

CHAPTER V CONCLUSIONS

Diesohol is an alternative diesel fuel being used in many countries. In Thailand, diesohol is not commercially used since it has some limitations to using in diesel engine. Biodiesel is found to be an additive in diesohol due to its properties as the solubility in both diesel fuel and ethanol, and high cetane number and flash point. However, there are still some problems about phase separation and low flash point in diesel-biodiesel-ethanol 99.5% systems which can be solved in diesel-biodiesel-butanol 99.9% system. Therefore, 3 types of biodiesel were prepared and used as an additive in order to investigate the phase stability and evaluate fuel properties of ethanol-biodiesel-diesel and butanol-biodiesel-diesel three-component systems. The results of this study could be concluded as follow:

1. In each of the three biodiesel esters (PME, PEE, and PBE), the most common fatty acids were Oleic and Palmitic acids at approximately 45 and 39 %, respectively.
2. The solubility of diesel-PME-alcohol was slightly higher than the solubility of diesel-PEE-alcohol and diesel-PBE-alcohol.
3. At temperatures of 10-30°C, the solubility of diesel-biodiesel-butanol was higher than the solubility of diesel-biodiesel-ethanol.
4. The use of butanol in diesohol could solve the problem with phase separation according to more solubility in diesel fuel.
5. The addition of alcohol to diesel fuel decreased fuel density, kinematic viscosity, and cetane number but it could be compensated by adding biodiesel.
6. Fuel properties of diesohol using PME, PEE, or PBE as an additive were not significantly different.
7. The blends of diesohol containing butanol have the properties close to diesel more than the blends of diesohol containing ethanol.
8. The blends containing butanol enhance the flash point which is a crucial problem of diesel-ethanol blend.

9. The blend of 85% diesel, 10% PEE, and 5% butanol was the most suitable as it provided stable mixture and acceptable fuel properties for using as an alternative fuel used in diesel engine.