

PRODUCTION OF BIODIESEL BY ULTRASOUND ASSISTED ESTERIFICATION OF RUBBERSEED OIL

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Abstract

Currently, the production of biodiesel is shifting from 1st generation to of 2nd generation where the raw materials are mostly from non-edible type oils and fats. Production of biodiesel is commonly operated under batch operation using mechanical mixing to accelerate mass transfer. The main bottleneck of esterification of oils is that they often contain large amounts of free fatty acids (FFA) which is reduce the yield of biodiesel and requires longer production time (2-5 hours). This longer time and lower yield seem to be major disadvantage for biodiesel production. Ultrasonification has been used in many applications due to its ability to produce cavitations. Therefore this research is aimed to implement ultrasound technology to improve biodiesel production process. A unit of cleaner ultrasound was facilitated under constant temperature and 40 Hz frequency. The result of this research showed that the ultrasound reduced significantly the processing time while the yield of biodiesel increases. The appropriate model to describe correlation of yield and defined variabls is $Y = 43,4894 - 0,6926 X_1 + 1,1807 X_2 - 7,1042 X_3 + 2,6451 X_1X_2 - 1,6557 X_1X_3 + 5,7586 X_2X_3 - 10,5145 X_1X_2X_3$, where X_1 is mesh sizes, X_2 ratio oil: methanol and X_3 type of catalyzt.

Keywords: Rubberseed oil, Ultrasound, Esterification, Biodiesel, Yield