

INDUSTRIAL APPLICATIONS OF BIOSURFACTANTS AND MICROORGANISMS

GREEN TECHNOLOGY AVENUES
FROM LAB TO
COMMERCIALIZATION

EDITED BY
RUBY ASLAM
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Industrial Applications of Biosurfactants and Microorganisms

Progress in Biochemistry and Biotechnology

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Green Technology Avenues From Lab to
Commercialization

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Preface

Microorganisms produce biosurfactants, which are surface-active molecules either secreted extracellularly or on the surface of cells. Biosurfactants produce a thin layer on the surface of microorganisms that assists in their adhesion or dissociation from other cell surfaces. Due to the growing global need for sustainable solutions, biosurfactants derived from microorganisms have been investigated as a potential alternative to synthetic surfactants in various industrial processes, including food, medicine, petroleum biotechnology, oil recovery, biomedical and therapeutic, and bioremediation. The book covers the most recent academic developments, significant applications, and implementation studies from around the world.

The book is separated into three parts, with each part consisting of several chapters, to capture a comprehensive picture of fundamental, industrial applications, and greener avenues of biosurfactants and offer readers a rational and impressive design of the topic and concentrated up-to-date references. The fundamentals of biosurfactants are examined in PART 1. Introduction and classification, basic properties and characterizations, production using microbial resources and waste products of the food industry, and factors affecting biosurfactant production are the topics covered in Chapters 1–5. PART 2 examines the industrial applications of biosurfactants. Chapters 6–16 cover topics such as crude oil storage tank cleanup using biosurfactants, pollution mitigation using biosurfactants, application of biosurfactants on the remediation of hydrophobic pollutants/petroleum derivatives, the role of biosurfactants in improving target efficiency of drugs and designing novel drug delivery systems, the role of biosurfactants in drug adsorption, the potential of biosurfactants in corrosion inhibition, antimicrobial and antibiofilm potentials of biosurfactants, insecticidal potential of biosurfactants, potential of biosurfactants as an antiadhesive biological coating, and advantages of biosurfactants over petroleum-based surfactants. PART 3 explores the greener avenues of biosurfactants. Commercialization of biosurfactants, biosurfactants for environmental health and safety, biosurfactants as sustainable alternatives to chemical surfactants, and biosurfactants for sustainability are discussed in Chapters 17–20.

This book aims to present the most recent developments in the field of biosurfactants for use in industrial applications. This book is written for a highly diverse audience that works in surface chemistry, colloids and interface chemistry, and other related subjects. This book will be a priceless resource for libraries in academic and professional settings, government and nonprofit organizations, solitary research groups, and scientists. This book is intended to be a resource for scientists, researchers, and advanced undergraduate and graduate students seeking biosurfactants for industrial applications to meet current research demands.

All chapters were authored by renowned academic and professional researchers, scientists, and subject matter specialists. We would like to express our gratitude to all chapter authors on behalf of Elsevier for their extraordinary and sincere efforts in producing this book. For their unwavering support and assistance throughout this project, we are extremely grateful to Dr. Linda Buschman (Senior Acquisition Editor), Ms. Barbara Makinster (Senior Editorial Project Manager), and the editorial team of Elsevier. In the end, Elsevier deserves all praise for releasing the book.

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