



RESEARCH ARTICLE

COMBUSTION AND PERFORMANCE CHARACTERISTICS OF CI ENGINE RUNNING WITH MANGO SEED OIL BLENDED WITH METHANOL

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ARTICLE INFO

Article History:

Received 21st April, 2016
Received in revised form
25th May, 2016
Accepted 04th June, 2016
Published online 16th July, 2016

Key words:

Diesel, Performance, Emissions,
Methanol, Mango seed oil.

ABSTRACT

In view of the existing fossil fuel deposits may come for another 30 to 40 years and Costs of these Fissile Fuels are day by day increasing. As we know that all over the world the diesel vehicle population is growing at an alarming rate. The emission will irritate skin, eyes, nose and throat and also leads to bronchitis asthma in the long run and has been led to air pollution. It is a serious concern with the pollution point of view. Developing Countries like India depends on its fossil fuel requirements on foreign countries for which spars a huge foreign currency in purchase of crude oil. The increasing pressure on crude oil reserves and environmental degradation as an outcome. Hence in view of the above drawbacks there is an urgent need to find an alternative fuels in the existing engines. Fuelslike (Low Cetane Fuels) like Mango seed oil blended with Methanol may promise and present a sustainable solution as it can be produced from a wide range of plants and seeds.

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Citation: Dr. Hiregoudar Yerrannagoudar, Manjunatha, K. and Nagaraj Malagund, 2016. "Combustion and performance characteristics of ci engine running with mango seed oil blended with methanol", *International Journal of Current Research*, 8, (07), 33977-33981.

INTRODUCTION

Rising petroleum prices, increasing threat to the environment from vehicle exhaust emissions and fastly depleting stock of fossil fuels have generated an intense international interest in developing alternative renewable fuels for IC engines. Bio fuel is an oxygenated fuel which increases the combustion and makes reduce exhaust emission. It can be produced from crops with high sugar or starch content. Some of these crops include sugarcane, sorghum, corn, barley, cassava, linseedplants, sugar beets etc. Numerical Investigation and Fatigue Life estimation of modified Diesel Engine Piston (Dr Hiregoudaru et al., 2014), Experimental Investigation of Twin Cylinder Diesel Engine Using Methanol Piston (Dr Hiregoudaru Yerrannagoudaru et al., 2014), Performance & emission of Twin Cylinder Diesel Engine Using Ethanol Piston (Dr Hiregoudaru Yerrannagoudaru et al., 2014), Experimental Investigation of Twin Cylinder Diesel Engine Using Diesel & Methanol (DrHiregoudaru Yerrannagoudaru et al., 2014), Performance & emission of Twin Cylinder Diesel Engine

Using Diesel & Ethanol (DrHiregoudaru Yerrannagoudaru et al., 2014), "Performance and Emission Characteristics of CI Engine using Hippie Oil and Cotton Seed Oil Blended with Methanol (DrHiregoudaru Yerrannagoudaru et al., 2014), "Performance & Emission of C I Engine Using Diesel & Ethanol Blended with Jatropa Oil" (DrHiregoudaru Yerrannagoudaru et al., 2014), "Performance & emission of C I Engine Using Diesel & Ethanol blended with linseed oil" (DrHiregoudaru Yerrannagoudaru et al., 2014), Performance and emission characteristics of two cylinder diesel engine using diesel and pine oil (Dr Hiregoudaru Yerrannagoudaru et al., 2014), "Combustion Analysis of Inverted M Type Piston CI Engine By Using CFD" (DrHiregoudaru Yerrannagoudaru et al., 2014), "Investigation Of Twin Cylinder Diesel Engine Fueled With Pongamia Oil And Diesel Oil." (DrHiregoudaru Yerrannagoudaru et al., 2014), "Performance and Emission Evaluation of Direct Injection Diesel Engine Fuelled with Rubber Seed Oil (DrHiregoudaru Yerrannagoudaru et al., 2014), "Experimental Investigation of multi Cylinder Diesel Engine Using Rubber Seed Oil and diesel (DrHiregoudaru Yerrannagoudaru et al., 2014), "Performance and Emission Characteristics of Twin Cylinder CI Engine Using Cottonseed Oil Blended With Methanol" (DrHiregoudaru Yerrannagoudaru et al., 2015), "Experimental Investigation of Twin Cylinder Diesel Engine Using Jatropa and Hippie Oil Blend With

