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Investigation of the fuel properties of biodiesel produced over an alumina-based solid catalyst

Nezahat BOZ[1], Miray KARA[1], Oylum SUNAL[1]
Ertan ALPTEKİN[2], Nebahat DEĞİRMENBAŞI[3]
[1]Kocaeli University, Department of Chemical Engineering, 41040, Kocaeli-TURKEY
e-mail: nezahatboz@kocaeli.edu.tr
[2]Kocaeli University, Department of Mechanical Education, 41380, Kocaeli-TURKEY
[3]Gazi University, Department of Chemistry, 06500, Teknikokullar, Ankara-TURKEY

Abstract: The present study investigated the transesterification process used in the production of canola oil methyl ester from canola oil and methanol over synthesized KF/Al_2O_3 catalysts. Different amounts of KF solution (15-65 wt. %) were impregnated into alumina. Loading 35 wt. % of KF into an alumina (35% KF/Al_2O_3) catalyst gave the maximum yield of 99.6% under the following reaction conditions: 60 °C, 8-h reaction time, 15:1 molar ratio of methanol/canola oil, and 3 wt. % of catalyst. The fuel properties of canola oil methyl ester were tested, including ester content, density, viscosity, flash point, copper strip corrosion, total and free glycerol, acid value, distillation temperatures, pour point, freezing point, and calculated cetane index. The calculated cetane index was 62.8. The pour point (-10 °C) and freezing point (-12.9 °C) were lower than those of No. 2 diesel fuel. The results show that the produced canola oil methyl ester can safely be used as an alternative diesel fuel.

Key Words: Biodiesel, fuel properties, transesterification, heterogeneous basic catalyst.

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