

ABSCTRACT

The increasing depletion of petroleum reserves is currently accompanied by an abundance of vegetable and animal oils, thereby increasing the demand for using vegetable oil instead of petroleum resources. Generally, vegetable oil can be obtained from plants such as oil palm, castor, coconut, soybean, etc. Furthermore the vegetable oil is converted into the form of ester or better known as biodiesel. Biodiesel production process is done by methanolysis reaction which then produce fatty acid methyl ester and glycerin. The purpose of this study is to know the performance of diesel engines using biodiesel fuel from castor oil and palm oil. This research begins by testing the physical properties of biodiesel, testing of biodiesel of castor-palm on diesel engines, testing of biodiesel injection characteristics, data analysis and conclusions.

The research results obtained that biodiesel fuel B5 and B10 have lower power than diesel fuel. Biodiesel that has the highest power of BJBS 55 B5 with power of 1.672 kW or 2.90% under diesel fuel power at maximum load. Specific fuel consumption on biodiesel B5 and B10 are lower than diesel fuel or more efficient in fuel consumption. Injection characteristics test result show that biodiesel B5 and B10 have longer spray and spray angle smaller than diesel fuel. The longest spray and the smallest spray angle are found in BJBS 91 B10 with a difference of 116.4 mm longer than the spray of diesel fuel and a split-angle difference of 2.15° under diesel fuel in 0.01 seconds.

Keywords: *biodiesel, performance of diesel engine, castor oil, palm oil, injection characteristics*