

## CHAPTER 1

### INTRODUCTION



Lubricant play a very important role in our society friction in every movable part of all types of machines, such as bearing, gears, screws, sliding surface, pistons and cams. Lubricants are therefore used in these components to reduce friction and subsequent power losses, ensuring a longer service life for the machine as a whole.

Mineral oil firstly overtook oil of animal and vegetable origin as the essential lubricant. After that, as the aerospace industry developed in the 20th century, it became necessary to introduce alternative, synthetic lubricant. Synthetic lubricants are synthesized by chemical reaction of a very limited number of well defined components. The types of synthetic lubricants are polyalphaolefins, alkylated aromatics, polybutenes, aliphatic diesters, polyolesters, phosphate esters and polyalkylene glycol. From these types of synthetic lubricants, esters widely use as the main lubricants because of their high viscosity index(VI), low pour point, good thermal stability, low volatility, and good response to many types of additives. In addition, the important property of ester is environment safety. The chemistry of ester is being modified so as to produce compounds which have high biodegradability, low toxicity and clean engine emissions. So, the synthetic ester lubricants are used extensively.

Soybean oil has been defined chemically as the ester of fatty acids with the trihydric alcohol, glycerol. Therefore, in this study, soybean oil was chosen to be raw material for synthesizing ester lubricant by chemical reaction process.

### Objective of This Research

The objective of this research is to synthesize the synthetic ester lubricant from soybean oil by transesterification and hydrogenation and to study the physical and chemical properties of blended oil between the synthetic ester lubricant and petroleum lube base oil.

### Scope of This Research

Soybean oil was reacted with various alcohol in transesterification process. Then, each monoester product was hydrogenated with the platinum catalyst on alumina. The products which obtained from each alcohol were chosen to use as the synthetic lubricant by determining the suitable physical and chemical properties. Moreover, the hydrogenated products were blended with petroleum base oil for observing viscosity index improver value.