

**PALM OIL AS DEVULCANIZATION AGENT  
FOR CHEMICAL- MICROWAVE DEVULCANIZATION**

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This Final Year Project Report entitled "**Palm oil as devulcanization agent for chemical- microwave devulcanization**" was submitted by Nur Jihan Binti Ruslizah in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

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## **ABSTRACT**

### **PALM OIL AS DEVULCANIZATION AGENT FOR CHEMICAL- MICROWAVE DEVULCANIZATION**

The growing environmental concerns associated with waste tire disposal and the need for sustainable rubber recycling methods have prompted researchers to explore efficient and eco-friendly devulcanization techniques. Microwave devulcanization has emerged as a promising method, enabling rapid and energy-efficient rubber recycling. This thesis investigates the potential of palm oil as a devulcanization agent for chemical-microwave devulcanization. The study focuses on the utilization of palm oil, a readily available and renewable resource, as a devulcanizing agent in the microwave-assisted devulcanization process. In this study the experimental variables used is different EPDM waste to palm oil ratio (1:0, 1:1, 1:2, 1:3, 2:1). Experimental investigations are conducted using waste EPDM samples, subjected to 450watt microwave power for 3 minutes. The extent of devulcanization is evaluated by analyzing the efficiency of the devulcanization process Horikx plot. In addition, the chemical composition of the devulcanized rubber is analyzed using Fourier-transform infrared spectroscopy (FTIR) to ensure the breakage of the crosslink in the sample. The results demonstrate that palm oil exhibits remarkable devulcanization efficiency in chemical-microwave devulcanization. The optimum process condition in this study is 2:1, as it has 68.75% of degree devulcanization. The Horikx plot for this graph shows decrease in crosslink density trendline.