

Microwave Assisted Thermal Cracking of Castor Oil Zeolite ZSM-5 as Catalyst for Biofuel Production

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Abstract : The aim of this investigation was to produce biofuel from castor oil through microwave assisted thermal cracking with zeolite ZSM-5 as catalyst. The obtained results showed that microwave assisted thermal cracking of castor oil with Zeolite ZSM-5 as catalyst generates products consisting of alcohol, methyl esters and fatty acids. The products obtained from this experimental procedure by the cracking of castor oil are components of biodiesel. Samples of cracked castor oil containing 1, 3 and 5wt % catalyst was analyzed, however, only the sample containing the 5wt % catalyst showed significant presence of condensate. FTIR and GCMS studies show that the condensate obtained is an unsaturated fatty acid, is 9, 12-octadecadienoic acid, suitable for biofuel use. 9, 12-octadecadienoic acid is an unsaturated fatty acid with a molecular weight of 280.445 g/mol. Characterization of the sample demonstrates that functional group for the products from the three samples display a similar peak in the FTIR graph analysis at 1700 cm⁻¹ and 3600 cm⁻¹. The result obtained from GCMS shows that there are 16 peaks obtained from the sample. The compound with the highest peak area is 9, 12-octadecadienoic acid with a retention time of 9.941 and 24.65 peak areas. All these compounds are organic material and can be characterized as biofuel and biodiesel.

Keywords : castor oil, biofuel, biodiesel, thermal cracking, microwave

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