

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

The production of biodiesel involves the reaction of triglycerides with methanol in the presence of an alkaline catalyst, to produce methyl ester. However, soap is formed during the reaction. Methyl ester is employed a water-washing step to remove soap, excess alcohol and catalyst by changing them to the water soluble phase, but it does not eliminate effectively some of contaminants such as phosphorus, FFAs residue and moisture.

In this study, the reduction of the FFAs from the biodiesel, which is synthesized from crude palm oil via base-catalyzed process with adsorbents, was studied. The adsorbents are including magnesol which is commercial grade, activated charcoal (powder and granule form), alumina, molecular sieve, bentonite clay and NaOH treated bentonite clay. The optimum condition for biodiesel production was a 16:1 molar ratio of methanol:oil, 1.4 %wt of sodium hydroxide reaction temperature 50°C for 1.50 h. The biodiesel was achieved a conversion of 88-96% and has 0.184 % of FFAs content. Then, the biodiesel was purified with seven adsorbents, which adsorbed the impurities such as FFAs content, total moisture and metals content by ASTM standard. The activated charcoal (powder), magnesol and basic alumina were good adsorbents at 30°C for 30 min. Although basic alumina was good adsorbent, it was expensive, so only the results of the activated charcoal and magnesol were compared. The selected activated charcoal gave FFAs as $0.014 \pm 0.002\%$, reduced moisture content, adsorbed group metal IA and IIA and phosphorus at adsorption temperature 60°C for 30 min. In addition, it was adsorbed colour which is pigments of palm oil. When analyzed surface area, it was found that the activated charcoal and magnesol, it was found that activated charcoal in powder form gave more surface area than magnesol. Furthermore the activated charcoal could be recovered and reused up to 8 times while magnesol could be recovered and reused only a few times. Moreover, methanol, which used for washing the adsorbents, could be reused for synthesizing

the methyl ester. Therefore, the activated charcoal (powder) is the appropriate adsorbent for reducing the FFAs content of biodiesel compare to magnesol.

5.2 Suggestion

Study new natural adsorbent for methyl ester purification such as laterite, calcite, combined adsorbents, etc.