

Production of biodiesel at room temperature from palm olein oil

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In order to reduce the demand and negative environmental impacts of petroleum based fuels, it is necessary to develop an economically viable and environmentally friendly alternative energy source. Biodiesel is a mixture of monoalkyl esters of long chain fatty acids and it is normally produced by transesterification of triglycerides in vegetable oils. Although biodiesel is a potential alternative fuel, its production cost is high because of high temperature (60-65°C) and lengthy procedure. This work was carried out to identifying a process of reducing the production cost by developing a method which requires less energy consumption and less time. Palm olein oil was used as the vegetable oil because many Asian countries use it to produce biodiesel and Sri Lanka produces palm olein oil. In this study, biodiesel was produced by transesterification of palm olein oil using methanol and NaOH. To increase the efficiency of the reaction, miscibility of reactants was increased using acetone as a cosolvent. The reaction occurred at room temperature (27-29°C). The yield was determined under different reaction conditions. The best conditions were methanol:oil (9:1), cosolvent:oil (5:1), 0.5 % NaOH (by weight) and 2 h. reaction period. The yield was 92%. The methyl esters of fatty acids present were oleic (60.28%), linoleic (13.14%) and palmitic (11.84%). Density, acid number, kinematic viscosity, flash point and calorific value agree with ASTM international standards. It is found that this method is economical because of less energy consumption and less time required.

Keywords: Biodiesel, Cosolvent, Palm olein oil, Transesterification

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