Microorganisms

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Special Issue Reprint

Microbial Metabolism and Application in Biodegradation

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Microorganisms are central to biodegradation, the process through which complex organic compounds are transformed into simpler substances via microbial metabolic activity. This capacity is of critical importance across multiple domains, particularly in environmental remediation, where microbial processes offer sustainable and cost-effective strategies for pollution mitigation and ecosystem restoration. Microorganisms contribute to the detoxification and removal of a wide range of contaminants, including hydrocarbons from oil spills, industrial effluents, and agricultural runoff, thereby reducing environmental risks and protecting both ecosystem integrity and human health.

Beyond remediation, microbial metabolism underpins a broad spectrum of applications, including waste management, bioenergy production, pharmaceuticals, biotechnology, and sustainable agriculture. Advancing our understanding of microbial metabolic pathways and their regulation is essential for developing innovative, nature-based solutions to pressing environmental challenges. This Special Issue aims to highlight the recent progress in the exploration, engineering, and application of microbial metabolism, with a focus on its role in driving sustainable development and enabling next-generation biotechnological innovations.

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