

CHAPTER I

INTRODUCTION

At present, the development of vegetable oil industry in Thailand has diversified greatly. One of the low-price commodities such castor oil is now becoming an important export and its price is usually competitive in the world market. About sixty percent of the exported castor oil was used in the automotive industries and the others were used in cosmetic, lubricants, adhesive, etc [1]. Due to the functional groups of castor oil, it could be transformed to many products by various chemical reactions. Thus, castor oil is an agricultural product which contribute significantly to the country foreign exchange earning.

Hydrogenation is another means of modifying fat and oil. Methyl ricinoleate is prepared from transesterification of castor oil by acid or basic catalyst with methanol [2]. Then, the catalytic hydrogenation of methyl ricinoleate produces the methyl ester wax (Methyl 12-hydroxystearate). This hydrogenated product is white wax solid, insoluble in water, limited soluble in organic solvents. It is used as low temperature plasticizer for rubber and plastic, pigment dispersion for elastomer and plastic including the composition of adhesives, inks, and cosmetics. It is a convenient source of hydroxystearic acid for glyceride-free multipurpose lithium grease.

This research work relates to a process for continuous hydrogenation of methyl ricinoleate. The nickel catalysts were prepared by impregnation of nickel nitrate on alumina support, which was used as heterogeneous hydrogenation catalyst in a continuously tubular reactor. So, the continuous hydrogenation of methyl ricinoleate to produce methyl ester wax could be obtained.

1.1 Objectives of this research

- 1.1.1 To prepare the nickel catalysts on alumina support for hydrogenation of methyl ricinoleate.
- 1.1.2 To investigate the continuous hydrogenation in a home-made tubular reactor and study the optimum conditions for the hydrogenation of methyl ricinoleate.
- 1.1.3 To study the properties of products obtained from the reactions.

1.2 Scope of this research

- 1.2.1 Preparing nickel catalysts using the impregnation method.
- 1.2.2 Preparing methyl ricinoleate from transesterification of castor oil.
- 1.2.3 Selecting the optimum operating conditions by varying these following parameters:
 - Concentration of catalyst (weight of metal per weight of support)
 - Reaction temperature
 - Hydrogen pressure
- 1.2.4 Studying the chemical properties of products obtained from the reaction.
 - Iodine value (I.V.)
 - Melting point (M.P.)
- 1.2.5 Studying percent of composition of product that obtained from the reaction by gas chromatograph-mass spectrometry (GC-MS).