

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATION

#### 5.1 Conclusions

Partial hydrogenation of polyunsaturated FAMES of soybean oil biodiesel has been investigated on Pd/SiO<sub>2</sub>, Pt/SiO<sub>2</sub>, and Pd/SiO<sub>2</sub> catalysts, under pressure 0.4 MPa, 80-120 °C, 150 ml/min of H<sub>2</sub> flow rate, 1000 rpm of stirring rate, and 1 wt.% of catalyst compared to starting oil. It was found that the Pd catalyst presented the highest catalytic activity since it could convert both C18:3 and C18:2 rapidly after 4 h of reaction time. Moreover, it substantially increased the amount of *cis*-C18:1. On the other hand, Ni catalyst showed the lowest catalytic activity. Moreover, the effect of magnesium-modified and temperature on partial hydrogenation were studied. The result showed that increasing temperature of partial hydrogenation of polyunsaturated FAMES leads to an increase of *trans*-C18:1. In addition, it was found that all magnesium-modified catalysts decreased *trans*-C18:1 formation in the partial hydrogenation of soybean oil biodiesel. Nevertheless, partial hydrogenation reaction plays an important role to improve the biodiesel properties especially oxidative stability.

#### 5.2 Recommendation

Finding the new type of support, which has high surface area and low-cost is another attractive study.