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Sustainable Biodiesel Production from Waste Cooking Oil and Waste Animal Fats

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Extended Abstract

The increase in energy and environmental crisis in recent years compelled many countries to take serious measures in order to resolve these problems. Many researchers claim that the world's future will be shaped by renewable energy since those sources are capable of fulfilling the energy requirements without or with minimal releases of either air pollutants or greenhouse gases. Therefore, exploiting renewable sources as an alternative to produce energy is crucial to fulfil the demand and mitigating climate change. This resulted in the raises of attention of both public and scientific community to utilize biofuels derived from biomass [1]. Biodiesel has recently become one of these leading alternatives to biofuel worldwide due to a combination of technical and economic features and advantages [2, 3]. In this study, the production of biodiesel was performed using a low-cost feedstock such as waste cooking oils [4, 5] and waste animal fats [6, 7] through the process of transesterification. The investigation of the performance of using alkali heterogeneous catalyst derived from waste chicken eggshells using the calcination technique was also studied. The synthesized biodiesel highest yield was obtained from waste cooking oil (80.6%), followed by mixed waste cooking oil and animal fats (79.3%) both using NaOH as a catalyst. The GC-MS analysis showed that the synthesized biodiesel using NaOH catalyst has favourable properties to be used as fuel. The analysis showed that the produced biodiesel contains different components of fatty acids methyl esters, the oleic acid methyl ester, palmitic acid methyl ester, linoleic acid methyl ester, as major components. The synthesis process of biodiesel produced also crude glycerol as a by-product, which can be refined and used for further applications such as in cosmetics production.

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