

Interesterification of Biodiesel Using Commercial Lipase Enzyme Based on Waste Cooking Oil and Methyl Acetate Acyl Acceptor
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ABSTRACT

Indonesia needs an alternative energy as an effort to increase the renewable energy uses so that it is able to supply its energy demand, one type of the renewable energies that need to be increased is biodiesel. Biodiesel in this research is made through interesterification reaction between waste cooking oil with methyl acetate. Interesterification is a reaction between oil with alkyl acetate group as acyl acceptor. This research aims to generate biodiesel sample with the highest yield through eco-friendly method by using a lipase enzyme catalyst. This research uses a variation of molar ratio waste cooking oil to methyl acetate 1:6, 1:9, and 1:12 with reaction temperature 40, 45, and 50°C, each sample was reacted for 10 hours with addition of 30% lipase enzyme catalyst based on oil weight, then stirred using a magnetic stirrer at 150 rpm. The highest yield shows in the MM2T2 sample or sample with variation of molar ratio 1:9 and reaction temperature 45 °C with 80,5 % of biodiesel yields. The MM2T2 sample was tested for characteristics based on SNI 7182:2015 and obtained the characteristics of biodiesel which has a 904 Kg/m³ of density, 29,18 cSt of kinematic viscosity, ≥100 of cetane number, 2,1 mg-KOH/g of acid number, 58 g-I₂/100g of iodine number, 10,86 % of methyl ester values, 37,91 MJ/Kg of calorific values, 1,06 % of FFA degrees.

Keywords: Biodiesel, Lipase Enzyme, Interesterification, Methyl Acetate, Waste Cooking Oil