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Article

Waste Cooking Oil as an Alternate Feedstock for Biodiesel Production

Arjun B. Chhetri¹✉, **K. C. Watts**²✉ and **M. R. Islam**^{2,*}✉

¹ Civil and Resources Engineering, Dalhousie University, Room D510, 1360 Barrington St., Box 1000, Halifax, N.S. B3J 2X4, Canada

² Process Engineering, Dalhousie University, Halifax, NS, Box 1000, Halifax, N.S. B3J 2X4, Canada
✉ kcarjun@gmail.com (A.C.); chris.watts@dal.ca (K.W.); rafiqul.islam@dal.ca (M.I.)

* Author to whom correspondence should be addressed.

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Abstract: As crude oil price reach a new high, the need for developing alternate fuels has become acute. Alternate fuels should be economically attractive in order to compete with currently used fossil fuels. In this work, biodiesel (ethyl ester) was prepared from waste cooking oil collected from a local restaurant in Halifax, Nova Scotia, Canada. Ethyl alcohol with sodium hydroxide as a catalyst was used for the transesterification process. The fatty acid composition of the final biodiesel esters was determined by gas chromatography. The biodiesel was characterized by its physical and fuel properties including density, viscosity, acid value, flash point, cloud point, pour point, cetane index, water and sediment content, total and free glycerin content, diglycerides and monoglycerides, phosphorus content and sulfur content according to ASTM standards. The viscosity of the biodiesel ethyl ester was found to be 5.03 mm²/sec at 40°C. The viscosity of waste cooking oil measured in room temperature (at 21° C) was 72 mm²/sec. From the tests, the flash point was found to be 164°C, the phosphorous content was 2 ppm, those of calcium and magnesium were 1 ppm combined, water and sediment was 0 %, sulfur content was 2 ppm, total acid number was 0.29 mgKOH/g, cetane index was 61, cloud point was -1°C and pour point was -16°C. Production of biodiesel from waste cooking oils for diesel substitute is particularly important because of the decreasing trend of economical oil reserves, environmental problems caused due to fossil fuel use and the high price of petroleum products in the international market.

Keywords: Waste cooking oil; alternate energy; biodiesel; feedstock; fuel characterization

To Cite this Article

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