

# The Performance Analysis and Comparision of Mahua Oil and Neem Oil are Blends with Diesel Fueled in CI Engine

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**ABSTRACT:** In the present paper, the performances of Mahua and Neem Bio-diesel are tested. The freely available resources can be used. The blends of Mahua methyl ester and Diesel were prepared analysed and their performance is compared with performance of diesel oil. The blends of Neem methyl ester and Diesel were prepared analysed and their performance compared with performance of diesel oil. Proceeding to this we compared the staging of Mahua and Neem oil in this work. The engine performance intended variables are thermal efficiency, Mechanical efficiency, fuel consumption have been obtaining from different blends and results are compared with pure diesel. The goal of this study is to verify the affiliation between engine performances by means of diesel.

**KEYWORDS:** Neem oil, Neem bio-diesel, Diesel oil, Mahua oil, Mahua bio-diesel

## I. INTRODUCTION

IC Engine is generally the compression ignition engine have crucial task in production, transport, power generation and farming region. We have to do research and find the customs of using alternate fuels which are sooner renewable and also manufacture in low levels of gaseous and particulate Pollutants presents in IC engines. Present work the performance survey tests by using petroleum diesel fuel and also blends of Mahua and Neem bio-diesel have been done.

Table 1.1 Engine specification

Made	Kirloskar
Cycle's used	Diesel
Number of strokes	4
Number of cylinder	1
Bore diameter	80 mm
Stroke	100 mm
Cooling system	Water cooled
Lubrication	Forced method
Output	3.675 kW at 1500 rpm
Dynamometer	D.C Generator
Armature	Shunt

Voltage	220 V
Rated BP	3.675 kW
Air box orifice diameter	25 mm
Current	13 A

## II. MATERIAL AND METHODS

The Mahua bio-diesel be prepared by using three march transesterification processes because of their FFA level is more than 1%. In the first march, esterification result is carried out by adding up 15 ml  $\text{CH}_3\text{OH}$  to 100 ml Mahua oil and 0.5ml  $\text{H}_2\text{SO}_4$ . This reaction is carried at temperature range between  $50^\circ\text{C}$  to  $60^\circ\text{C}$  with reaction period of 60 minutes. In the second march 8ml methanol is added to the sample obtained from first march with 0.5 ml sulfuric acid with reaction instance of 60 minutes and the temperature range  $50^\circ\text{C}$  to  $60^\circ\text{C}$ . In third march transesterification retort was completed by adding 15ml of  $\text{CH}_3\text{OH}$  to the trial gets from earlier march and 0.5gms of sodium hydroxide with retort instant of 60 minutes and temperature is  $56^\circ\text{C}$  to  $65^\circ\text{C}$ . Mahua bio-diesel blends were arranged by mixing B10, B25, B50, B75 and B100 respective bio-diesel with diesel oil on volume basis.

Neem oil biodiesel was prepared by using two-stage transesterification process due to their free fatty acids (FFA) level is more than 1%. In the first march, esterification result was carried out to minimize the FFA level. Minimum level of FFA was getting by adding 15ml methanol and 1ml  $\text{H}_2\text{SO}_4$  to 100ml of Neem oil. This retort be carry at temperature sort between  $55^\circ\text{C}$  to  $60^\circ\text{C}$  with a feedback time is about 60 minutes. In the second stage, maximum capitulate was obtained by adding 35ml methanol and 0.3% NaOH to the trial 100ml get from the first march which has lowest FFA level. During this process the temperature range of  $55^\circ\text{C}$  to  $60^\circ\text{C}$  was maintained for reaction timing is 90 minutes. Neem bio-diesel oil blends are equipped by mixing B10, B20, B40, B60, B80 and B100 respective bio-diesel with diesel oil on volume basis.

## III. RESULTS AND DISCUSSION

The basic engine performance measuring parameters are BTE, Mechanical efficiency, SFC has been obtained from different blends and results are compared with pure diesel.

