

Kinetics of the transesterification of *Jatropha curcas* triglyceride with an alcohol in the presence of an 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 k_{TG} range from 0.11 to 0.17 and the values of k_{DG} 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: Kinetics of transesterification; *Jatropha curcas* triglyceride; Alkaline catalyst.