Energy Consumption in Biodiesel Production at Various Kinetic Reaction of Transesterification

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Abstract : Biodiesel is a potential renewable energy due to biodegradable and non-toxic. The challenge of its commercialization is associated with high production cost due to its feedstock also useful in various food products. Non-competitive feedstock such as waste cooking oils normally contains a large amount of free fatty acids (FFAs). Large amount of fatty acid degrades the alkaline catalyst in the biodiesel production, thereby decreasing the biodiesel production rate. Generally, biodiesel production processes including esterification and trans-esterification are conducting in a mixed system, in which the hydrodynamic effect on the reaction could not be completely defined. The aim of this study was to investigate the effect of variation rate constant and activation energy on energy consumption of biodiesel production. Usually, the changes of rate constant and activation energy depend on the operating temperature and the degradation of catalyst. By varying the activation energy and kinetic rate constant, the effects can be seen on the energy consumption of biodiesel production. The result showed that the energy consumption of biodiesel is dependent on the changes of rate constant and activation energy. Furthermore, this study was simulated using Aspen HYSYS.

Keywords : methanol, palm oil, simulation, transesterification, triolein

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