

CHAPTER V

CONCLUSION

This research aimed to study the activity and the selectivity of catalysts in the hydrogenation of soybean oil. The objective for accomplishment was a development of a process for the partial and selective hydrogenation of soybean oil using nickel on ball clay, china clay and diatomite catalysts. The operating condition was studied for each type of catalysts, in order to produce oleic acid and/or stearic acid.

The activity of the prepared catalysts was dependent on acidity and surface area of support catalyst. The increasing of acidity and surface area increased the catalytic activity. The selectivity of the prepared catalysts was not only dependent on morphology of support but also dependent on the condition of reaction.

The suitable catalyst in this study for the hydrogenation of soybean oil to give good yield of oleic acid was 10%Ni on ball clay. The suitable operating condition for the hydrogenation of soybean oil using the 10%Ni on ball clay (NiB) catalyst to produce oleic acid was 150 °C reaction temperature, 150 psig. hydrogen pressure, 120 minutes reaction time, 600 rpm. agitation speed, and catalyst concentration of 0.05 % by weight of oil. Under this condition, the hydrogenation of soybean oil at the selected condition provided the hydrogenated product, which was composed of 69.93 %w/w of oleic acid. The iodine value was 108.6.

The hydrogenation of soybean oil by NiB catalyst at 180 °C reaction temperature, 200 psig. hydrogen pressure, 180 minutes reaction time, 600 rpm. agitation speed, and catalyst concentration of 0.05 % by weight of oil gave waxy product with composed 68.47% stearic acid as the main constituent.

Suggestion for further work

1) The catalysts with incorporated promoters should be prepared. The activity and the stability of the hydrogenation catalyst which would be affected to a certain degree by promoters should be studied.

2) To improve the hydrogenation process, the catalytic transfer hydrogenation using sodium formate to increase rate of reaction should be studied.