

Microbial Remediation Technologies for Mining Waste Management

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Abstract

Mining activities have significantly contributed to pollution and environmental degradation, generating vast amounts of waste that pose substantial risks to ecosystems. Conventional remediation methods often fail to address the complex nature of pollutants in mining wastes. Alternative approaches, such as microbial remediation, have emerged as promising solutions for sustainable remediation of contaminated sites. This chapter provides a detailed overview of microbial remediation technologies specifically tailored to mining and industrial waste. It explores the diversity of microorganisms capable of degrading various pollutants commonly found in these waste, including heavy metals, organic pollutants, and toxic chemicals. Additionally, it examines factors that affect microbial activity and the optimization of remediation processes. Furthermore, it highlights the advantages, limitations, and applicability of microbial remediation techniques for different types of mining and industrial waste. The chapter also discusses the challenges and considerations regarding the real-world implementation of microbial remediation. Additionally, it reviews the synergistic effects of combining different antimicrobial approaches to enhance overall efficacy and efficiency. Overall, this chapter presents a valuable resource for interested parties seeking to understand and apply microbial remediation technologies for mining and industrial waste. By harnessing the power of microbes, these techniques offer promising prospects for restoring contaminated sites, reducing environmental impacts, and promoting sustainable development.

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