CHAPTER 1

INTRODUCTION

The requirement for lubricants to perform over increasing temperature ranges, that can not be accommodated by mineral oil, is causing a move away from mineral oil to synthetic lubricants. Although these products still represent a small volume proportion of the lubricants used today, their range of applications is extending steadily, including automotive engine oils, marrine engine oils, transmissions and industrial lubricants.

The terms "synthetic" is used to describe the basestocks used in these lubricants. Synthetic basestocks are synthesized by chemical reaction of a very limited number of well defined components. For example, polyalphaolefins are derived from ethylene, and esters are synthesized from acids and alcohols. In this way the synthetic basestocks can be controlled and can provide desired properties. This is in contrast to petroleum basestocks (or mineral oils) which are composed of many compounds of varying chemical composition depending upon the method of refining and source of crude stock.

The advantages of synthetic base oils comparable petroleum base oils are (1)improved thermal and oxidation stability, (2)more desirable viscosity-temperature characteristics, (3)superior volatility characteristics and (4)preferred frictional properties. These special properties are obtained because of the nature of the synthetic molecules or the absence of unwanted components (such as sulpher, nitrogen or wax components) that are present in petroleum base oils. The synthetic base oils can also have some disadvantages such as hydrolytic and

corrosion behavior. A combination of different synthetic base oils or additive chemistry will need to be used to compensate for the missing properties.

Nowadays, many compounds are investigated as possible synthetic base oils. The major types are polyalphaolefins, alkylated aromatics, polybutenes, esters, polyalkyleneglycols and phosphate esters. Amongst these, esters are widely use as the main lubricants because of their high viscosity index, low pour point, low volatility and good thermal stability. In response to increased environmental pressure, the chemistry of esters is being modified so as to produce compounds which have high biodegradabilities, low toxicity and clean engine emissions. Raw materials that received significant attention for providing synthetic esters are vegetable oils such as castor oil.

Castor oil, known primarily for its medicinal use as a cathartic, is now used primarily as an industrial raw material for the preparation of chemical derivatives used in coatings, surfactants and dispersants, cosmetics, lubricants, etc. Castor oil is a unique fatty oil containing a major amount of ricinoleic acid. The oil has three functional groups: double bonds, esters and hydroxy groups, which open numerous possibilities for chemical reactions.

This present study purposes to synthesize ester used as lubricating oil from castor oil by transesterification and then hydrogenation of double bonds using Platinum catalyst and to determine the physical and chemical properties of prepared ester.