

真菌对污染水稻土中苯并[a]芘共代谢降解研究

EFFECTS OF FUNGI ON CO-METABOLIC DEGRADATION OF BENZO[A]PYRENE IN PADDY SOIL

中文关键词: [多环芳烃 \(PAHs\)](#) [共代谢降解](#) [苯并\[a\]芘 \(B\[a\]P\)](#) [真菌](#)

Key words: [PAHs](#) [co-metabolic degradation](#) [benzo\[a\]pyrene](#) [fungus](#)

基金项目: 国家自然科学基金项目 (重点项目)

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中文摘要:

在恒温和恒定转速培养条件下, 模拟生物泥浆反应器法, 选择从石油污染土壤中分离出来的青霉菌、黑曲霉、白腐真菌等3种真菌, 在添加不同浓度菲和邻苯二甲酸作为共存底物情况下, 研究其对水稻土中苯并[a]芘(B[a]P)的共代谢降解。结果表明, 未灭菌土壤对B[a]P有降解能力。当土壤中添加菲时, 提高了B[a]P在土壤中的降解率, 100 mg kg⁻¹浓度菲处理的降解率显著高于200 mg kg⁻¹浓度菲处理, 邻苯二甲酸对B[a]P降解影响不大。灭菌土壤中的B[a]P几乎没有降解。添加菲及邻苯二甲酸均促进了青霉菌对B[a]P的降解, 其中菲浓度为100 mg kg⁻¹处理效果最显著。与灭菌土壤相比, 接种黑曲霉提高了B[a]P的降解率, 但添加菲与邻苯二甲酸却均抑制了黑曲霉对B[a]P的降解。白腐真菌能有效地降解B[a]P, 但高浓度菲抑制了白腐真菌对B[a]P的降解, 同时邻苯二甲酸对促进白腐真菌降解B[a]P的效果不明显。

英文摘要:

Simulated bioslurry remediation of PAHs contaminated soil was carried out. Three strains of fungi isolated from petroleum-contaminated soils were inoculated into paddy soils different in application rate of phenanthrene and phthalic acid, to investigate their effects of co-metabolic degradation of B[a]P therein. Results show that in natural soils, some native microorganisms were able to degrade B[a]P and addition of low molecular weight PAHs-phenanthrene increased, degradation rate of B[a]P in the soil. The effect was greater when the application rate of phenanthrene was 100 mg kg⁻¹ than when it was 200 mg kg⁻¹. But the addition of phthalic acid did not show much effect. In sterilized soils, degradation of B[a]P in soils was hardly observed. However, inoculation of *Penicillium* stimulated degradation of B[a]P in all the three treatments, i.e. phenanthrene at 100 mg kg⁻¹, phenanthrene at 200 mg kg⁻¹ and phthalic acid, but only in the treatment of phenanthrene at 100 mg kg⁻¹ the effect was significant. Inoculation of *Aspergillus niger* also showed similar effect, which, however, was inhibited by the presence of phenanthrene and phthalic acid in the soil. White-rot fungus could effectively degrade B[a]P, but high concentration of phenanthrene inhibited its effect in the soils, and phthalic acid was neither an optimal co-substrates of white-rot fungus in degrading B[a]P in paddy soils.

刘世亮, 骆永明, 吴龙华. 真菌对污染水稻土中苯并[a]芘共代谢降解研究[J]. 土壤学报, 2011, 48(1): 54~61

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