

## Decolorization of Textile Wastewater by Immobilized *Coriolus versicolor* RC3 in Repeated-Batch System with the Effect of Sugar Addition

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### ABSTRACT

*Synthetic textile wastewater and real wastewater from Batik dyeing process were decolorized by immobilized white-rot fungus *Coriolus versicolor* RC3 in repeated-batch system. Synthetic wastewater containing 150 ppm of commercial textile dye and 0.5 vvm of aeration was used with 10-liter air-bubble bioreactor. Immobilized cells of the fungus were prepared in potato dextrose broth with 1.5 cm<sup>3</sup> polyurethane foam, incubated at 37°C on 120 rpm orbital shaker for 4 days and used as inoculum. It was found that three cycles of repeated-batch decolorization were obtained with more than 90% decolorization in 24 hours when a half of wastewater was removed and replaced with new fresh dye. Addition of various carbon sources such as glucose, sucrose and molasses in repeated-batch decolorization was also investigated and it was found that 3 g/l of sucrose was selected as the suitable carbon source and 14 cycles of repeated-batch decolorization could be achieved. Decolorization of Batik wastewater obtained from the factory in Lamphun province was also investigated in the same manner. The immobilized fungal cells decolorized up to 80% and 67% of COD value was reduced.*

**Key words:** Decolorization, *Coriolus versicolor*, Laccase, Immobilized cells, Textile wastewater

### INTRODUCTION

Wastewater from textile industries constitute a threat to the environment in large parts of the world, as the degradation products of textile dyes are often carcinogenic. In addition, light absorption hindered by textile dyes creates problems to photosynthetic aquatic plants and algae. The main important pollutants in textile effluent are recalcitrant organic compounds, color, toxicant and inhibitory compounds, surfactants and chlorinated compounds. During processing, 5-20% of the used dyestuffs are released into the process water (Wong and Yu, 1999; Soares et al., 2001) and dye is the most difficult constituent to treat by conventional biological wastewater treatment. In addition to their visual effect and their adverse impact in terms of chemical oxygen demand, many synthetic dyes are toxic, mutagenic and carcinogenic