BIODEGRADATION OF VEGETABLE OILS BASED POLYURETHANE BY *Escherichia coli*

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This Final Year Project entitled "**Biodegradation of Vegetable Oils Based Polyurethane by *Escherichia coli***" was submitted by Norsyakila Binti Hamzah, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, and was approved by

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ABSTRACT

BIODEGRADATION OF VEGETABLE OILS BASED POLYURETHANE BY *Escherichia coli*

Two types of rigid polyurethane foams have been produced in this study. Polyol used in the reaction with isocyanates to produce polyurethane was successfully synthesized from soybean oil through the process of epoxidation followed by ring opening. This polyol from soybean oil was synthesized to study for the replacement of the polyol derived from petroleum oil. Among problem arises from petroleum based polyurethane is that they are not biodegradable thus replacing petroleum with vegetable oils which is natural oil could make the polyurethane susceptible to biodegradation. In this study, *Escherichia coli* were selected as bacteria to degrade polyurethane derived from vegetable oil. The biodegradation process of polyurethane by bacteria is believed due to the presence of the polyester functional group in the polyurethane chain. This ester functional group in infrared spectra would expected to appear at 1730-1750 cm^{-1}, the significant decreased in intensity of this peak after going through biodegradation process was observed. The reaction of polyol with isocyantes was in the ratio of 1:1. Synthesized polyurethane foam from soybean oil in this study was compared for the ability to biodegrade by bacteria with polyurethane from palm kernel oil. All polyurethanes that have gone through biodegradation process show the weight loss and the decrease in the intensity of IR peaks as well as destruction on their structure.