

## Supercritical Methanol for Biodiesel Production from Jatropha Oil in the Presence of Heterogeneous Catalysts

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**Abstract :** The lanthanum and zinc oxide were synthesized and then loaded with 6 wt% over  $\gamma\text{-Al}_2\text{O}_3$  using the wet impregnation method. The samples were calcined at 900 °C to ensure a coherent structure with high catalytic performance. Characterization of the catalysts was verified by X-ray diffraction (XRD) and Fourier-transform infrared spectroscopy (FT-IR). The effect of catalysts on biodiesel content from jatropha oil was studied under supercritical conditions. The results showed that  $\text{ZnO}/\gamma\text{-Al}_2\text{O}_3$  was the superior catalyst for jatropha oil with 98.05% biodiesel under reaction conditions of 7 min reaction time, 1:40 oil to methanol molar ratio, 6 wt% of catalyst loading, 90 bar of reaction pressure, and 300 °C of reaction temperature, compared to 95.50% with  $\text{La}_2\text{O}_3/\gamma\text{-Al}_2\text{O}_3$  at the same parameters. For this study,  $\text{ZnO}/\gamma\text{-Al}_2\text{O}_3$  was the most suitable catalyst due to performance and cost considerations.

**Keywords :** biodiesel, heterogeneous catalyst, jatropha oil, supercritical methanol, transesterification

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