

Thesis Title	Improvement of Saponification Process and Properties of Waste in Production of Carotenoids from Crude Palm Oil
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ABSTRACT

The study on improvement of saponification process and properties of waste in production of carotenoids from crude palm oil was aimed to 1) determine the optimum amount of sodium hydroxide used in saponification 2) investigate the partial replacement of ethanol by water for dissolution of sodium hydroxide in the reaction of saponification and 3) assess the quantity, quality and value of fat, soap and glycerine in the waste from processing of carotenoids.

The optimum amount of sodium hydroxide for saponification using 100% ethanol was 25% by weight of carotenoid extract. The carotenoids quantity and relative recovery were not significantly different ($p>0.05$) as compared to the values obtained when 100% of sodium hydroxide was used.

Up to 40% replacement of ethanol by water was effective as sodium hydroxide dissolution medium. The reduction of ethanol still allowed complete reaction of saponification with 90% sodium hydroxide. This resulted in similar carotenoids quantity and relative recoveries ($p>0.05$) as compared to the use of 60% ethanol and 100% sodium hydroxide.

According to the values of carotenoids and waste, the optimum condition for saponification was using 100% ethanol and 25% sodium hydroxide. It gave the highest values of carotenoids and waste of 68.36 Baht/kilogram of crude palm oil. Fat content of the waste was 63.22%. The properties of fat were similar to the standard properties of natural palm oil. The lowest production cost was obtained from the use of 60% ethanol, 40% water and 90% sodium hydroxide. This resulted in

15.40% cost reduction as compared to the use of 100% ethanol and 100% sodium hydroxide.



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