

High Shear Reactor for Glycerolysis – Interesterification Palm Stearin-Olein Blend: Reaction Kinetics and Physical Properties

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Abstract

The objective of this research was to investigate the effect of temperature on the glycerolysis-interesterification reaction kinetics of immiscible and high viscous reactants at relatively low temperatures in a high shear reactor (HSR), and their physical product properties. The reaction was performed at various temperatures (80-120°C) and a mixing rate of 2000 rpm for 5 h. Results showed that the reaction rate constant increased and followed the Arrhenius equation as temperature increased. TAG conversion was 2.5 fold greater at 110 and 120°C compared to lower reaction temperatures. MAG and DAG increased by about 18.3% and 13.4%, respectively, as the reaction temperature increased from 80 to 120°C. The product's melting point, hardness, and color were also improved by increasing temperature. In summary, structured lipids (SLs) synthesis containing high MAG and DAG could be produced at a relatively low temperature (110°C) using HSR, and followed the glycerolysis-interesterification kinetic and Arrhenius model.

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