Performance Evaluation of A Vegetable Oil Fuelled Compression Ignition Engine

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Following the fuel crisis and vehicular pollution growth, search for renewable fuels has become very prominent. It has become very important to search the renewable alternative fuels from bio-origin, which are environment friendly such as vegetable oils. Non-edible vegetable oil such as linseed oil. Mahua oil, rice bran oil, etc are found to be effective substitute fuel for diesel engines.

In the present study, vegetable oil esters have been proposed as an alternative fuel for powering existing diesel engine. Transesterification has been carried out for effective utilization of the linseed oil. After transesterification process using methanol, linseed oil gets converted to linseed oil methyl esters (LOME).

The present study is carried out to investigate the combustion and emission performance of linseed oil, mahua oil, rice bran oil and linseed oil methyl ester (LOME), in a stationary single cylinder diesel engine and compare it with that of conventional diesel fuel.

The linseed oil, mahua oil, rice bran oil and linseed oil methyl ester have been blended with diesel fuel in different proportions. Thermal efficiency, brake specific energy consumption (BSEC), smoke opacity, exhaust gas temperature (EGT), brake mean effective pressure (BMEP), cooling water losses and exhaust losses have been measured for different blends. Separate tests were also conducted for pure mineral diesel oil for generating baseline data and neat linseed oil methyl ester.

A comparable study is carried out on the basis of different performance curves, which are plotted for each proportion between thermal efficiency versus brake mean effective pressure (BMEP), smoke opacity versus brake mean effective pressure (BMEP) and specific energy consumption (BSEC) versus brake mean effective pressure (BMEP).

Transesterification process is a very effective process for reducing high viscosity of vegetable oils and bringing about changes at molecular level. Vegetable oil esters also

did not exhibit combustion related problems and the transesterification process produces a Bio-origin fuel that behaves almost like mineral diesel oils.