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研究报告

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Cd^{2+}共存时镰刀菌(*Fusarium* sp.HJ01)降解对氯苯酚的特性与机制

Cd^{2+} impact on biodegradation of p-chlorophenol with *Fusarium* sp. HJ01

关键词：镰刀菌(*Fusarium* sp. HJ01) 对氯苯酚 生物降解 重金属

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摘要：为了解Cd^{2+}对镰刀菌(*Fusarium* sp. HJ01)降解对氯苯酚(4-CP)的影响,研究了Cd^{2+}共存时,浓度、pH、碳源与氮源对镰刀菌降解4-CP特性的影响,并分析了其降解动力学与机理.结果表明,在降解温度、4-CP浓度等相同时,Cd^{2+}共存对镰刀菌降解4-CP有一定的抑制作用.Cd^{2+}浓度小于3.0 mg·L^{-1}时,随着4-CP浓度的增大,镰刀菌对4-CP的降解速率变慢.镰刀菌降解4-CP的适宜pH为4.外加碳源蔗糖(3.0 g·L^{-1})与外加NH_4Cl(3.0 g·L^{-1})均使镰刀菌降解4-CP速度有所减缓.在Cd^{2+}浓度0.1~3.0 mg·L^{-1}时,镰刀菌降解4-CP符合零级动力学方程.Cd^{2+}共存时只对4-CP的降解速率产生一定的抑制作用,而对其降解途径可能无显著影响.

Abstract: The effects of concentration, pH, carbon and nitrogen source on degradation of p-chlorophenol (4-CP) by *Fusarium* sp. HJ01 with co-existence of Cd^{2+} were investigated. The kinetic and mechanism of 4-CP degradation by *Fusarium* sp. HJ01 were discussed. It was concluded that cadmium (Cd^{2+}) had a restraining effect on degradation of p-chlorophenol by *Fusarium* sp. HJ01 in the same temperature and concentration of 4-CP. The rate of 4-CP biodegradation with Cd^{2+} coexistence was decreasing with the increasing of 4-CP concentration while Cd^{2+} of concentration was less 3.0 mg·L^{-1}. The suitable pH for degradation of 4-CP by *Fusarium* sp. HJ01 was equal to 4. Addition of 3.0 g·L^{-1} carbon ($C_{12}H_{22}O_{11}$) and nitrogen source could weaken the rate of 4-CP degradation by *Fusarium* sp. HJ01. The kinetic of 4-CP biodegradation could well accord with the zero order equation for 4-CP as the sole carbon source with 0.1~3.0 mg·L^{-1} Cd^{2+} coexistence. Cd^{2+} could decrease the rate of 4-CP degradation, but might not change the pathway of 4-CP degradation.

Key words: *Fusarium* sp. HJ01 p-chlorophenol biological degradation heavy metals