



## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

The microwave-assisted KOH pretreatment with on corn cobs was effective in improving enzymatic hydrolysis accessibility. According to an increase in pretreatment temperature, pretreatment time, and KOH concentration improved enzymatic hydrolysis. Among the variables studied, the KOH concentration had the most significant impact on enzymatic hydrolysis. The higher KOH concentration, higher temperature, and longer time during pretreatment resulted in higher solid loss and also higher lignin removal; therefore, leading to less total sugar concentration. Glucose was the major components in total sugars produced after hydrolysis with fair amount of xylose and arabinose. The optimum conditions were found at 2% KOH at 120 °C for 25 min which can reduce hemicellulose and lignin by 38.15% and 6.64%, respectively, and increased in surface area by 45.67%. The highest glucose concentration can reach up to 19.49 g/L and total sugar was released 34.79 g/L. Moreover, microwave assists KOH pretreatment can produce the highest total sugar concentration, which compared with autoclave and conventional heating. The microwave assists KOH pretreatment produced total sugar concentration at shorter pretreatment time compared with autoclave.

#### 5.2 Recommendations

Pretreatment with two-stage consists of microwave/acid followed by microwave/alkali, which can improve monomeric sugar released. In addition, microwave/acid/alkali with H<sub>2</sub>O<sub>2</sub> pretreatment had the highest hydrolysis rate and glucose content in the hydrolyzate (Zhu *et al.*, 2006). Drying of pretreated lignocellulose can cause a collapse in pore structure, resulting in a decreased (enzymatic) hydrolysability (Hendriks and Zeeman, 2009).