

Intensification of Biodiesel Synthesis through Ultrasound Assisted Heterogeneous Catalyzed Transesterification

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Transesterification of vegetable oils using sodium or potassium hydroxide in homogenous catalysis is the most used procedure for making biodiesel. Calcium oxide (CaO) is a solid with high basicity, low solubility, noncorrosive and environmentally friendly. It is one of the most used heterogeneous catalysts for the biodiesel production by transesterification reaction.

This paper presents the results of biodiesel production in ultrasound (US) assisted condition. Heterogeneous catalyzed biodiesel synthesis starting from sunflower oil using CaO or CaO impregnated with different Li₂CO₃ concentrations was conducted under ultrasound conditions. The transesterification reactions were carried out during 2 h using 1-5 wt % of the catalyst, 1:6 oil:methanol molar ratio, 45-65°C, at 20 – 30% amplitude US, in pulse sonication (5 s ON, 5 s OFF), 0.3 – 0.55 W/mL, 20 KHz. The FAME yields were approximately 90% at the optimal reaction conditions.

Ultrasounds induced a remarkable activation of catalyst by sonication in methanol and they resulted in the process intensification by enhancing the mass transfer between the different phases of the reaction.

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Biography

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