 10 Most outstanding Researchers in the field of Immunology and Microbiology (2018). He is a Fellow of the Academy of Microbiological Sciences, of the Biotech Research Society of India (FBRS), and the National Academy of Agricultural Sciences (FNAAS). In 2011 he was selected as Scientist in the Southern Ocean Expedition.

He also serves as a Guest Professor at the South China University of Technology, Guangzhou, China.

He is Editor of the Indian Journal of Microbiology (Springer), Associate Editor of 3Biotech (Springer), Guest Editor of Current Protein and Peptide Science (Bentham Science), Editor of Protein and Peptide Letters, and Scientific Reports (Nature), Associate Editor of BMC Microbiology, and Academic Editor of PLOS One.

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