

Analysis of Production of Biodiesel from Used Cooking Oil from the Adsorption Process of Corn Cob Charcoal Using Banana Stem Catalyst (*Musa paradisiaca*) in the Transesterification Process

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ABSTRACT

Biodiesel is an alternative fuel to replace diesel oil (fossil oil) which is made from vegetable and animal oils. The type of oil that is often used in the manufacture of biodiesel is waste cooking oil or known as used cooking oil. Used cooking oil has high fatty acids so it has the potential to be developed into biodiesel fuel. The catalyst is used in the reaction for making biodiesel. In this study using a K_2O heterogeneous catalyst obtained from the calcination process of banana stems. This study analyzed the effect of K_2O catalyst and temperature on the transesterification process, as well as the characteristics of biodiesel according to SNI 7182-2015 quality standards. This study used RAL (completely randomized design) with 2 factorials and 3 levels, namely K_2O concentration (1%, 3% and 5%) and temperature (50°C, 60°C and 70°C). Biodiesel purification uses the water washing method using 50 v/v distilled water and evaporation to remove the remaining water in the biodiesel. The highest yield of biodiesel produced was 95% in the MIT2 sample with a catalyst concentration of 1% and a temperature of 60°C. The resulting test parameters include a density of 872 Kg/m³, an iodine number of 12.8%-mass, a cetane number of 43.44, an acid number of 1.87%, a kinematic viscosity of 2.6 cSt, and a methyl ester content of 165.16%.

Keywords: Biodiesel, Banana Stem, Used Cooking Oil, Transesterification.