



STUDIES ON RECYCLING OF WASTE COOKING OILS FOR BIODIESEL PRODUCTION

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Abstract

Among the biofuels produced nowadays in the world, biodiesel became more and more attractive thanks to its advantages compared with petroleum-based diesel: (a) reducing the dependence on petroleum; (b) reduction of most exhaust emissions; (c) biodegradability; (d) higher flash point, leading to safer handling and storage; (e) excellent lubricity.

However, the neat vegetable oils used in biodiesel production determine a higher price of biodiesel compared with petroleum diesel price. Waste cooking oils can be alternative raw material for biodiesel production especially because of its low cost, high availability and benefits of environmental protection.

The research presented in this paper aimed to establish: (a) simple methods for monitoring the synthesis of biodiesel by transesterification of two different waste cooking sunflower oils with methanol using NaOH as catalyst, in comparison with neat sunflower oil and (b) the characteristics of oils and biodiesel obtained, comparative with characteristics described for biodiesel by the standards ASTM D6751 and EN 14214.

The results obtained showed that during biodiesel synthesis, the saponification value decreased both for sunflower oil and waste cooking oils due to transesterification reaction of lipids from oils and formation of methyl esters. The values of physical and chemical characteristics of biodiesel were much smaller than those for neat and waste sunflower oils, especially viscosity, saponification value and acid value. The characteristics values of biodiesel obtained from waste cooking oils were better than characteristics of the petroleum diesel (standard EN 590), and they fit within ASTM D6751 and EN 14214 standards, which indicate that the obtained biodiesel samples could be used in engines without other modifications.

Key words: biodiesel, neat sunflower oil, transesterification, waste cooking oils

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