TITLE OF PAPER

PERFORMANCE ANALYSIS OF BIO-DIESEL ON SINGLE CYLINDER C.I. ENGINE

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Key words: CSO:Cotton seed oil,
CSOME: Cotton seed oil Methyl ester,
Transesterification,
Characterization,
Performance,
C.I. Engine,
BD: Bio-diesel,
D: Diesel.

- In the present work the performance evaluation of bio diesel (CSOME & its blends with diesel) was done in single & dual fuel (pure diesel, pure bio diesel & blends of diesel & bio-diesel were used) mode.
- The results thus obtained were encouraging & signifies that cotton seed Methyl ester (Bio-diesel) can easily replace the conventional diesel without any modification in existing diesel engine.

- **INTRODUCTION: Alternative fuels are urgently needed to mitigate the impacts of engine exhaust on the environment and depleting fossil fuel reserves.**

- **TRANSESTERIFICATION PROCESS : Two stage transestrification process.**

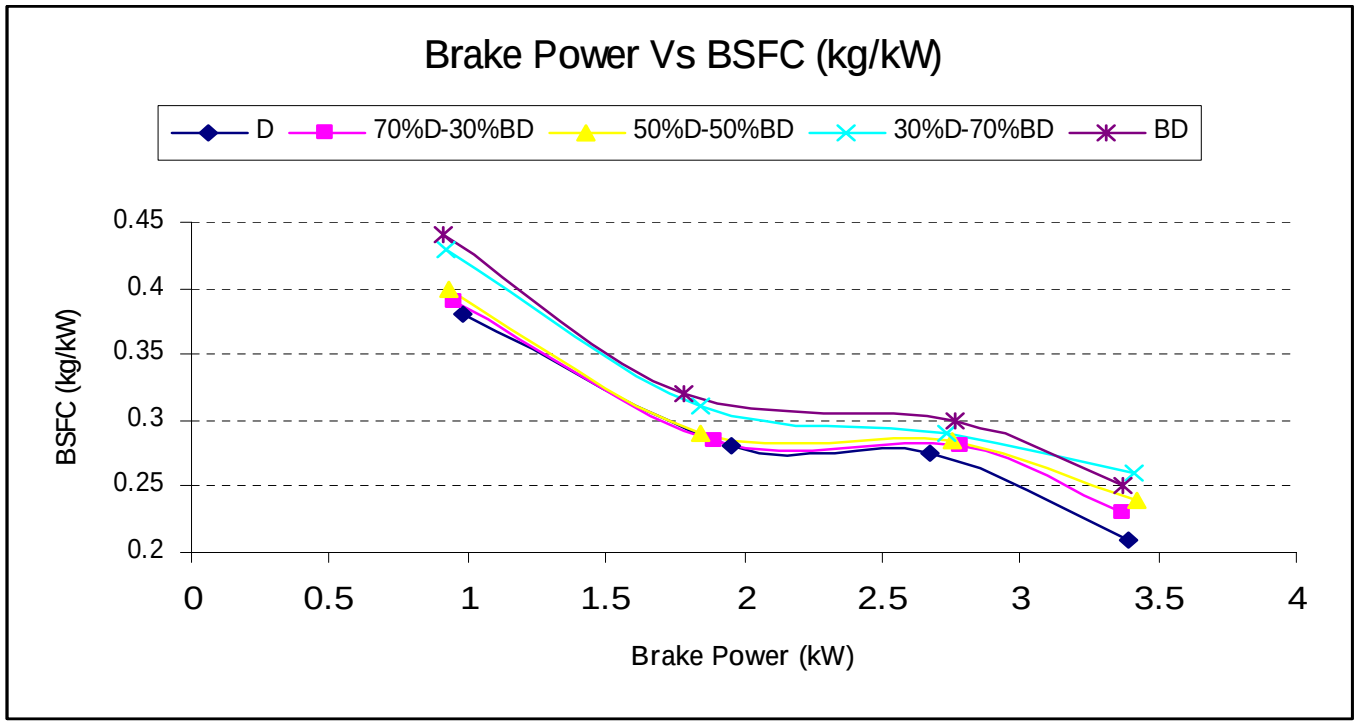
- ***Fuel characteristics of cottonseed oil (CSO) and cottonseed oil methyl esters (CSOME)***