### 3.1 EFFECT OF BP ON BSFC

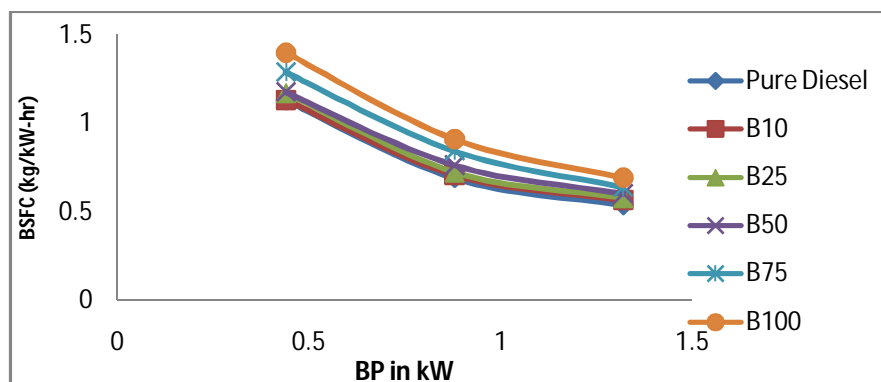


Figure 3.1 Effect of BP on specific fuel consumption when diesel engine has run on blends of Mahua fuel as B10, B25, B50, B75, B100 and Diesel.

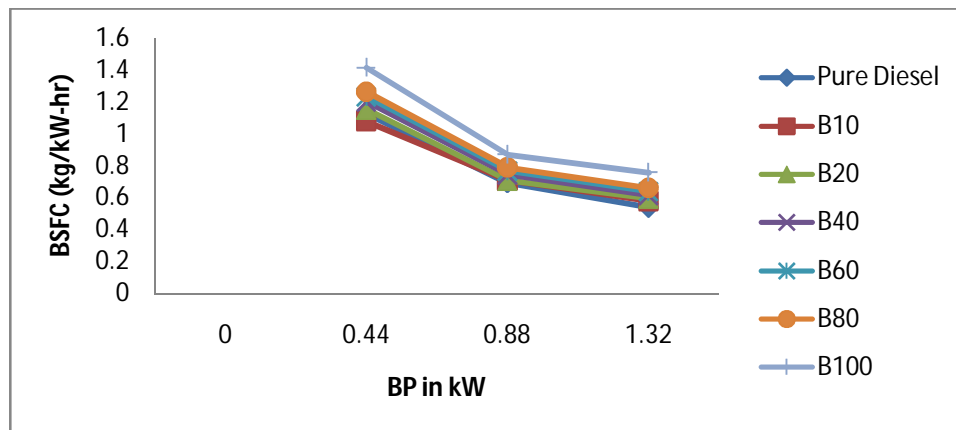


Figure 3.2 Effect of BP on Specific fuel consumption when diesel engine has run on blends of Neem oil as B10, B20, B40, B60, B80, B100 and Diesel.

### 3.2 Effect of BP on Brake Thermal Efficiency

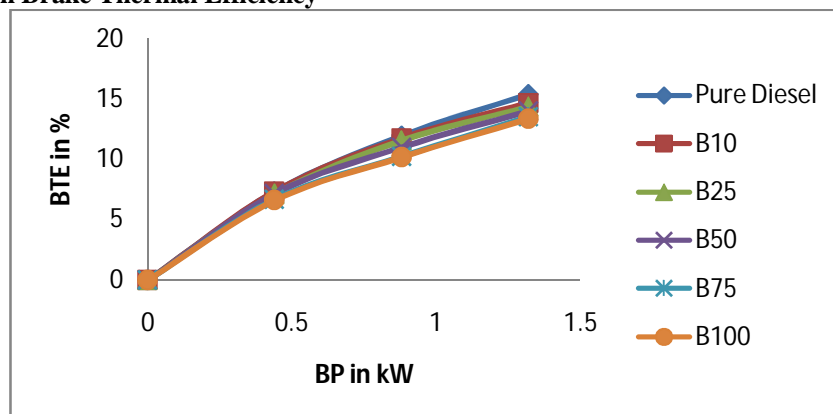


Figure 3.3 Effect of BP on Brake thermal efficiency when diesel engine has run on blends of Mahua oil as B10, B25, B50, B75, B100 and Diesel.

