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Nota di contenuto	Introduction of heavy metal contamination in wastewater -- Impacts of Industrialization on Biosphere Integrity: Heavy Metal Contamination Threats to Water Resources and Ecosystem -- Sources and Types of Environmental Contaminants -- Health Impacts of Heavy Metal Exposure: Toxicity Mechanisms and Public Health Risks -- Heavy metals in the environment: A major health issue -- Heavy metal resistant bacteria for bioremediation of toxic heavy metal ion-Arsenic and Lead -- Arsenic Contamination in Surface and Groundwater: Assessment and Carcinogenic Impacts -- Heavy Metals as Ecological Contaminants: Sources, Persistence, Human Health Risks, and Pollution Assessment Indices -- Genetically Modified Microorganisms for Enhanced Heavy Metal Removal Properties -- Current Approaches in

Enhancing the Capacity of Microbial Fuel Cells (MFCs) for the Treatment of Heavy Metal-Containing Wastewater -- Microbial Fuel cells (MFCs): An integrated approach for wastewater treatment and bioelectricity generation -- Recent updates of eco-friendly heavy metal reduction methods -- Current Update of Microbial based Water Treatment and its Role in the Sustainable Development Goals -- Heavy Metal Removal by Bacteria: Mechanism and Challenges -- As (III) and Cr (VI) Remediation by Genetically Engineered Microorganisms: An Overview of Principles and Criteria of Fundamental Processes -- Major Challenges for Implementation of Microbes in the Wastewater Treatment Plants, Commercialization, and Future Prospective.

Sommario/riassunto

This book covers various aspects of heavy metal contamination in wastewater and its removal by microbial-based approaches. The heavy metal contamination in water is generally caused due to natural and anthropogenic activities. There are many industrial processes responsible for such a contamination, for example, leather tanning, coal washeries, agriculture activities, chrome plating and paint industries. The industrial effluent directly or indirectly discharges into water sources, and heavy metal containing wastewater decreases the quality of surface water and groundwater. The heavy metal contamination causes various types of health issues in human and other living organisms, including kidney and liver damage, heart failure, mental retardation, cancers, and skin and gastric problems. The high level of heavy metal concentration in the cell generates reactive oxygen species (ROS) which may cause damage to cell organelles. Due to their high toxicity, there is an urgent need to develop effective heavy metal removal method for wastewater treatment. There are several conventional methods available for the removal of heavy metal ions from contaminated sites. These methods have some disadvantages such as the generation of secondary toxic sludge and high operation cost. Hence, it is required to develop cost-effective and eco-friendly methods for decontamination. Microorganisms have tendency to accumulate heavy metal ions into their intracellular space and can grow in various high-stress environments, and microbial-based methods are considered as eco-friendly and cost-effective. Moreover, the integrated approach of wastewater treatment and utilization of microbial biomass for bioenergy production can be beneficial in terms of heavy metal bioremediation and zero waste generation. This book focuses on the heavy metal contamination, their toxicity and microbial methods for the removal of heavy metal ions from contaminated sites.