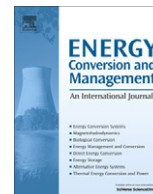




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A new heterogeneous acid catalyst for esterification: Optimization using response surface methodology

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ABSTRACT

Studies on heterogeneous acid catalysts for converting free fatty acids into biodiesel have been intensified over the years. This paper focuses on the optimization of a new catalyst system, ferric-alginate as a heterogeneous acid catalyst to esterify lauric acid into methyl laurate. Methanol to lauric acid molar ratio and catalyst amount was optimized using response surface methodology (RSM). The best reaction conditions to achieve methyl laurate yield of 99% was found to be 0.16:1 ferric-alginate to lauric acid mass ratio and 16:1 methanol to lauric acid molar ratio. The reaction time and temperature was fixed at 3 h and methanol refluxing temperature, respectively. The optimized reaction conditions were also used to esterify palm fatty acid distillate to give 89% methyl esters conversion. The acid value of palm fatty acid distillate (PFAD) was reduced from 228 to 0.8 mg KOH/g PFAD.

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