

Kinetics of transesterification of *Jatropha curcas*-based triglycerides with an alcohol in the presence of alkaline catalyst

ABSTRACT

The *Jatropha curcas* methyl ester can be produced through a transesterification reaction by using an alkaline catalyst with an alcohol as the excess reactant. The reaction was carried out in a batch mixed reactor under various operating conditions. The kinetics study on the transesterification of *Jatropha curcas*-based triglycerides with methanol was carried out under various temperatures (323, 328, 333 and 338 K). The conversion of triglycerides into methyl esters follows the first-order mechanism for the forward reaction. The reaction rate constants were determined and finally the rate constants were plotted against temperatures for calculating the activation energies. The values of kTG range from 0.11 to 0.17 and the values of kDG are from 0.07 to 0.20 respectively. The activation energies for stepwise reactions for transesterification of *Jatropha curcas*-based triglycerides and diglycerides with methanol are 27.38 and 46.72 kJ mol⁻¹. Future work should examine the real step-wise reaction kinetics in *Jatropha curcas* biodiesel production under acid catalyst.

Keyword: Transesterification; *Jatropha curcas* triglycerides; Alkaline catalyst