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# A sustainability study of the processing of kitchen waste as a potential source of biofuel: Biodiesel production from waste cooking oil (WCO)

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## Abstract

One of the most concerned components in world's food system challenges is food waste, and it is particularly a critical issue in developed countries. Waste cooking oil (WCO) is one of the liquid food wastes that are recyclable. A proper recycling practice of WCO helps to reduce the adverse impact on environment and it can be reused by converting it into industrial products such as biodiesel and soap. With the rising in cost of crude oil in the global market and depletion of conventional fuel, the world also is in need of alternative fuel to fulfil the global rising of energy demands. This paper studies on the potential of WCO as a source of biofuel by converting it to biodiesel by transesterification process. The acid value of the WCO is determined using standard titration method, in which, if the percentage of FFA is more than 2%, in which the WCO needs to undergo pre-treatment process. Sodium hydroxide is used as a catalyst and methanol as the reacting alcohol in transesterification. The characteristics of the biodiesel produced were tested and compared with the standard specification of the biodiesel; ASTM D6751 and EN 14214. From the experiment conducted, more than 90% of biodiesel yield can be obtained from the waste cooking oil. The properties of biodiesel that undergoes more washing process, such as acid value, density, kinematic viscosity, and cloud and pour points have values typically close to the ASTM D6751 and EN 14214 biodiesel standards, which can be seen in Sample 1. Producing biodiesel from WCO is one of the alternatives of disposing these waste products as it gives beneficial impacts to the environment. Since WCO is biodegradable, economical, environmental friendly and always available, the economic feasibility of biodiesel production from waste cooking oil is viable. © 2022 The Author(s)

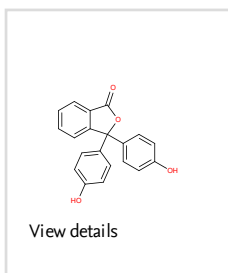
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Biodiesel; Transesterification and free fatty acid; Waste cooking oil

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