

CHAPTER VII

CONCLUSION AND RECOMMENDATION

The conclusion of hydrogenation of methyl ricinoleate are the followings :

1. The suitable commercial catalysts for hydrogenation are Ni 3609F, Ni 3712F, and Ni 3742D. The best commercial catalyst Ni 3742D is considered for the hydrogenated product with the minimum iodine value value of 1.85, the maximum melting point of 48.5 °C and the shortest induction period

2. The suitable operating condition for hydrogenation of methyl ricinoleate by using the best commercial catalyst, Ni 3742D, is reaction temperature 150 °C, hydrogen pressure 150 psig, agitation speed 800 rpm, hydrogenation time 2 hours, and catalyst concentration of 0.07% Ni/oil.

3. The initial hydrogen feeding gives better quality products than the initial nitrogen feeding at the same operating conditions. Thus, the some operating parameters ; such as temperature, reaction time, and catalyst concentration may be economically considered to be decreased for hydrogenation for hydrogenation of methyl ricinoleate to give the desired products.

4. One of the suitable operating conditions for hydrogenation of methyl ricinoleate at the initial hydrogen feeding by using Ni 3742D catalyst is reaction temperature 150 °C, hydrogen pressure, 150 psig., agitation speed 800 rpm,

hydrogenation time 2 hours, and catalyst concentration of 0.03% Ni/oil.

5. The storage time of methyl ricinoleate is one important factor in hydrogenation to give the desired product. The longer storage time is increased, the lower quality hydrogenated product is obtained.

6. For the hydrogenated product obtained from the longer storage time of raw material may be improved quality by using the initial hydrogen feeding hydrogenation.

This commercial catalyst, Ni 3742D, has no more information of its properties. It is the interesting catalyst because of its rapid activity. This catalyst, however, is not completely characterized in this study due to the limitation of time. To complete the research, the works would be recommended to do the followings :

1. The nickel catalysts should be prepared in the laboratory to compare with the commercial nickel catalysts in activity, particle sizes of catalyst, catalyst loadings and operating conditions for desired hydrogenated products.

2. To study chemical and physical structure, the commercial and synthesized catalysts should be characterized. The methods of characterization are the determination of total surface area by CO absorption, void fraction, and pore size distribution. Crystallite size may be determined by x-ray line broadening or by direct observation in electron microscopy.

3. The oil storing and storage time ought to be more studied for preservation the oil properties. From the study of hydrogenation of methyl ricinoleate, however, shows the important prevention of hydrogen gas feeding on hydrogenation. If the atmosphere over the oil level in the storage drum is nitrogen gas, the oil decomposition would be reduced substantially during storing.

4. To check mass transfer limitation surely, the agitation motor should be changed to give the higher speed over 800 rpm. Consequently, the kinetic of the reaction could be studied.