EFFECT OF REACTION TIME IN TRANSESTERIFICATION FOR BIODIESEL PRODUCTION USING CALCIUM OXIDE SUPPORT ON ALUMINIUM OXIDE AS CATALYST

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ABSTRACT

EFFECT ON REACTION TIME IN TRANSESTERIFICATION FOR BIODIESEL PRODUCTION USING CALCIUM OXIDE SUPPORT ON ALUMINA AS CATALYST

Biodiesel fuel is promising source to replace diesel fuel that can be produced transesterification process. The objective of this study is to examine the effect of transesterification time to the percentage yield of fatty acid methyl ester (FAME) formed. Calcium oxide support on aluminium oxide, heterogeneous base catalyst is used to carry out transesterification process. The transesterification process is carried out in a condition at 65°C reaction temperature, 2g catalyst and 9:1 methanol to oil ratio. The different reaction time shows significant value in the percentage yield. The time varied from three hour to seven hour. Highest production of FAME is found at five hours which gives out 63%. The catalyst was characterized by Fourier transform infrared (FTIR) and Field emission scanning electron microscope (FESEM). FTIR result for calcium oxide show band at 946.68cm^{-1} indicates the existence of carbonate species and band at 667.26cm^{-1} for Al_2O_3 spectrum represent stretching vibration of alumina. Agglomeration of CaO and Al_2O_3 can be seen at band 595.38cm^{-1}for Ca-O-Al. FESEM result show the agglomeration of catalyst after calcined. The types of fatty acid presence in the rubber seed oil is analyse using gas chromatography mass spectra resulting four types of fatty acid found during the analysis. The fatty acids found are palmitic acid, stearic acid, linoleic acid and linolenic acid. Therefore, Cao/Al_2O_3 showed a good catalytic characteristic which produced high percentage of FAME.

TABLE OF CONTENT

LIST OF FIGURES