

## **CHAPTER V**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Conclusions**

In this research, the hydrogen production from the alcohol distillery wastewater in an ASBR system under the thermophilic temperature of 55 °C and a controlled pH of 5.5 was found to greatly depend on the COD loading rate, as well as the amounts of VFA and alcohol produced. The optimum conditions for the maximum hydrogen percentage in the produced gas (19.72 %) and minimum VFA and alcohol concentrations were a COD loading rate of 45 kg/m<sup>3</sup>d and a HRT of 21 h. These conditions resulted in the hydrogen yield of 56.1 ml H<sub>2</sub>/g COD removed and the specific hydrogen production rate of 65.3 ml H<sub>2</sub>/g MLVSS d (or 562 ml H<sub>2</sub>/l d). Methane was another produced gas from the ASBR system due to the presence of the methanogenic bacteria survived at high substrate concentration.

#### **5.2 Recommendations**

In order to reduce the toxicity of potassium in the alcohol distillery wastewater, it is interesting to investigate the effect of chemical addition for potassium reduction. Moreover, other kinds of wastewaters, e.g. paper wastewater and potato wastewater, are of interest to be used as carbon sources for the ASBR operation.