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Objective

Objective of the present study is to:

- It is proposed to use Bio Fuel blended with Ethanol in the diesel engine.
- The emissions like HC, CO₂, NO_x and Smoke in the exhaust gases are proposed to reduce during the combustion itself.
- To study the performance evaluation of the using Bio fuel blended with Ethanol in the diesel engine.
- To analyse the exhaust emissions and measurement, reduction in the exhaust gas.

Table 1. Properties of Bio Fuel Blended With Alcohol

S.No	Biofuel	CV KJ/Kg
1.	Diesel	44800
2.	Mango seed oil blended with Methanol	31,067

Table 2. Engine Specification

Test Engine specification	
Injection Pressure	1800 bar
Engine type	Four stroke Twin cylinder diesel engine
No. of cylinders	02
Stroke	100 mm
Bore Diameter	87 mm
Engine Power	15KVA
Compression ratio	17.5:1
RPM	1500

RESULTS

Performance Graphs

Brake Specific Energy Consumption

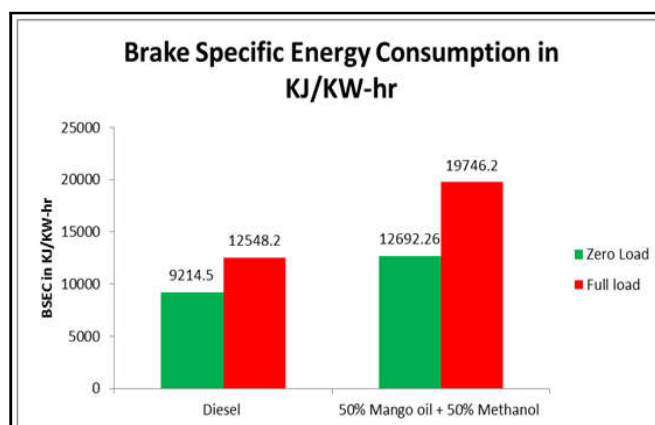


Fig. 2. The variations of Brake Specific Energy Consumption for Diesel and Mango seed oil blended with Methanol at Zero Load and Full Load

Brake Thermal Efficiency

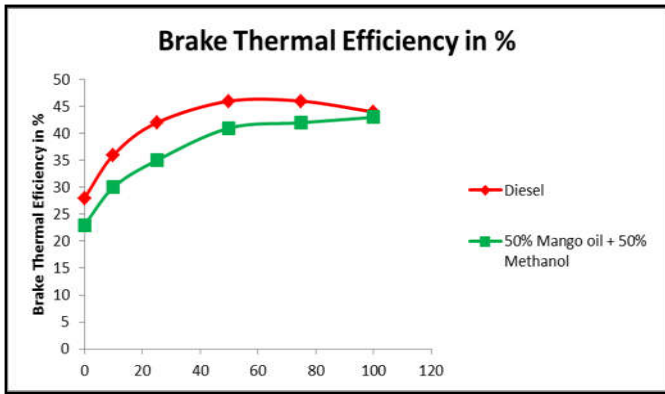


Fig. 3. The variations of Brake Thermal Efficiency for Diesel and Mango seed oil blended with Methanol at different Loads

Carbon Dioxide

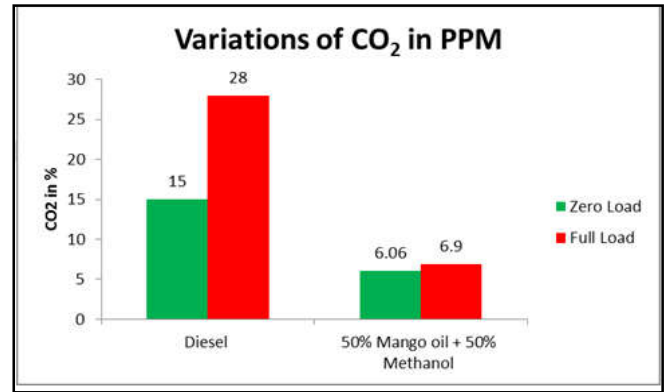


Fig.6. The variations of Carbon dioxide for Diesel and Mango seed oil blended with Methanol at Zero Load and Full Load

