

Alternative Energy

Edited by

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Chapter 10

Comparative study of performance characteristics using *Jatropha* Oil Methyl Esters Biodiesel and Diesel

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Introduction

The development of transportation, industries and other needs depends greatly on energy especially from fuel. The increase of the industrialization exclusively has been drastic as the world develops. In 2010, the world energy use has been climbed more than 5%, with China and India show no signs of slowing down in energy consumption and keep continued their extreme demand for all forms of energy (Lapillonne, 2010).

The use of biodiesel has been introduced by Rudolph Diesel, the inventor of diesel engine as an alternative to diesel. There are numerous types of plant have potential to become resources for biodiesel nowadays, and *Jatropha L. Curcas* was once cited by investment bank Goldman Sachs as one of the best candidates for future biodiesel production (Barta, 2007). Biodiesel blends require no engine modification and have result moderately similar performance as diesel.

Engine torque and power are likely lower when using biodiesel due to the biodiesel's lower energy per unit volume compared to diesel. Engine performance parameters as torque and brake power can be measured by using dynamometer. Torque can be used to indicate the capability of engines to do work. It is defined as force acting at a moment distance with units of Nm. Power indicates the rate at which work is done.

Methodology

Table 1: Fuel properties

Fuel Properties	JB0	JB10	JB20
Density (kg/m ³)	0.8272	0.8306	0.8338
Kinematic viscosity (mm ² /s)	3.3873	3.4569	3.5329
Dynamic viscosity (mPa-s)	2.8021	2.8713	2.9458
Heating Value (J/kg)	45547.5	45114	44672
Flash point (oC)	70	74	88