

**SYNTHESIS OF RIGID POLYURETHANE FOAM FROM
WASTE COOKING OIL-BASED POLYOL USING
TRANSESTERIFICATION REACTION AND SUGARCANE
BAGASSE ACTIVATED CARBON AS ADSORBENT**

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JANUARY 2014

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ABSTRACT

SYNTHESIS OF RIGID POLYURETHANE FOAM FROM WASTE COOKING OIL-BASED POLYOL USING TRANSESTERIFICATION REACTION AND SUGARCANE BAGASSE ACTIVATED CARBON AS ADSORBENT

This study was carried out to determine the use of waste cooking oil (WCO) in preparation of rigid polyurethane (PU) foam. The WCO was adsorbed by using sugarcane bagasse activated carbon in order to purify the oil. It was observed that percent free fatty acid decreased from 4.3 % to 0.77 % and viscosity from 106 mPa.s to 72.5 mPa.s which indicate the increase of the oil quality after adsorption. FTIR spectra also showed that there is no changes in functional group after adsorption action. The transesterification reaction was used to produce polyol from the adsorbed WCO. The reaction was proven successful due to the presence of O-H, C-H, C=O, and C-N functional group in FTIR spectra. Then O-H value, viscosity, colour, odour and pH for WCO-based polyol was also determined. It is showed that O-H value for WCO-based polyol were 148.79 mgKOH/g. The viscosity and pH for WCO-based polyol were 162.5 mPa.s and 10.47 respectively. Then the PU foam was prepared by using waste cooking oil-based polyol at ratio of 60:54:90:40 of glycerol:water:WCO oil-based polyol:amine. FTIR spectra show the presence of important peak such as N-H, C-H, C=O, C-N-H and C-O-C in the WCO-based PU. The PU obtained has low compressive strength which is 0.10 MPa but high in density which is 277.7 kg/m³. From all the analyses, it is concluded that the sugarcane bagasse can be used to purify the waste cooking oil and waste cooking oil-based polyol can be prepared by using transesterification reaction.