Property	**CSO**	**CSOME**
Viscosity (mm^2/s)at 35^0C	32-37	4.1-4.5
Density(kg/m^3)	900- 915	875-880
Flash point (K)	294	224
Calorific value (MJ/kg)	41.13	38.9

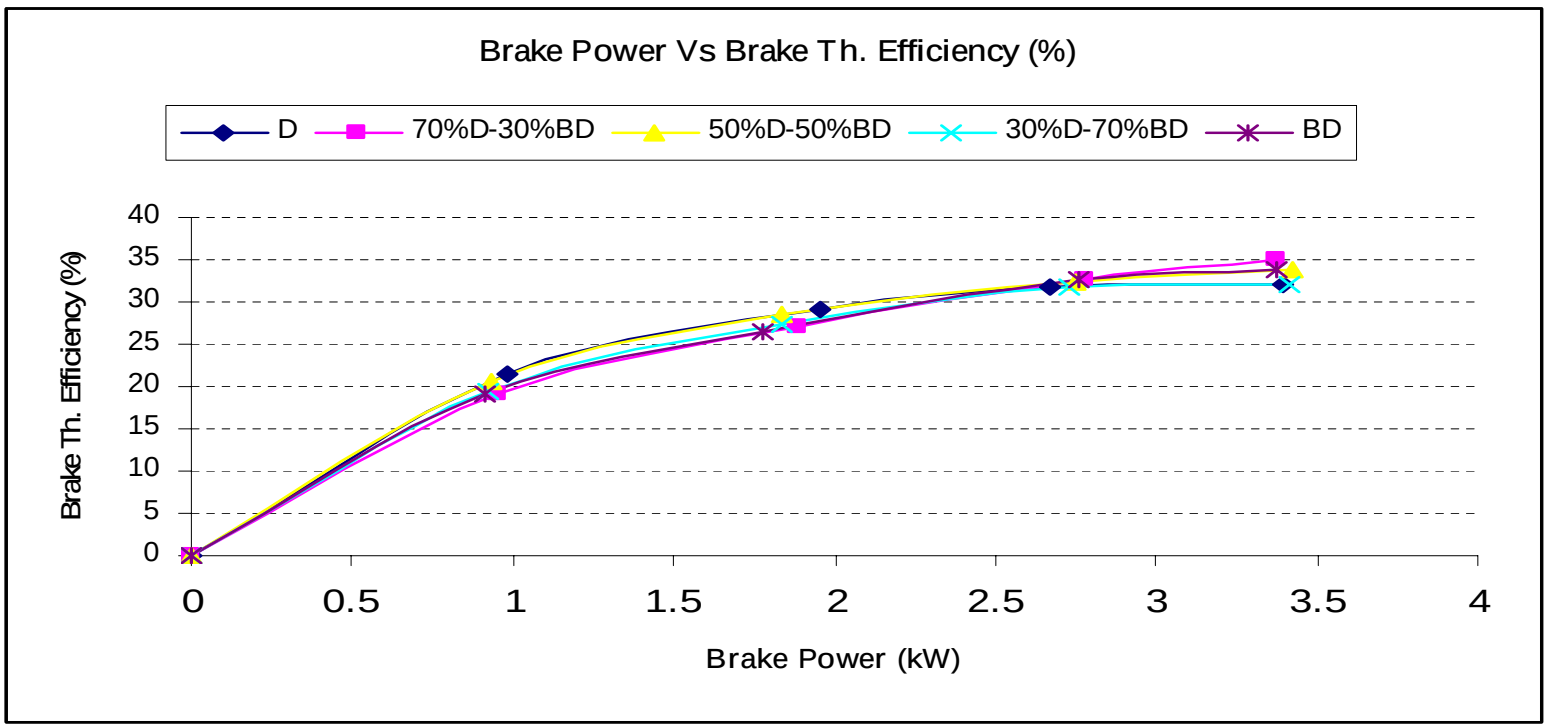
- **Engine test:**
  Specification of Engine
- Single cylinder two stroke D.I. diesel engine
- Make : Kirloskar Oil Engine Ltd. India
- Rated Power : 3.60
- Bore : 80mm
- Stroke : 110mm
- Compression ratio : 16 : 1
- RPM : 1500
- Loading device : Rope brake dynamometer

ENGINE TEST RESULTS:

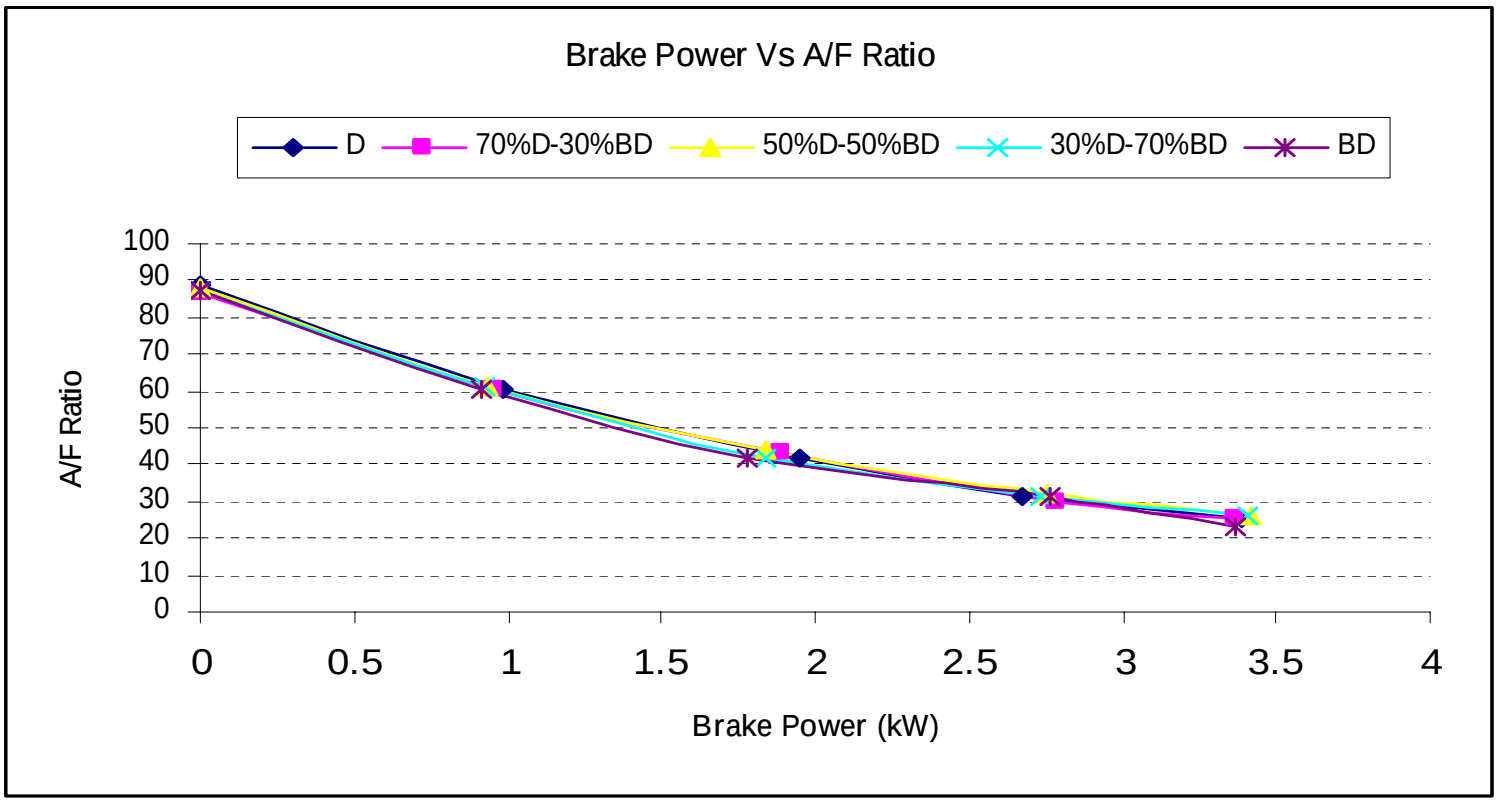
Effect of Brake power on brake specific fuel consumption.



