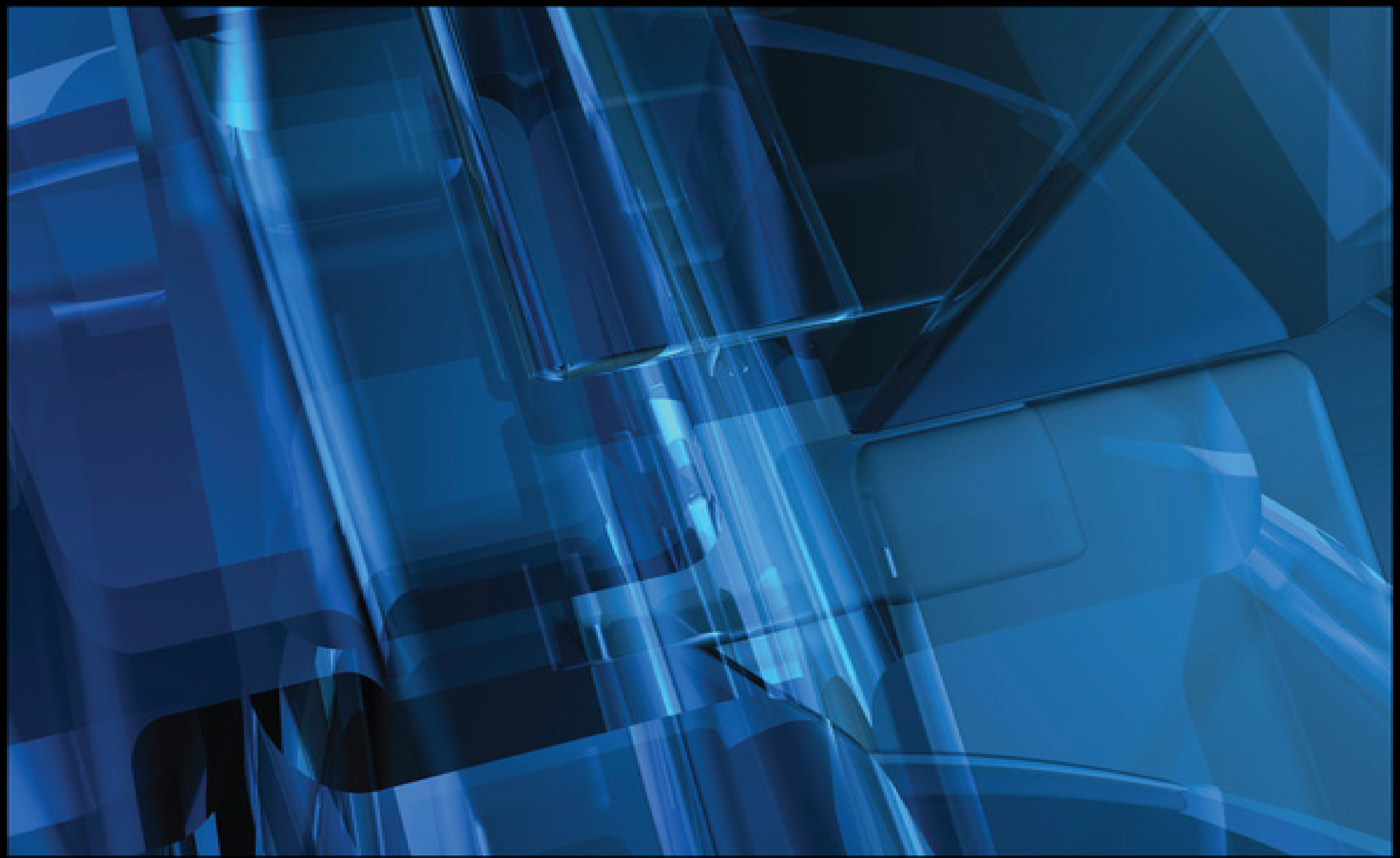

Microbes Based Approaches for the Management of Hazardous Contaminants

Edited by
Ajay Kumar · Livleen Shukla
Joginder Singh · Luiz Fernando Romanhol

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Preface

Hazardous contaminants in waste from the industrial, home, and agricultural sectors inflict enormous harm to the ecosystem and the lives of those who live nearby. These hazardous contaminants can exist in a variety of forms that are inclined by climate features like the presence of various types of organic matter, pH, water system hardness, transformation, and bioavailability. Since majority of them are mobile and soluble, they have the potential to bioaccumulate in the food chain and cause serious harm above certain concentrations. Microbe-based approaches are an important tool for removing toxic contaminants from the ecosystem and have piqued the concern of investigators over the centuries. Hence, the use of appropriate microorganisms in the remediation of pollutants is critical to effectively reducing the negative effects of toxic pollutants. Several microorganisms were discovered as promising candidates for bioremediation of hazardous contaminants via biotransformation, bioremediation, bioaccumulation, or biosorption processes. Hazardous contaminants degradation mechanisms exhibited by microorganisms are primarily determined by their degradative plasmids and spores. The book entitled *Microbes Based Approaches for the Management of Hazardous Contaminants* is focused on the most insightful aspects of microbe-based approaches for addressing hazardous contaminants in our ecosystem. This book covers novel and indigenous microbes and microbial products. Biofilms, exopolysaccharides, bio-surfactants, enzymes, metabolites, microbially synthesized nanoparticles, and the latest genetic and other metabolic engineering approaches based on microbial technologies that are utilized in the remediation and management of hazardous contamination from the environment and surroundings are covered. The book details many methods used, including degradation and remediation of hazardous pollutants, genetically engineered microorganisms for the removal of toxic organic compounds, metabolic engineering as alternative strategies for microbial bioremediation, microbial immobilization and use of microbial surfactants, microorganisms as the indicator for pollutants, biochemical approaches in microbial biodegradation, to name a few. The chapters provide readers with rich sources of reference information on important topics in this field. There are several illustrations so that the scholars can grasp the flow of the content and the transition to the next topic.

Chapters are written by active researchers and presented in an accessible way to the public beyond those specialists in the topic dealt with. The content aims to bridge the gap between advanced research and general understanding, providing clear explanations and practical insights that can be appreciated by a broader audience. This book serves as a helpful tool for scientists, industrial professionals, and experts working in diverse aspects to understand the various microbial-based methodologies toward hazardous waste management with proper resource management and technological applications. We are honored that the leading experts with extensive, in-depth experience and expertise in diverse microbial technologies have taken the time and effort to develop outstanding chapters.

We thank team Wiley for their generous assistance, constant support, and patience in initializing the book. The authors are also grateful to our esteemed friends, well-wishers, and faculty colleagues.

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