EPOXIDATION OF PALM OLEIC ACID BY USING PERACID MECHANISM AND KINETIC STUDY

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2019

AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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SUPERVISOR'S CERTIFICATION

I declared that I read this thesis and in my point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honors.

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ACKNOWLEDGEMENT

First and foremost, I am thankful to God for giving us strength and guidance to finish this report. Special thanks to Sir Mohd Jumain bin Jalil, my final year project supervisor of who has contributed his knowledge towards my understanding that has guided me throughout this research project. His comments, advices and guidance made me proud and enjoy collaborating with him. I would like to extend my appreciation especially for my friends for their cooperation and willingness to complete this work. They were always there to help me in sharing different opinions and guided me when there are misunderstanding about this topic. My thanks also go to parents and family for giving me such as worthwhile, motivation, financial support and love throughout our thick and thin. May Allah bless all of you. Thank you.

ABSTRACT

This research study to determine the effect of hydrogen peroxide (H_2O_2), temperature and agitation speed toward epoxidation palm oleic acid by organic catalyst. Currently, the study about palm oil not very popular as researcher tend to study about other vegetable oil such as canola seed or soybean. As palm oil were abundant in Malaysia as Malaysia is number 2 of world palm oil supplier, a study of palm oil is necessary to expand number of researches in order to increase the quality of palm oil production. From the objective, palm-based oleic acid was first epoxidized by using performic generated with *in situ*. The parameter study included reaction temperature (40^{o}C, 60 ^{o}C and 80 ^{o}C) unsaturation molar ratio of hydrogen peroxide to formic acid (1:1, 3:1, 5:1) and agitation speed (200 rpm, 400 rpm and 600 rpm). For constant parameter involves for epoxide were reaction time (35 minutes), mass of catalyst (0.5 g). The experiment is proceed to titration process by using hydrogen bromide to calculate oxirane oxygen content (OOC) experimentally and OOC theoretically in order to achieved value of Relative Conversion of Oxirane (RCO). The sample from the experiment is collected to proceed next objective, the samples of epoxidized oil is used to determine the existing epoxy group by using Fourier Transform Infrared (FTIR) Analysis and Ultraviolet-violet spectrophotometer. FTIR is used to analyse the formation of epoxy functional group for optimum reaction condition at certain wavelength while. The kinetic study of the study to determine the *k* value for every reaction. The purpose of kinetic modelling of palm oil is to provide the evidence for the detail mechanism reaction of palm oil production via Genetic Algorithm application in MATLAB. The modelling will be developed in simulation. The simulation develops in simulation via MATLAB to calculate *k* value.