

CHAPTER V

CONCLUSION AND SUGGESTION

5.1 Conclusion

The nitrate compound from vegetable oils such as palm oil and soybean oil could be synthesized and used as a cetane improver in diesel fuel. Firstly, transesterification of vegetable oils with methanol using sulfuric acid as a catalyst gave a methyl ester product. Epoxidation of methyl ester product with peroxy acid gave an epoxide product. Then hydrolysis of the epoxide product with hydrochloric acid gave the diol compound. Nitrate compound could be prepared from the nitration of diol compound with concentrated nitric acid and concentrated sulfuric acid, while maintaining the temperature of the reaction at $0\pm 2^{\circ}\text{C}$ in the presence of dichloromethane. These synthesized nitrate compounds were palm oil nitrate and soybean oil nitrate.

In this study, all of products were obtained in high yield. These synthesized nitrate compounds were easily soluble in base diesel fuel which did not change their physical properties within the specification of diesel fuel at the concentration of 0.05% to 1.00% by weight. The palm oil nitrate gave lower cetane number as comparing with purified palm oil nitrate and soybean oil nitrate which increased to 4.4, 6.8 and 6.8 units at 1.0% by weight, respectively. At the similar concentration, the synthesized nitrate compounds gave lower cetane numbers as comparing with 2-ethylhexyl nitrate, the commercial available cetane improver.

Nitrate compounds from vegetable oils were a new alternative to be used for improving cetane number in diesel fuel.

5.2 Suggestions for the future work

Even though, the nitrate compounds from vegetable oils could not compete with a commercial improver, 2-ethylhexyl nitrate, but the nitrate compounds from vegetable oils may possible improve the lubricity of the fuel as well as heat stability. Then, these properties should be studied, as concentrate on nitrate group and methyl ester group on the same molecule.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย