CHAPTER 1

INTRODUCTION

At present, the development of vegetable oils industry in Thailand has diversified greatly and the once low-key commodity such as castor oil is now becoming an important export. Its price in the world market is usually competitive. During the last four years, the average quantity of castor oil export was about 8,730 tons/year and its value was about 225 million bahts/year (1). Thuse, castor oil is an agricultural product which contribute significantly to the country foreign exchange earning. Therefore, Thai farmers should be encouraged to grow castor instead of other low-price crops. In order to increase the value-added to the country further, down-stream products from castor oil should be developed for examples; dehydrated castor oil, hydrogenated castor oil, sulphated castor oil, etc.

Hydrogenation is another means of modifying castor oil. The catalytic hydrogenation of castor oil produces castorwax (12-hydroxystearate), also known as Opal wax, a hard, brittle, high melting wax-like product. Insoluble at room temperature in most organic solvents but highly compatible with many resins and waxes, it is used in compositions where grease and solvent-resistance, hardness or higher melting points are desired. It is noted for its sharp melting point and minimum shrinkage. Paper coating based on castorwax alone exhibits grease as well as moisture resistance, therefore it is utilized in food packaging. It is a convenient

source of hydroxystearic acid for the manufacture of lithium and calcium multi-purpose petroleum base greases exhibiting high drop points, resistance to water high performance and storage stability. Even more, it is used in the surface-coating industry, where it is valued as a pigment-dispersing on anti-settling agent in paints in order to improve their brushing qualities and reduce the tendency of thick coating. Therefore, the hydrogenation of castor oils should be studied to produce castor wax.

1.1 The Objective of This Research

1.1.1 To study the catalyst preparation technology (Impregnated nickel catalysts and Raney nickel)

1.1.2 To find out the optimum condition for hydrogenation of castor oil

1.2 The Scope of This Research

1.2.1 Preparing several in-house catalysts by using impregnation method and leaching method.

1.2.2 Screening commercial catalysts

1.2.3 Selecting an optimum operating conditions by varying these following parameters:

- Reaction temperature 80, 100, 120, 140, 180°c
- Hydrogen pressure 75, 125, 150, 175 psig
- Reaction period 1, 2, 3, 5 hours
- Concentration of catalyst in oil 0.05, 0.2, 0.5 %
- Agitation 200, 400, 800 rpm.

1.2.4 Comparing the in-house catalysts to the best commercial catalyst.

1.2.5 Studying the effect of the particle size and nickel loading of the impregnated nickel catalysts on the properties of the hydrogenated product.