Energy Saving of Biodiesel Production from Waste Chicken Fats by Microwave Technology Using Response Surface Methodology (RSM)

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Abstract

Transesterification of waste chicken fat oil into biodiesel using a batch microwave system was investigated in this study. A response surface methodology (RSM) was used to analyze the influence of the process variables in term of reaction temperature, catalyst concentration, methanol to oil molar ratio and reaction time on the yield of waste chicken fats biodiesel.Based on RSM analysis,the optimal conditions were determined at reaction temperature of 64.69°C, catalyst concentration of 0.18 w/w %, methanol to oil molar ratio of 8.58:1, and reaction time of 10 min. Under these conditions, the experimental yield of waste chicken fat ester was 92.3%, which is within the value predicted by the model. This indicates that use of microwave technology to assist the transesterification process resulted in faster reaction times while the yield of waste chicken fats into methyl ester compares favourably with the conventional heating methods

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Keywords: Biodiesel, Chicken fat,Microwave, Response surface Methodology, Transesterification

Citation

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