

詹琪,廖红福,张敏,杨鼎俊,杨海龙.漆酶催化复合染料酸性黑ATT脱色的研究[J].环境科学学报,2014,34(5):1236-1241

漆酶催化复合染料酸性黑ATT脱色的研究

Decolorization of the compound dye Acid Black ATT catalyzed by laccase

关键词: [漆酶](#) [催化](#) [脱色](#) [复合染料](#) [酸性黑ATT](#)

基金项目: [浙江省自然科学基金项目 \(No.Y3100711\)](#)

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摘要: 利用白腐菌 *Ganoderma lucidum* wz-32 发酵制备的漆酶对印染工业常用的复合染料酸性黑ATT进行催化脱色.在单因子试验的基础上,通过正交优化试验确定酸性黑ATT的最佳脱色条件为:温度50 ℃,染料浓度0.1 g · L⁻¹,酶量9 U · mL⁻¹,pH 5.0,最适条件下酸性黑ATT的脱色率达87.35%.同时研究了金属离子、酶抑制剂、脱色助剂对酸性黑ATT脱色的影响,结果表明,Co²⁺、Fe²⁺、Mn²⁺、Ca²⁺、I⁻对脱色有抑制作用,10 mmol · L⁻¹的浓度使脱色率降低了50%以上;Na⁺、Cu²⁺在低浓度时对脱色有一定的促进作用;SDS显著抑制漆酶的催化脱色作用,浓度为10 mmol · L⁻¹时脱色率降低了68%;HBT是高效的脱色助剂,可显著提高漆酶的脱色效率.

Abstract: The compound dye of Acid Black ATT, one of the commonly used dyes in the printing and dyeing industry, was decolorized by laccase that was produced by the fermentation of a white rot fungus *Ganoderma lucidum* wz-32. Based on the single factor test, the optimal decolorizing conditions for Acid Black ATT was obtained via orthogonal experiment. The optimal temperature was 50 ℃; the optimal dye concentration was 0.1 g · L⁻¹; the optimal enzyme dosage was 9 U · mL⁻¹, and the optimal pH was 5.0. The maximum decolorization rate for Acid Black ATT was 87.35% under the optimal conditions. Moreover, the effects of metal ions, enzyme inhibitors and decolorizing auxiliaries on the decolorization were investigated. Results showed that the decolorization rate decreased by more than 50% in the presence of 10 mmol · L⁻¹ Co²⁺, Fe²⁺, Mn²⁺, Ca²⁺ and I⁻, respectively; both of Na⁺ and Cu²⁺ in low concentration could enhance the decoloration. The catalysis was significantly inhibited by SDS and the decolorization rate decreased by 68% in the presence of 10 mmol · L⁻¹ SDS. HBT was a highly effective decolorizing auxiliary, which could significantly enhance the decolorization efficiency of laccase.

Key words: [laccase](#) [catalyze](#) [decolorization](#) [compound dye](#) [Acid Black ATT](#)

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