



Performance and Emission Analysis of Diesel Engine Using Karanja Oil Biodiesel Blend with Diethyl Ether

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ABSTRACT: In 21st century energy demand was increased by reason of development of industries, population, amount of vehicles. But availability of fuel is not satisfied. In other routes to solve the energy demand and control the pollution under using of alternative fuels. The usage of fossil fuel is causes to more pollution and change environmental conditions. The use of biodiesel is one of the major solution for this kind of problems. Our project work is used Karanja biodiesel for potentiate the diesel. The Karanja oil is readily available in India and it has more potential to use as alternative fuel in diesel engine without modification. Experimental is going conduct to study the performance and emissions characteristics of biodiesel, additive used biodiesel and compared with diesel. Similarly, the properties like calorific value, flash point, viscosity and fire point also going to study.

Keywords: Diesel Engine, Biodiesel, Diethyl Ether, Emission Analysis,



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alternative fuel in the title of "Performance and emission analysis of diesel engine using karanja oil biodiesel blend with diethyl ether".



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1. Introduction

1.1 Karanja oil

Karanja oil is derived from the seeds of the *Millettia pinnata* tree. It is more effective to use with biodiesel blends with additives. It will increase the performance and efficiency of the diesel. It is easily available in our country.

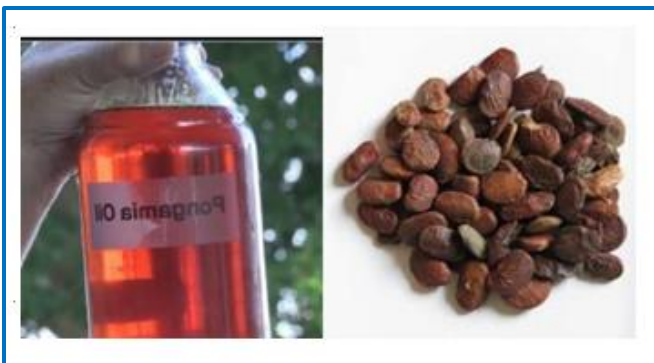


Fig. 1 Karanja oil & seeds

1.2 Karanja oil

Diethyl ether, or simply ether, is an organic compound in the ether class with the formula $(C_2H_5)_2O$, sometimes abbreviated as Et_2O . It is a colorless, highly volatile flammable liquid. It has been used as a recreational drug to cause intoxication. It has a high cetane number of 85–96 and is used as a starting fluid, in combination with Diesel engines because of its high volatility and low flash point.

1.3 Ci Engine

CI stands for compression ignition. Diesel engines work by compressing only the air [1-5]. This increases the air temperature inside the cylinder to such a high degree that atomized diesel fuel injected into the combustion chamber ignites spontaneously. The original diesel engine operates on the "constant pressure" cycle of gradual combustion and produces no audible knock [6-8].

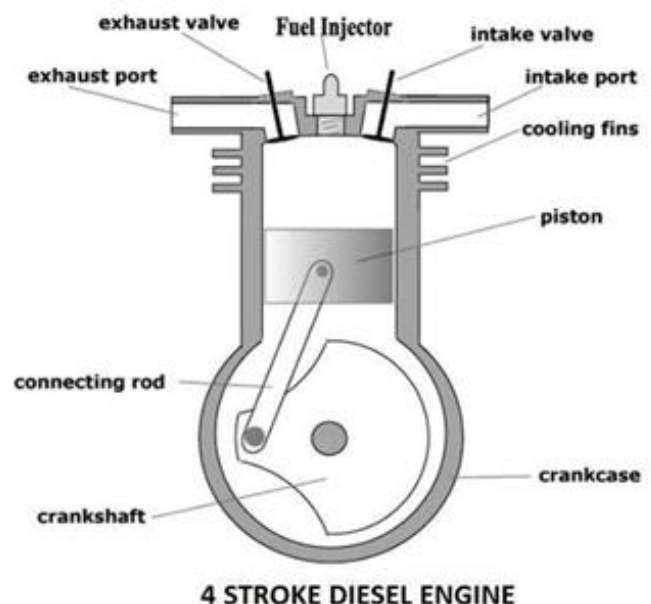


Fig. 2 Cut section of IC engine

2. Problem Identification

Nowadays consumption of diesel is very high, Cost is high. It cause environmental pollution and affects humans, plants and animals. It also causes climate change and cause global warming. For reducing these problems we prepare the mixture of biodiesel additive with diesel to reduce pollution .For these problems we conduct the experiment of using karanja oil biodiesel with diethyl ether additive in CI engine. Because the karanja oil is more effective compare to other and the low cost. Also using diethyl ether additive to reduce more amount of emission gases and improve the performance of the engine.