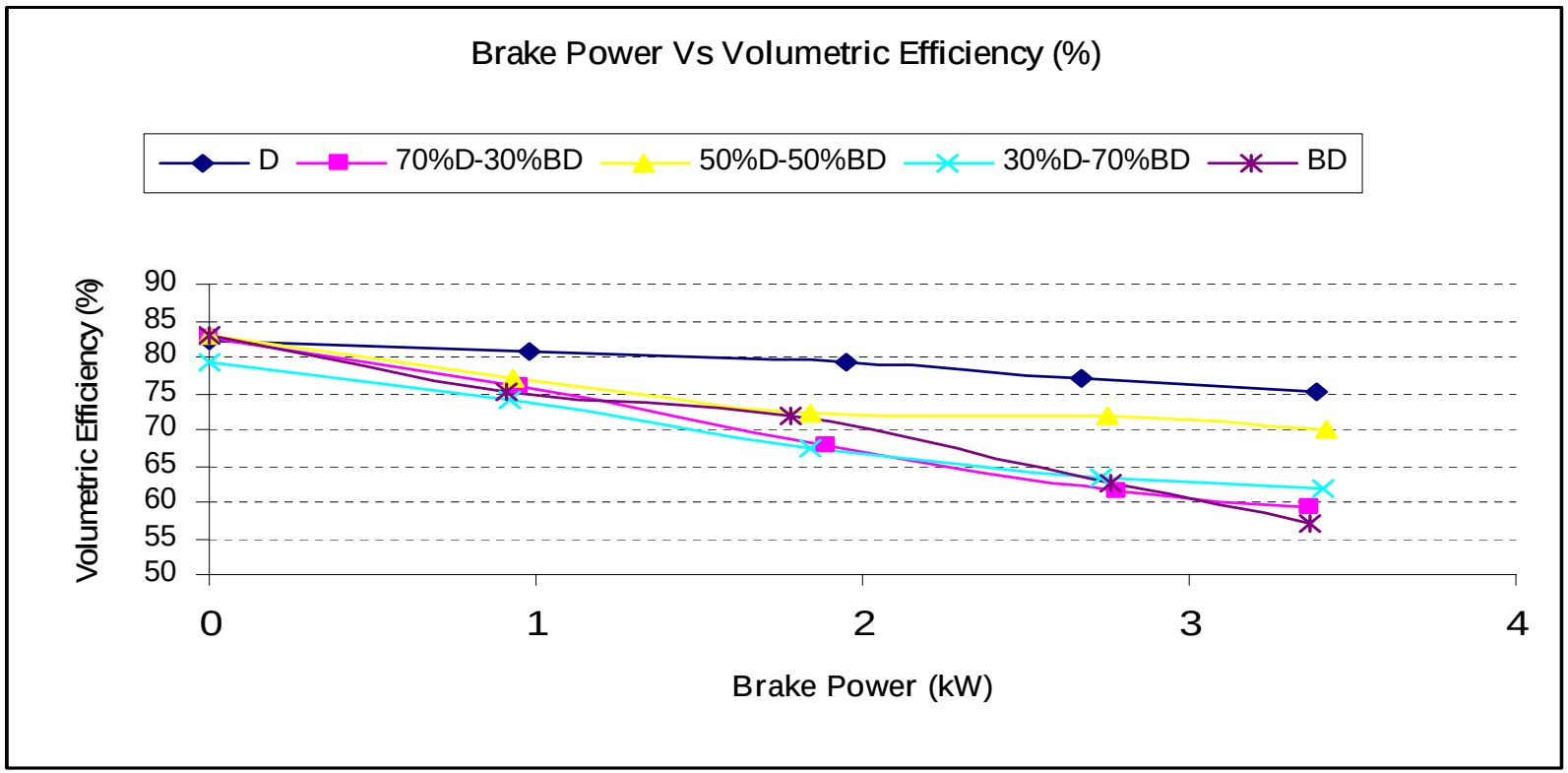
Effect of Brake Power on Brake thermal efficiency:



Effect of Brake power on Air-Fuel ratio.



Effect of Brake power on Volumetric Efficiency.



Conclusion

- **In Maharashtra, 10 lakhs hector of land is under cotton cultivation.**
- **Availability cotton seed oil approximately 4800 lakh Kg.**
- **Major cotton growing area is in Vidarbha region.**
- **Therefore cotton seed oil and its methyl ester becomes good source of energy.**
- **As from the above result and discussion we can conclude that Bio-diesel from cotton seed oil resemble very much with the conventional diesel, in properties as well as in the performance on CI engines which are widely used in rural India in agriculture sector and other applications. The economical analysis suggests good scope for Cotton seed oil methyl ester (biodiesel) in comparison to diesel. The efforts are being made to use by product, glycerol of the esterification process, for some other application to reduce the cost of biodiesel production. Glycerol can be used in soap making or other industrial applications.**
- **Biodiesel is an environmentally friendly fuel that can be used in any diesel engine without modification. 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.**