

ABSTRACT

The Energy crisis and environmental pollution are concern around the world. One of the main defiance facing the world is to complete the growing needs of energy growth. The research of biodiesel attract the attention of countries around the world due to its renewable nature, has gas fewer emissions and biodegradable. Biodiesel has several advantages over diesel fuel as it can be biodegraded or decomposed, non-toxic, low emission value and better cetane number. But the process, requires a large reactor tube and takes longer reaction time, so it requires greater energy as well. To overcome these problems needed technology to assist the process, one of them is ultrasonic. The aim of this research is to investigate the effect of amplitude as an important parameter for biodiesel process from waste cooking oil by ultrasonic technique. Based on waste cooking oil as raw material can be considered as sustainable green feedstock. The experiment was used to determine the effect of ester contents by reaction time (10-40 minutes) and amplitude (20-90%) using horn ultrasonic reactor. The result of biodiesel process using horn ultrasonic reactor are the reaction time of 30 minute and amplitude of 70%. The reaction time reduced to four times (minute) compare to mechanical stirring with present amplitude 70% to ensure sufficient mixing and emulsification of two immiscible reaction layers. Also the Fourier Transform Infra-Red (FTIR) and Gas Chromatography Mass Spectrometry (GC-MS) test showed good results, that is the existence of ester and methyl palmitate compounds in the product. Ultrasonic amplitude could influence the reaction rate and biodiesel conversion as it is directly related with the transmitted of energy ultrasonic into the tube.

Keywords: Biodiesel, waste cooking oil, ultrasonic, and amplitude