3. Methodology

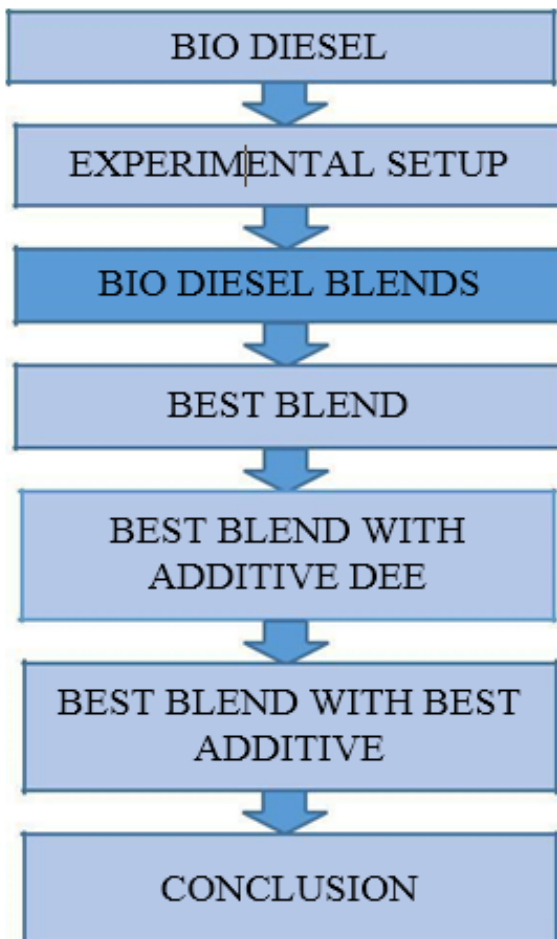


Fig. 3 Methodology flow chart

4. Experimental Setup

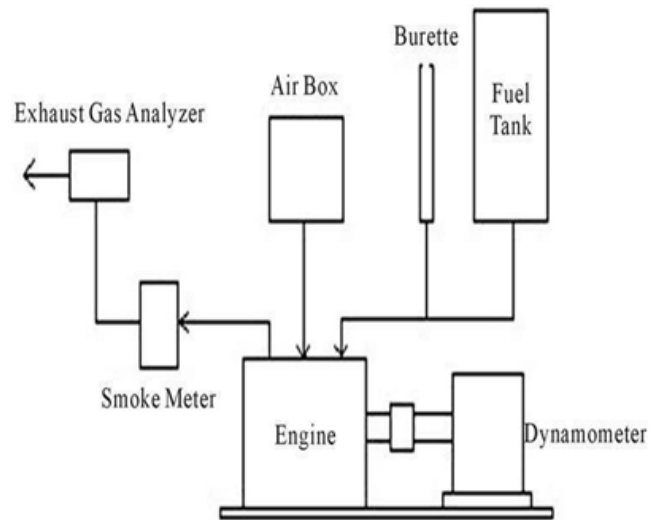


Figure. 4 Experimental Setup

5. Conclusion

Based on the review, the lot scope is available for doing experimental work in the area of alternative fuels. The main drawback of bio diesel is high viscosity and low cetane number. This may be reduced by transesterification process. After the transesterification process, biodiesel used as fuel in diesel engine without any modification and also the performance and emissions characteristics of biodiesel similar to standard diesel.

References

- [1] Shyam Pandey, Amit Sharma, P. K. Sahoo. (2012). "Experimental Investigation On The Performance And Emission Characteristics Of A Diesel Engine Fuelled With Ethanol, Diesel And Jatropha Based Biodiesel Blends", *International Journal of Advances in Engineering & Technology*, Vol. 4, pp. 341-353.
- [2] Deepak Agarwal a, Avinash Kumar Agarwal. (2007). "Performance and emissions characteristics of Jatropha oil (preheated and blends) in a direct injection compression ignition engine".
- [3] Y. He, Y.D. Bao, Study on rapeseed oil as alternative fuel for a single cylinder diesel engine, *Renewable Energy*, 28 (2003) 1447–1453.
- [4] N. Hemmerlein, V. Korte, H. Richter, Performance, Exhaust Emission and Durability of Modern Diesel Engines Running on Rapeseed Oil. SAE paper 910848.
- [5] C.W. Yu, S. Bari, A. Ameen, A comparison of combustion characteristics of waste cooking oil with diesel as fuel in a direct injection diesel engine, *Proceedings of the Institution of Mechanical Engineers: Part D: Journal of Automobile Engineering* 216 (3) (2002) 237–243.
- [6] O.D. Hebbal, K.V. Reddy, K. Rajagopal, Performance characteristics of a diesel engine with Deccan hemp oil, *Fuel* 85 (14–15) (2006) 2187– 2194.
- [7] M.S. Kumar, A. Ramesh, B. Nagalingam, An experimental comparison of methods to use methanol and jatropha oil in a compression ignition engine, *Biomass and Bioenergy* 25 (2003) 309– 318.
- [8] A.S. Huzayyin, A.H. Bawady, M.A. Rady, A. Dawood, Experimental evaluation of diesel engine performance and emission using blends of jojoba oil and diesel fuel, *Energy Conversion and Management* 45 (13–14) (2004) 2093– 2112.

Competing Interests:

The authors declare that they have no competing interests.

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