

低温微生物修复石油烃类污染土壤研究进展

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摘要

耐冷菌、嗜冷菌等低温微生物广泛存在于极地、高山以及高纬度等土壤环境中, 是石油烃类污染物在低温条件下降解与转化的重要微生物资源. 利用低温微生物的独特优势, 石油污染土壤的低温生物修复技术的研究成为当前热点领域. 本文系统综述了低温石油烃降解菌的分类及冷适机制, 低温微生物对不同石油烃组分的降解特征和降解机理, 低温环境中接种降解菌、添加营养物质和表面活性剂等强化技术在石油污染土壤中生物修复的应用, 以及微生物分子生物学技术在低温微生物降解石油烃的研究现状, 为拓展我国石油污染土壤生物修复技术提供参考.

关键词: 土壤 低温微生物 石油烃污染 生物降解 生物修复

Abstract:

Cold-adapted microorganisms such as psychrotrophs and psychrophiles widely exist in the soils of sub-Arctic, Arctic, Antarctic, alpine, and high mountains, being the important microbial resources for the biodegradation of petroleum hydrocarbons at low temperature. Using the unique advantage of cold-adapted microorganisms to the bioremediation of petroleum hydrocarbon-contaminated soils in low temperature region has become a research hotspot. This paper summarized the category and cold-adaptation mechanisms of the microorganisms able to degrade petroleum hydrocarbon at low temperature, biodegradation characteristics and mechanisms of different petroleum fractions under the action of cold-adapted microorganisms, bio-stimulation techniques for improving biodegradation efficiency, *e.g.*, inoculating petroleum-degrading microorganisms and adding nutrients or bio-surfactants, and the present status of applying molecular biotechnology in this research field, aimed to provide references to the development of bioremediation techniques for petroleum hydrocarbon-contaminated soils.

Key words: soil cold-adapted microorganism petroleum hydrocarbon contamination biodegradation bioremediation

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