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研究报告

共基质对10株细菌降解芘的作用

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摘要 从石油污染的污泥中分离出10株细菌(SB01—SB10)，研究了有(或无)共基质(葡萄糖Glu，或菲PHE)对细菌降解芘(PYR)的影响. 结果表明：当以PYR为唯一碳源和能源时(MS_1)，SB01的PYR降解率最高，5 d可降解30.4%；以Glu为共代谢基质时(MS_2)，SB09的PYR降解率最高，可达37.7%；以PHE为共代谢基质时(MS_3)，SB10的PYR降解率为50.2%. Glu抑制SB01、SB03对PYR的降解，对SB01抑制作用最明显，使SB01的PYR降解率降低7.9%；Glu对SB02、SB07、SB08、SB10降解率无明显促进或抑制作用. PHE对细菌降解PYR均有促进作用，对SB10的促进作用最明显，使其降解率提高29 8%. Glu与PHE对SB04和SB09降解PYR的促进作用无显著差异，而对其它各菌株而言，PHE对PYR降解的促进作用大于Glu.

关键词 菌株 生物降解 芘 葡萄糖 菲 共基质

分类号

Effects of co-substrates on biodegradation of pyrene by ten bacterial strains

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Abstract

A total of 10 bacterial strains represented as from SB01 to SB10 were isolated from a petrolium-contaminated sludge, and their potential of degrading pyrene (PYR) was investigated on the substrates pyrene (MS_1), pyrene plus glucose (MS_2), and pyrene plus phenanthrene (MS_3). The results showed that on MS_1, the degradation rate of PYR by SB01 was the highest, with 30.4% of PYR degraded after 5 days. On MS_2, the degradation rate of PYR by SB09 was the highest, being 37.7% after 5 days, while on MS_3, 50.2% of PYR was removed by SB01. The degradation of PYR by SB01 and SB03 was inhibited by glucose, which was more obvious for SB01, but no significant difference was observed among SB02, SB07, SB08 and SB10. The biodegradation rate of PYR by all the ten bacterial strains was enhanced on MS_3, and that by SB10 was increased by 29.8%. For SB04 and SB09, the biodegradation rate of PYR had no significant difference between MS_1 and MS_2, but for other strains, the stimulation effect of phenanthrene on PYR degradation was higher than that of glucose.

Key words bacterial strain biodegradation pyrene glucose phenanthrene co-substrate

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