CHAPTER VIII
CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Mission grass (*P. polystachyon*), Kans grass (*S. spontaneum*), Giant reed (*A. donax*), and Tiger grass (*T.maxima*) in Thailand show a potential as a biofuel feedstock by the two-stage microwave/chemical pretreatment process. The maximum monomeric sugars released from microwave-assisted NaOH pretreatment were in a range of 5 to 7 g/100 g biomass while the acid-assisted pretreatment resulted in a range of 30-43 g/100 g biomass at different pretreatment temperatures/times and acid/alkaline concentrations. This two-stage pretreatment is an effective technique to remove lignin, disrupt the structure of lignocellulose, and release high monomeric sugars yields, especially glucose.

Using the two-stage microwave/chemical pretreatment and enzymatic hydrolysis, the maximum monomeric sugar yield of *T. maxima* by *T. viride* C1794 was 110.4 g/100g biomass at optimum conditions. The hydrolysis process using *T. viride* is also an impressive process for preparing the monomeric sugars.

After the chemical pretreatment followed by enzymatic hydrolysis, the fermentation process provided the highest ethanol yield of 16 g/L when using *P. polystachyon* hydrolysate within 24 h and *S. cerevisiae* TISTR 5596 with overliming at pH 10.

8.2 Recommendations

1. Use of a cellulase mixture from different microorganisms or a mixture of cellulases and other enzymes in the hydrolysis of cellulose.

2. Study of enzyme recycling method for reducing cost of the hydrolysis process.

3. Use of a microorganism mixture or other microorganisms for converting xylose and glucose to ethanol.