CHAPTER 5

CONCLUSION

Synthetic ester derived from castor oil was obtained by transesterification and then hydrogenation. Its properties both physically and chemically were suitable for use as a lubricating oil.

2-Ethylhexanol was selected for transesterification of castor oil. The optimum condition for transesterification was at temperature 80^{o}C and reaction time 3 hours. The physical and chemical properties of the product were as follow: color was equal to 2.0-2.5, pour point was lower than -15^{o}C, viscosity index was 131, flash point was 240^{o}C and oxidative compounds were 27.55%wt. The product was 85.66%yield.

Hydrogenation process was operated in a batch reactor under hydrogen. The used catalyst contained 3%wt of platinum supported on alumina. The optimum condition for hydrogenation was 4%of catalyst concentration, under hydrogen partial pressure 100 psi, at temperature 100^{o}C and reaction time 3 hours.

From this study, it could be concluded that the main compositions of hydrogenated oil were:

(1) 2-ethylhexyl stearate ($C_{26}H_{52}O_2$)

(2) 2-ethylhexyl-12-hydroxy stearate ($C_{26}H_{52}O_3$)

(3) 2-ethylhexyl-12-keto stearate ($C_{26}H_{50}O_3$)

The physical and chemical properties of hydrogenated product which performed at the optimum condition were as follow: color was 0.5-1.0, pour point

was -10°C, viscosity index was 149, flash point was 238°C and oxidative compounds were 15.96%wt. This product had also good thermal and oxidation stability.

Up to this point, the hydrogenated oil could be used as a lubricating oil in automotive engines because of its high viscosity index, low pour point and good thermal and oxidation stability.