

CHAPTER V

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Dilute sulfuric acid and phosphoric acid pretreatments contributed to the successful method for improving enzymatic hydrolysis. The highest total monomeric sugar, surface area, and crystallinity index were obtained in the corncobs pretreated with 2% (w/w) H_2SO_4 120 °C for 5 min and 10:1 LSR. While corncobs pretreated with 2% (w/w) H_3PO_4 140 °C 10 min and 10:1 LSR gave total monomeric sugar and crystallinity index which are similar to the highest condition obtained from sulfuric acid pretreated samples. In term of furfural formation, an inhibitor, sulfuric acid pretreatment gives lower content than phosphoric acid pretreatment. In order to remove inhibitors, lime detoxification or overliming has been recognized as an effective procedure. Acetone-Butanol-Ethanol (ABE) yield and productivity were significantly increased with a minor decrease of furfural. Therefore, furfural might not be the major effect to inhibit culture. The main benefit of Simultaneous saccharification and fermentation (SSF), which is performing enzymatic hydrolysis together with fermentation instead of in a separate step after hydrolysis, is to reduce inhibition of enzymatic hydrolysis. To enhance ABE yield, optimization by using Response Surface Methodology (RSM) with important variables such as pH, temperature, and time were performed. A high ABE concentration was obtained under an optimal condition of pH 6.30, 35.7 °C, and 61.2 h. In addition, SSF with sugar supplementation can improve ABE concentration compared with non-sugar supplementation.

5.2 Recommendation

For the future work, detoxification by using other methods, such as activated carbon, should be performed and compared with the overliming step. Moreover, optimization using RSM is supposed to vary the temperature range of 35–40 °C comparing the results with this work.