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### Influence of operating variables on the in-situ transesterification using $\text{CaO}/\text{Al}_2(\text{SO}_4)_3$ derived from waste (Article)

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#### Abstract

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The purpose of this research project is to investigate the effects of amount of catalyst, the ratio of solid to methanol and different temperature on the biodiesel yield. Solid coconut waste and heterogeneous catalyst derived from the waste, which is calcium oxide (CaO) are used to produce biodiesel and also examine the kinetics of the reactive extraction. In this project, the heterogeneous catalyst is produced by combining solid coconut waste and egg shells and finally treating it with  $\text{Al}_2(\text{SO}_4)_3$ . Then, the mixture of wastes was calcinated under high temperature. Then, solid coconut waste in situ transesterification experiment were conducted at different amount of catalysts (2-6wt%), temperature (50-65°C) and methanol to oil ratio (6:1 - 12:1). The optimum parameters were the solid to methanol ratio, temperature and mixing speed which were at 1:10, 60 °C and 350 rpm respectively with highest yield of 47 wt%. The result proves that the biodiesel conversion increase with methanol, but the reaction did not change and decrease after achieving certain percentage of methanol. © 2017 PENERBIT AKADEMI BARU - All rights reserved.

#### Author keywords

Catalyst amount Eggshells Methanol to oil ratio Solid coconut waste Temperature Transesterification

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