Transesterification of Waste Cooking Oil with Natural Zeolite Heterogeneous Catalyst in Biodiesel Production

Dafit Ari Prasetyo. S.T., M.T. (*Supervisor Thesis*)

I'zaz bachtiar Basri
Renewable Energy Engineerng Study Program
Department of Engineering

ABSTRACT

One example of renewable fuel is biodiesel which has great potential to replace diesel fuel or fuel made from oil. The manufacture of biodiesel from used cooking oil is carried out through several stages, one of which is the transesterification reaction. The transesterification process is a reaction between triglycerides and alcohol, which can form biodiesel (methyl ester) and glycerol. This study utilizes natural zeolite as a catalyst to accelerate chemical reactions during the transesterification process. This study aims to determine the effect of natural zeolite catalysts on the Transesterification process. This study used a Completely Randomized Design (CRD) of 2 factors with 3 levels of treatment each. The first factor is the duration of the transesterification process (A) with variations of 100, 110 and 120 minutes. The second factor is the addition of catalyst concentration during the transesterification process (B) with variations of 1.5, 3 and 4.5 m / v. Tested by analysis of variance (ANOVA) and if there is a difference in the average of the test results, it is continued with the Duncan's Multiple Range Test (DMRT). The results of this study produced the highest percentage of biodiesel yield in the A2B3 variation (110 minutes, 4.5% m/v) of 55.35%, with biodiesel characteristics, namely a density of 863.43 kg/m3, kinematic viscosity of 3.65 cSt., acid number of 5.57 mg-KOH/g, iodine number of 11.20 ± 0.14 gr/100gr, and methyl ester content of 83,14% mass.

Keywords: *Biodiesel, Natural Zeolite, Transesterification, Waste Cooking Oil*