

Biodiesel Production via Ultrasound-Assisted Method using Oil Adsorbed on Spent Bleaching Clay

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Abstract

This paper reports studies in ultrasound-assisted heterogeneous solid catalyzed (CaO) synthesis of biodiesel from adsorbed crude palm oil on spent bleaching clay (SBC.) Ultrasonication provides a faster chemical reaction, and the rate enhancements, refereed by cavitation that causes the building- up of pressures and temperatures, as well as increased catalytic surface areas and improve mass transfer. This novel method offers significant advantages such as shorter reaction time and less energy consumption than the conventional method, efficient molar ratio of methanol to triglycerides and provides the mechanical energy for mixing. The required activation energy for initiating the transesterification reaction and so, it gives a higher yield by transesterification of oils into biodiesel. The optimized reaction conditions were as follows: methanol to oil molar ratio of 15:1; catalyst (B-CaO), 9 wt. %; reaction temperature, 65 ± 2 °C; reaction time, 2 h at a working frequency of 42 kHz and the power supply of 100W. Highest conversion of 97.33 wt. % was achieved.

Keywords: Biodiesel; Ultrasound-assisted; Spent Bleaching Clay; Heterogeneous Catalyst