

عنوان مقاله:

Synthesis of Biodiesel from Palm Kernel Oil using Mixed Clay-Eggshell Heterogeneous Catalysts

محل انتشار:

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خلاصه مقاله:

The synthesis and characterization of clay-eggshell mixed catalysts was carried out for the transesterification of palm kernel oil using methanol as solvent. Clay from anthill and waste chicken eggshells were powdered and mixed via incipient wet impregnation in 50-50, 80-20 and 20-80% proportions of clay to eggshell on mass basis. The resulting mixtures were oven dried at 120 °C and calcined in the furnace at 900 °C for 4 hours. The uncalcined raw clay sample was characterized via the X-ray fluorescence method while the as-synthesized catalyst samples were characterized via the Fourier Transform Infrared Radiation Spectroscopy and Scanning Electron Microscopy. The performance of the as-synthesized catalysts was tested in transesterification of palm kernel oil (PKO) via a 2 level factorial experimental design optimizing four variables including reaction time, reaction temperature, methanol/oil molar ratio and catalyst loading in which case the yield was the required response. The 50-50 catalyst attained a maximum yield of 56.2% at 70 °C, methanol/oil ratio of 12:1, reaction time of 180 min, catalyst loading of 5 wt.% compared to the 65.2% achieved with the 80-20 catalyst at 90 °C, methanol/oil ratio of 12:1, reaction time of 180 min., catalyst loading of 5 wt.% and the 70.7% obtained for the 20-80 catalyst at 70 °C, methanol/oil ratio of 12:1, reaction time of 180 min, catalyst loading of 3 wt%, thus, indicating mixed effect of variables as fully discussed. The developed catalysts were found to be good for biodiesel production and have the ability of improved performance

کلمات کلیدی:

,Anthill,Biodiesel,Chicken-eggshell,Palm kernel oil,Transesterification

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