

## CHAPTER I

### INTRODUCTION



Lubrication has generally been applied to a moving surface in order to reduce friction on the surface, leading to the reduction of wear of the surface. Lubrication has commonly been established by inserting a sufficiently thick film of lubricant between two moving surfaces. Lubricant from petroleum oil have been separated from a relatively high boiling fraction of petroleum oil by vacuum distillation in order to avoid thermal decomposition of its constituents. Besides the friction of moving surfaces, lubricants may be employed to remove heat generated and to flush metallic chips during machine-tool operations, or to control surface corrosion by coating as a protective film. Vegetable and animal oils have a long history of usage in lubrication. In addition, vegetable oils are used as feedstocks for oleochemical industry to produce a wide variety of chemical products. These chemicals have been used in many applications, including lubricants, surfactant industries, surface coating industries and ethers as additives of for the production of synthetic materials such as ester base fluids.

Lubricant, which are used for machine-tool operations, are known as "cutting fluids" or "metalworking fluids" Metalworking fluids are usually mixtures of petroleum and several additives. Petroleum lubricant has been manufactured domestically, while additives have been imported from other countries.

In the point of view of sustainable development, various reproducible organic compounds, such as vegetable oils, have been manufactured domestically from agricultural industries. Various vegetable oils; i.e. coconut oil, plam oil soybean oil, rice bran oil have been produced in Thailand. In order to provide another alternative of vegetable oils utilization, these vegetable oils, which were used as lubricating oils, may improve some properties of metalworking fluids. In these circumstances, some imported additives might be replaced by certain vegetable oils.

Palm oil, rice bran oil, soybean oil and coconut oil, which have been refined were used in this research, for studying viscosity, lubricity, flash point and copper strip corrosion. The significant of viscosity is generally the most important controlled property for manufacture and selection. While lubricity indicates anti-wear properties of lubricating oil. For flash point, which is important for safety operation the highly risk operating temperature can be avoided. While copper strip corrosion indicates the effect of corrosive oil.

### **1.1 Objective of the study**

1.1.1 To measure properties of vegetable oils for using in neat cutting oil.

1.1.2 To develop expressions for predicting the properties of the mixture between base oil and vegetable oils.

### **1.2 Outline of the study**

This project studies properties analysis of 4 vegetable oils and paraffinic base oil and analysis after adding 5-20% w/w of 4 different vegetable oil e.g. palm oil, coconut oil, rice bran oil and soybean oil. Viscosity, lubricity, flash point and corrosion are key factors of these studies.