

**SYNTHESIS OF WASTE COOKING OIL-BASED POLYOL VIA ONE-POT
EPOXIDATION AND HYDROXYLATION REACTION**

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ABSTRACT

SYNTHESIS OF WASTE COOKING OIL-BASED POLYOL VIA ONE-POT EPOXIDATION AND HYDROXYLATION REACTION

This study was carried out to synthesize waste cooking oil-based polyol for polyurethane via one-pot epoxidation and hydroxylation reaction. The raw WCO was first pretreated and was used to synthesize WCO-based polyol. The effect of concentration of oxidant, hydrogen peroxide (H_2O_2) was observed using physical, chemical (FTIR, %FFA, acid value, iodine value and hydroxyl value) and thermal (TGA) analysis. The pre-treatment process results in no alteration of functional group as proven by FTIR spectroscopy. The WCO contains free fatty acid percentage (%FFA) and acid value (AV) at 2.31% and 4.6 mgKOH/g, respectively. The FTIR spectra of all WCO-based polyol samples showed the formation of OH absorption peak and supported by the increase in hydroxyl value (OHV) from 5.030 up to 229.32 mgKOH/g. It was found that the OHV increased as the concentration of H_2O_2 increased. The total weight loss for WCO-based polyol by using TGA is 86.89%. and functionality obtained from GC-MS is 2.44. This study showed that the chosen reaction is suitable for synthesis of WCO-based polyol and WCO exhibit promising potential as raw material for polyol formation.