## Heterogeneous Catalytic Hydroesterification of Soybean Oil to Develop a Biodiesel Formation

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**Abstract :** Finding alternative renewable resources of energy has attracted the attentions in consequence of limitation of the traditional fossil fuel resources, increasing of crude oil price and environmental concern over greenhouse gas emissions. Biodiesel (or Fatty Acid Methyl Esters (FAME)), an alternative energy source, is synthesised from renewable sources such as vegetable oils and animal fats and can be produced from waste oils. FAME can be produced via hydroesterification of oils. The process involves two stages. In the first stage of this process, fatty acids and glycerol are being obtained by hydrolysis of the feed stock oil. In the second stage, the recovered fatty acids are then esterified with an alcohol to methyl esters. The presence of a catalyst accelerates the rate of the hydroesterification reaction of oils. The overarching aim of this study is to find the effect of using zeolite as a catalyst in the heterogeneous hydroesterification of soybean oil. Both stages of the catalytic hydroesterification of soybean oil had been conducted at atmospheric and high-pressure conditions using reflux glass reactor and Parr reactor, respectively. The effect of operating parameters such as temperature and reaction time on the overall yield of biodiesel formation was also investigated.

Keywords : biodiesel, heterogeneous catalytic hydroesterification, soybean oil, zeolite

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