

## Removal of free fatty acid in rubber seed oil by using ferric sulfate as an acid heterogeneous catalyst

S. Wootthikanokkhan<sup>a,e1</sup>, C. Sookman<sup>b,e2</sup>, T. Chuen-Im<sup>c,e3</sup>, A. Sonsiri<sup>d,e4</sup>

<sup>a</sup>Department of Chemistry, Faculty of Science and Technology, Rajamangala University of Technology Krungthep, Bangkok, 10240, Thailand

<sup>b</sup>Department of Chemical Engineering, Faculty of Engineering, Rajamangala University of Technology Krungthep, Bangkok, 10240, Thailand

<sup>c</sup>Department of Microbiology, Faculty of Science, Silpakorn University, Nakorn Pathom, 73000, Thailand

<sup>d</sup>Faculty of Technical Education, Rajamangala University of Technology Krungthep, Bangkok, 10240, Thailand

<sup>e1</sup>sasiwimol.w@rmutk.ac.th, <sup>e2</sup> chatchawan.s@rmutk.ac.th, <sup>e3</sup>suy85@hotmail.co.uk, <sup>e4</sup>a.sonsiri@gmail.com

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### Abstract

Rubber seed oil is another a renewable source that is suitable for biodiesel production in Thailand. However, high free fatty acid contents in the oil cause problem in biodiesel production using conventional process. This study attempted to reduce free high fatty acid content (>20% w/w) in the seed oil via esterification reaction with ethanol and ferric sulfate, an acid heterogeneous catalyst. Various parameters of the condition have been studied for optimal condition including volume ratio of ethanol to seed oil (0.69/1 – 1.20/1), ferric sulfate amount (2.5-4% w/w), temperature (35-75°C) and reaction time (1-4 hr). The results indicated that the condition at volume ratio of ethanol to seed oil of 0.86/1, ferric sulfate amount at 3% (w/w), reaction time at 3 hr and temperature at 75°C gave the highest free fatty acid content reduction efficiency at 81.9% (w/w). When the reduction reaction was performed twice, free fatty acid average content was decreased to 0.9% (w/w) which could be used as raw material for biodiesel production.

*Keywords: rubber seed oil; free fatty acid; ferric sulfate; esterification*

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