

### 研究报告

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#### CMC-膨润土交联固定镰刀菌反应器对对氯苯酚废水的降解特性

#### 4-Chlorophenol removal in a bioreactor using CMC-Bentonite gel immobilized *Fusarium* sp.

**关键词:** [固定化微生物](#) [镰刀菌](#) [对氯苯酚](#) [CMC-膨润土交联](#)

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**作者单位**

李济吾 浙江工商大学环境科学与工程学院, 杭州 310035

蔡伟建 浙江工商大学食品与生物工程学院, 杭州 310035

**摘要:** 采用CMC-膨润土交联方法固定镰刀菌,研究了其固定方法对4-CP废水的降解效果,考察了固定化生物反应器间歇与连续运行处理4-CP废水的降解性能.结果表明,CMC-膨润土包埋固定镰刀菌对4-CP的降解速率最大;反应器间歇运行时,4-CP的降解率随其初始浓度增加而有所下降,浓度高于 $50 \text{ mg}\cdot\text{L}^{-1}$ 的4-CP降解过程基本上遵循零级反应动力学;当反应器连续运行12 h,停留时间6 h时,浓度 $50 \text{ mg}\cdot\text{L}^{-1}$ 的4-CP被完全降解.

**Abstract:** An innovative CMC-bentonite gel immobilized *Fusarium* sp. was prepared and the removal rate of 4-chlorophenol by a bioreactor containing *Fusarium* sp. immobilized by various methods was investigated. The performance of the bioreactor was investigated at different hydraulic residence times (HRT) for various concentrations of 4-chlorophenol in wastewater, using both batch-recirculation and continuous flow operation. The 4-chlorophenol degradation rate for CMC-bentonite gel-immobilized *Fusarium* sp. was higher under the same conditions than three other tested immobilization methods and free cells. The removal rate decreased with increasing initial concentration of 4-chlorophenol in the bioreactor in batch-recirculation mode. A series of zero-order reaction equations are proposed to describe the biodegradation kinetics of 4-chlorophenol at high concentration in the bioreactor. In a series of bioreactor continuous flow experiments, the overall removal rate remained at about 100% after operation for 12 h with an initial concentration of 4-chlorophenol of  $50 \text{ mg}\cdot\text{L}^{-1}$  and an HRT of 6 h.

**Key words:** [immobilized microorganism](#) [Fusarium sp.](#) [4-chlorophenol](#) [CMC-bentonite gel](#)

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服务热线: 010-62941073 传真: 010-62941073 Email: [hjxxb@rcees.ac.cn](mailto:hjxxb@rcees.ac.cn)

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