Comparative aspects on the epoxidation of soybean oil and high oleic soybean oil

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Abstract

Soybean oil (SO) epoxidation is an extensively studied method to generate a sustainable plasticizer for polyvinyl chloride (PVC). Standard soybean oil is composed of triglycerides whose fatty acids are primarily unsaturated linoleic, oleic, and linolenic acids. High oleic soybean oil (HOSO) is collected from a soybean variety higher in oleic acid than other acids. The present study focused on a preliminary comparison of the epoxidation reaction behavior between SO and HOSO, conducted isoperibolically. The experimental data were correlated by a kinetic model. Considerable differences in the temperature and oxirane index profiles suggest that the epoxidation of HOSO tends to be faster and with a more intense heat release rate than the epoxidation of SO, which was confirmed by the results of estimated kinetic constants. The data collected and shared herein suggest that a first epoxy group generated may cause steric hindrance to slow the epoxidation in the second and third double bonds of the oil.

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