# An Experimental Investigation on Diesel Engine by Dual Bio-Diesel Blend

**A.M.Rathod [1] Prof.S.S.Dandge[2]**
[1]M.E. Student [2]Associate Professor
[1,2]IBSS College Of Engineering, Amravati

*Abstract*— Bio-diesel is one of the most promising alternatives for diesel engine. Bio-diesel is produced by the transestrification of triglycerides of edible/non edible oil, waste vegetables oils using methanol with alkaline catalyst. The objective of this project is to investigate the mechanical properties and performance characteristic of Dual bio-diesel extracted from neem and pongamia pinnate oil. Also we discuss the bio-diesel production from neem oil and pongamia oil which is monoester produced using transestrification process.

***Key words:*** Transestrification, Triglycerides

## I. INTRODUCTION

The global fuel crisis has triggered the awareness amongst many countries to focus on the development of alternative fuels. Automobiles contribute significant role to the air pollution problems. Diesel engine is such a prime mover which is used in every sector like road transportation, marine, agriculture, industries etc. Import of petroleum product is a major drain on our foreign exchange sources and the situation is likely very worst as demand growing day by day. An extensive worldwide search is underway for alternative fuels to replace the conventional oil based fuels. The main reason is the increased prices, the very limited resources for such fossil fuels and increasing stringent environmental regulations. Growing concerns about greenhouse gas emissions will lead to an increase in bio-fuels and oxygenated fuels production. The application of bio-fuels and oxygenated fuels plays an important role in an alternative fuel for the internal combustion engines. The possible alternative fuels available in the market are diverse Biodiesel fuels seem to be providing a promising alternative solution to all the present problems.

## II. TEST PROCEDURE

Fig. 1: Experimental set-up

## III. RESULTS AND DISCUSSION:

The experimental investigation was carried out at different load for mixed blend of Neem and Pongamia pinnate. The blends used are B5% i.e.5% biodiesel (50% neem and 50% pongamia pinnate) and 95% diesel,B10% i.e.10% biodiesel and 90 % diesel,B15% i.e.15% biodiesel and 85% diesel, B20% i.e.20% biodiesel and 80% diesel.

### *A. BP VS LOAD:*

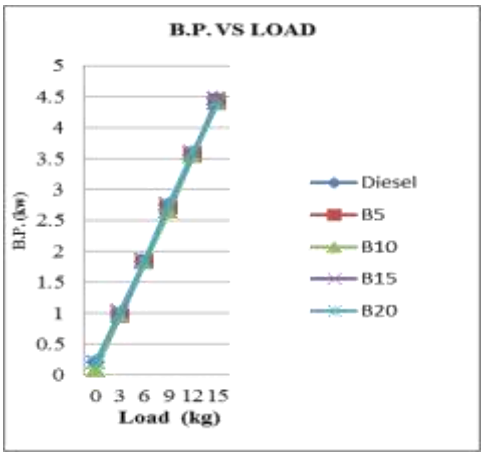


Fig. 2: BP VS LOAD:

### *B. IP VS. LOAD:*

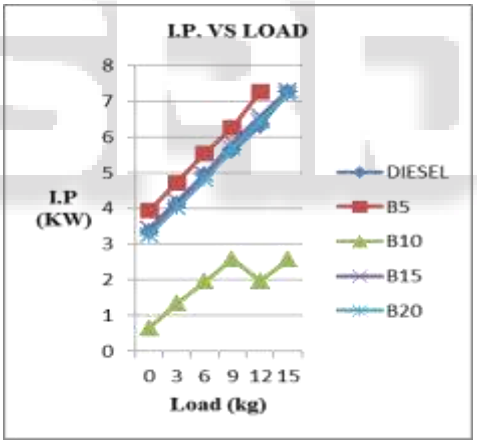


Fig. 3: IP VS. LOAD

### *C. Breake Thermal Efficiency Vs. Load:*

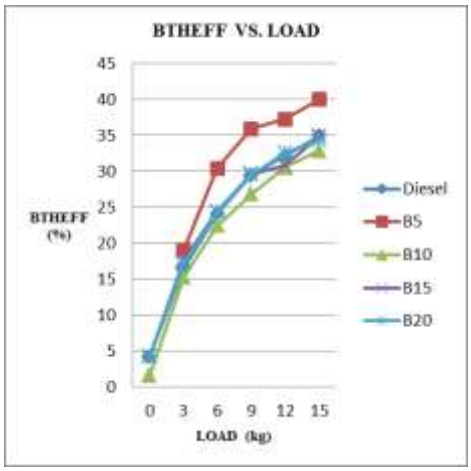


Fig. 4: Breake Thermal Efficiency Vs. Load:

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*D. Indicated Thermal Efficiency Vs. Load:*

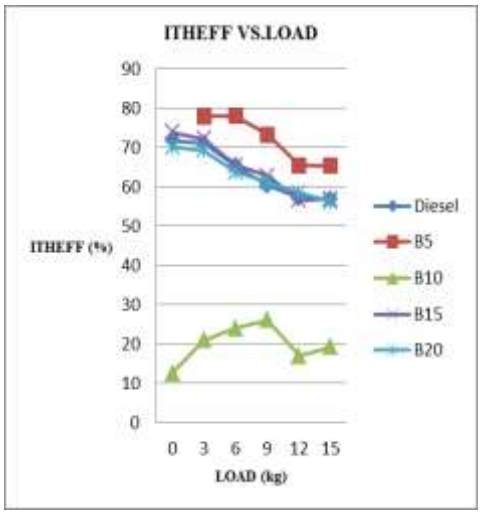


Fig. 5: Indicated Thermal Efficiency Vs. Load:

*E. Mechanical Efficiency Vs. Load*

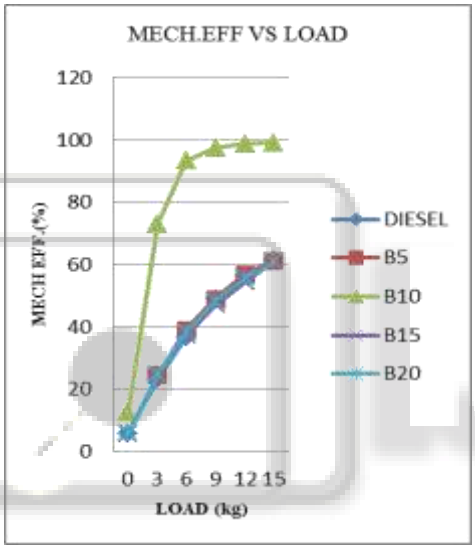


Fig. 6: Mechanical Efficiency Vs. Load

*F. Volumetric Efficiency Vs. Load*

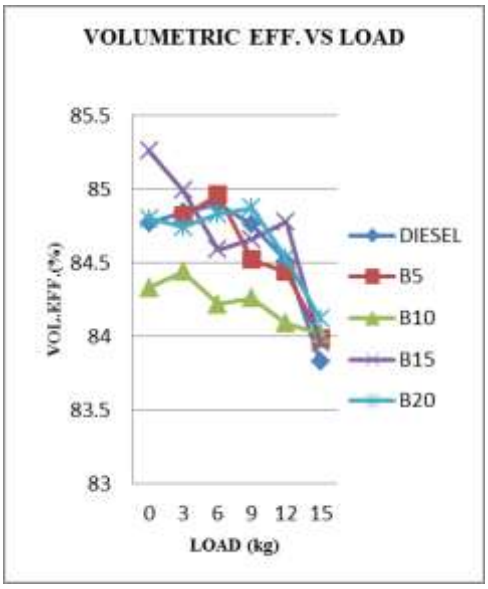


Fig. 7: Volumetric Efficiency Vs. Load

## IV. CONCLUSION

The following conclusions are drawn from the above experimental work performed on single cylinder diesel engine. The engine operates at different load like 3kg, 6kg, 9kg, 12kg &15kg on combination of diesel fuel with the blend of dual fuel mode of neem and pongamia pinnate (karanj) biodiesel.

- The blend of biodiesel in dual fuel mode can be directly used in diesel engine without any engine modification.
- Breake thermal efficiency is increased for B5% and remains same for B15 &B20 Blend as compared to diesel engine.
- Indicated thermal efficiency continuously decreases as load on the engine increases. Indicated thermal efficiency is superior for B15&B20 Blend as compared to diesel engine.
- Mechanical efficiency and volumetric efficiency remains constant for all blend.

The dependency on the diesel can be reduced by use of biodiesel instead of diesel in the applications where it is possible which will save the environment as well as our foreign exchange.

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