

ABSTRACT

TRANSESTERIFICATION PALM OIL WITH METHANOL AND HETEROGENEOUS CATALYSTS RICE HUSK SILICA-BASED (TiO₂/SiO₂)

by

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This research studied the transesterification of palm oil with methanol and heterogeneous catalysts based on rice husk silica, ie TiO₂/SiO₂. Preparation of the catalyst was conducted by sol-gel method combined with ultrasonification method using silica sol produced from rice husk and TiCl₃ solution, to produce a catalyst with 5% dopant levels. Furthermore, the catalyst was calcined at a temperature of 700 °C with a temperature rise of 3°C/minute and held for 3 h at peak temperature. The catalysts were tested for transesterification of palm oil to study the influence of kinetic variables including catalyst ratio, mole ratio of palm oil to methanol, and reaction time. The results revealed that the optimum condition is the use of 10% catalyst, mole ratio of palm oil and methanol 1:4, at a temperature of 60 °C for 30 minutes with the percent conversion rate of 90.91%. The biodiesel produced meets the SNI 04-7182-2006 in terms of viscosity (4.49 mm² / s), cetane number (98.5), and density (0.87 g / mL). Analysis using GC-MS can indicate that the main component in the biodiesel is methyl palmitate, which amounted to 97.70%.

Key word: palm oil, biodiesel, heterogeneous catalysts