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Experimental investigation of jatropha oil based bio-diesel in compression ignition engines

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The rapid depletion of crude oil and ever increasing price of fossil fuel has led to search for alternative fuels. With consideration of above project on "Experimental Investigation of Jatropha oil Based Bio-Diesel for Compression Ignition Engines" was conducted at the Department of Mechanical and Manufacturing, Faculty of Engineering, University of Ruhuna. Jatropha oil was taken as the base fuel for bio diesel. Jatropha oil was extracted from the seeds collected from Moneragala district. The extracted oil then cleaned from solid impurities and transesterification was done. Both the raw oil and transesterified bio-diesel were tested for main important properties such as density, viscosity, saponification value, acid value, flash point, calorific value etc.

A single cylinder direct ignition four stroke diesel engine was used to test the different configurations of fuels. Fuel configurations were 95% diesel with 5% raw Jatropha oil (B5), 90% diesel with 10% biodiesel (B10), and 95% diesel with 5% raw Jatropha oil. Diesel oil 100% by volume was used for bench mark for the comparison. It was found that Jatropha oil based bio diesel has similar properties, as diesel oil the performance of the engine seems to be comparable. The fuel consumption with bio diesel has improved and this could be attributed due to the presence of oxygen in Jatropha oil.

Jatropha oil has substantial prospects as a long-term substitute for diesel fuels. The B5, B10 fuel blends competed favourably with diesel fuel and offers a reasonable, if not even a better, substitute for pure diesel oil. It has been established that Jatropha oil can be used as a substitute for diesel oil for use in compression ignition engines without major operational difficulties. However, the proportion of the blends may be further improved to make use of higher percentage of Jatropha oil in the blend using Jatropha oil purer grade which may be obtained by pretreatment of the oil. Moreover, the long term durability of the engine while using bio-diesel as fuel requires further study.

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