Emission Graphs

Unburnt Hydro Carbon

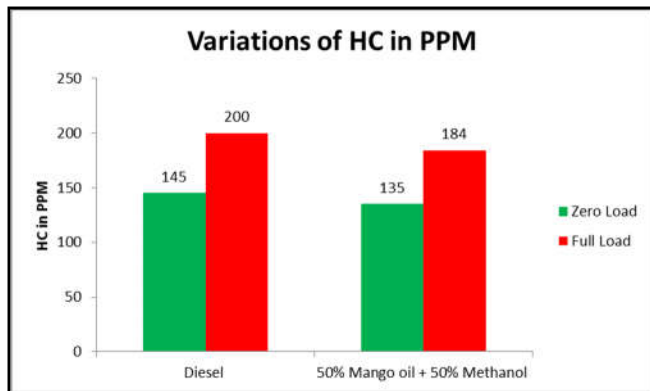


Fig.4. The variations of Unburnt Hydro Carbon for Diesel and Mango seed oil blended with Methanol at Zero Load and Full Load

Nitrogen Dioxide

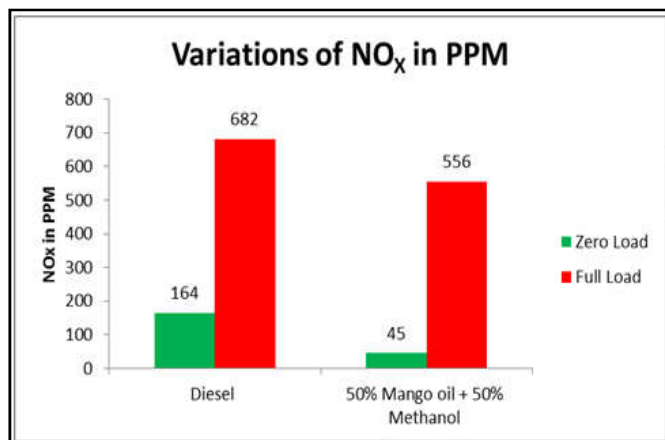


Fig. 5. The variations of Nitrogen dioxide for Diesel and Mango seed oil blended with Methanol at Zero Load and Full Load

Smoke

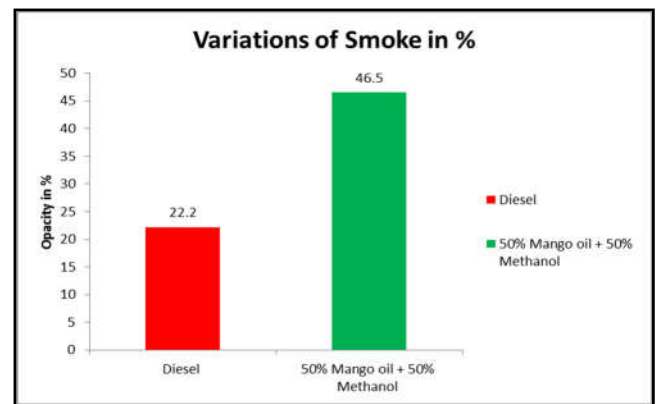


Fig.7. The variations of Smoke for Diesel and Mango seed oil blended with Methanol at Zero Load and Full Load

Conclusion

Based on the experimental results the performance and emissions of Mango seed oil blended with Methanol, it is concluded that the Mango seed oil blended with Methanol represents a good alternative fuel with closer performance and better emission characteristics in Diesel Engine. From the above experimental results the Mango seed oil blended with Methanol shows better performance Diesel Engine. From the above experimental results the Mango seed oil blended with Methanol shows performance characteristics like Brake thermal efficiency, Brake specific Energy consumption and decrease in the emission parameters like HC, CO₂, NO_x, Smoke are lower Biofuel blended with Methanol compared with Diesel, Hence the Mango seed oil blended with Methanol can be used as a substitute for diesel effectively in diesel engines.

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