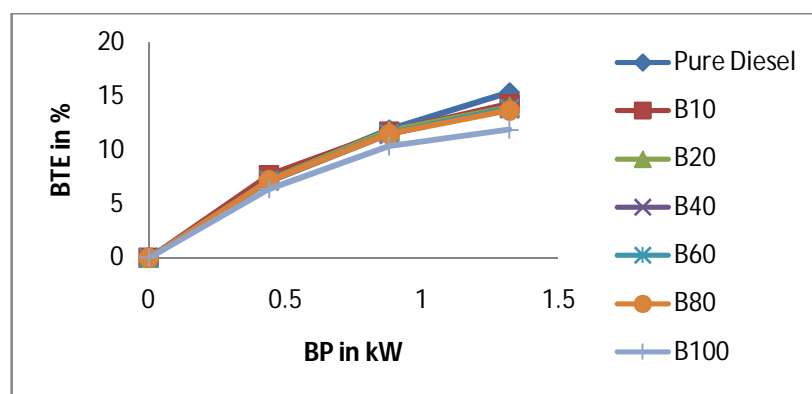


Figure 3.4 Effect of BP on Brake thermal efficiency when diesel engine has run on blends of Neem oil as B10, B20, B40, B60, B80, B100 and Diesel.

### 3.3 Effect of BP on Mechanical Efficiency

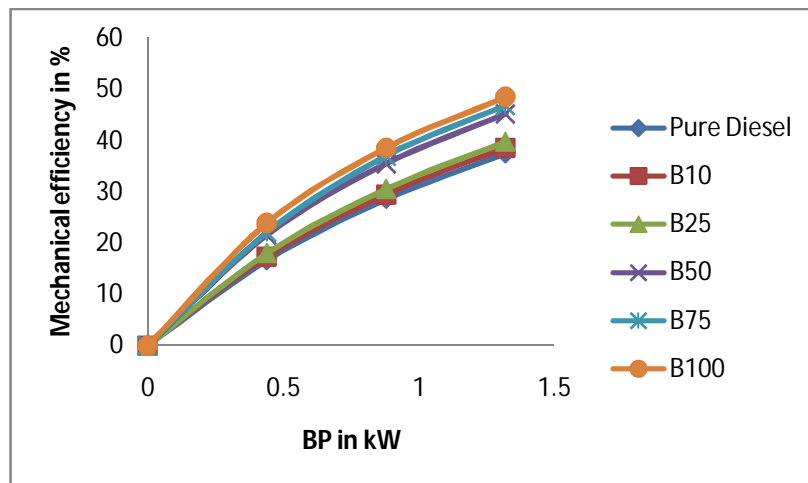


Figure 3.5 Effect of BP on Mechanical efficiency when diesel engine has run on blends of Mahua oil as B10, B25, B50, B75, B100 and Diesel.

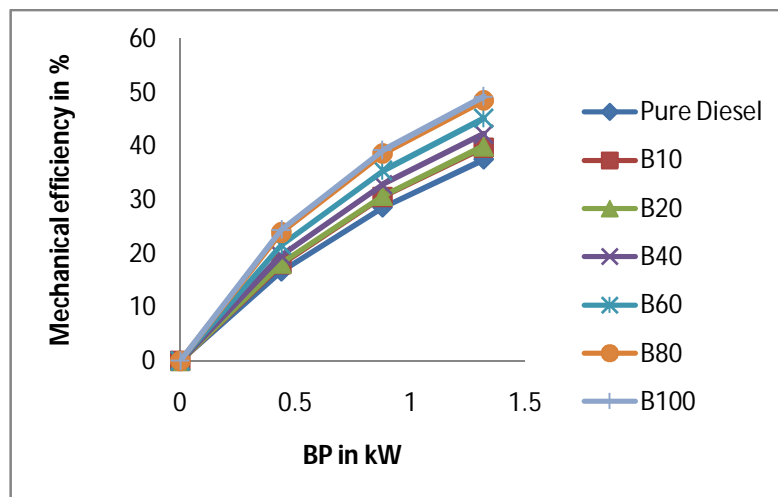


Figure 3.6 Effect of BP on Mechanical efficiency when diesel engine has run on blends of Neem oil B10, B20, B40, B60, B80, B100 and Diesel.

### IV. CONCLUSION

- BTE of B20 is more in Neem as compared with diesel.
- Brake thermal efficiency of B25 is nearer to diesel.
- Least SFC for B20 fuel as compared to diesel and B10.
- Specific fuel consumption of B10, B25 is close with the diesel.
- BTE and Mechanical efficiency of Mahua and Neem oil for the Blend B10, B20 and B25 is analyzed we get BTE and mechanical efficiency is more in Neem than Mahua oil.

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