

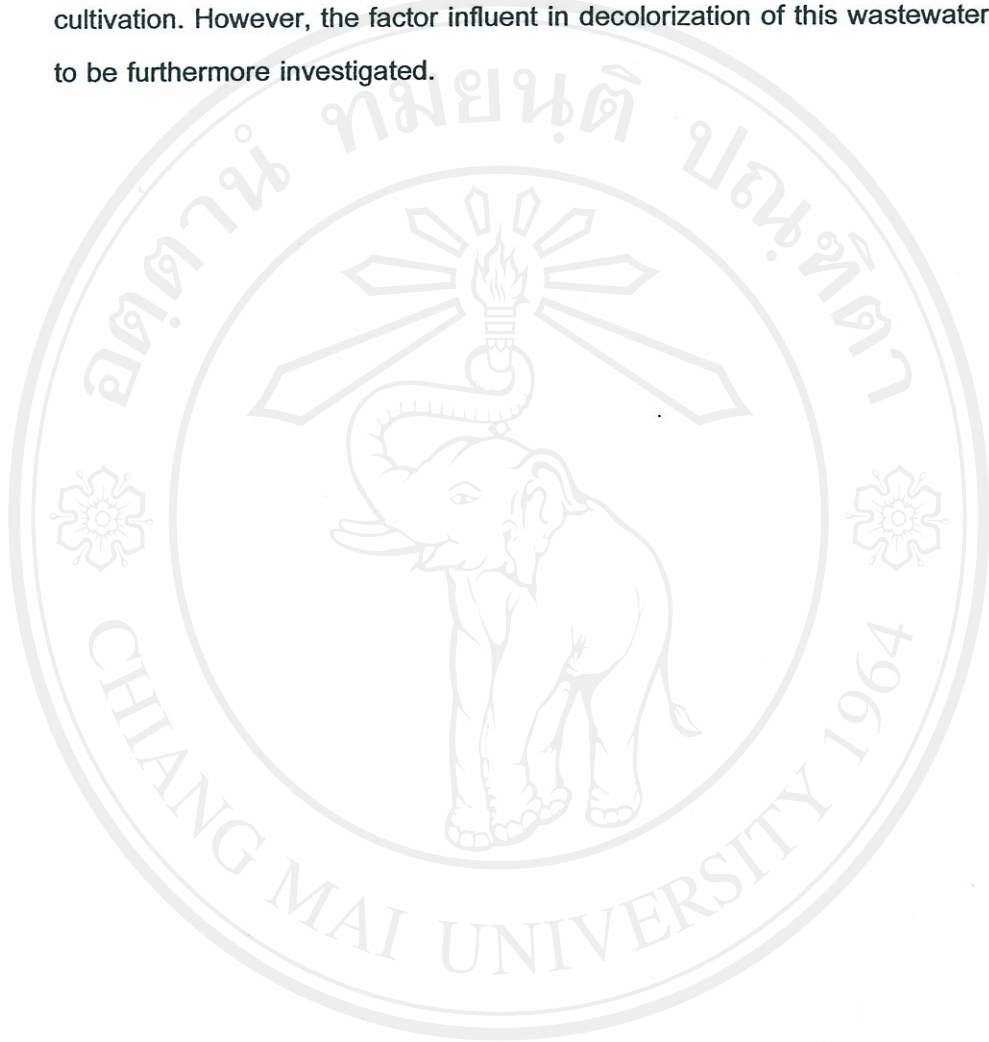
## CHAPTER 5

### CONCLUSIONS

This study can be concluded separately in 4 parts as the following.

1. In batch decolorization; Ammonium oxalate was a best source for dye decolorization and 1 g/l of glucose concentration could maintain a satisfying decolorization. Ammonium oxalate at 0.2 g/l provided a fastest decolorization rate, however, a satisfying decolorization could be also obtained in nitrogen limited condition. Optimal initial pH and ambient temperature were 6.5 and 30–37°C, respectively. Major ligninolytic enzyme produced by the fungus was laccase and could be found up to 6 mU/ml of activity at 84 hours.
2. Cell immobilization; One gram of polyurethane foam per 50 ml of medium broth was a suitable condition for preparation of immobilized *C. versicolor* RC3 by colonization method resulting g dry biomass per kg of polyurethane foam. Packed bed bioreactor was constructed for the immobilized fungus and could be used efficiently in decolorization purpose with simple operation.
3. Continuous decolorization; Optimal warming-up time of decolorization in the reactor was 5 hours. At 8 hour of HRT with 1 cm<sup>3</sup> PUF, 90% and 80% decolorization could be obtained within 120 and 156 hours, respectively, and the duration for obtaining a satisfying decolorization was increased when increased HRT. Suitable size of PUF was 1.5 cm<sup>3</sup>, that could maintain almost 2 weeks of decolorization duration under 8 hours of HRT. Quantity of dye removal was increased when increased dye concentration, however, the remaining dye in effluent was also increased under the condition of 1.5 cm<sup>3</sup> PUF and 8 hours of HRT. The average value of laccase activity found during continuous decolorization was 6.5 mU/ml. It tended to be increased when PUF size was increased and maximum activity was found almost 30 mU/ml in the initial period of continuous running (at 20 hours).

4. Decolorization of Batik wastewater; *C. versicolor* RC3 exhibited the potential to use in decolorization of real textile wastewater collected from Batik factory in Lamphun. More than 80% decolorization could be obtain in 4 days of batch cultivation. However, the factor influent in decolorization of this wastewater has to be furthermore investigated.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright© by Chiang Mai University  
All rights reserved