Conclusions

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CHAPTER 6

CONCLUSIONS

In order to attain better engine performance and optimum emission levels of a diesel engine, the following three techniques are investigated.

i. Using Bio-Diesel blends of Karanja,

ii. Cutting grooves on the piston crown with diamond mesh cut on the remaining face and

iii. Different percentages of exhaust gas recirculation.

The results are presented at 3/4 of the rated load of the combined system and compared with normal engine.

The following conclusions are drawn from the present investigation.

- The improvement in the brake thermal efficiency is about 7.4% for the same compression ratio.
- The brake fuel consumption is lowered by 2.94%.
- The reduction in the exhaust gas temperatures is about 3.8%.
- The reduction in ignition delay is about 1.8%.
- The peak cylinder pressure is decreased by 2.833%.
- The reduction in smoke emission is about 2.4%.
- The reduction in NO\textsubscript{x} emission is around 12.8%.
- The reduction in Hydro Carbon emission is 5.37%.
- The reduction in CO emission is about 2.9%.

Based on the research done, for a single cylinder direct injection 5HP diesel engine of Kirloskar make, it is recommended that the following modifications can give better performance and lower emissions.
i) Using Karanja Bio-Diesel (K20) blend.

ii) Providing nine numbers of elliptical grooves of volume 603.2 mm$^3$ and diamond mesh cut on the remaining face of the piston crown.

iii) Supplying a 20% of exhaust gas recirculation.

6.1 SCOPE FOR FUTURE WORK

The above research work provides ample scope for future work, which is listed below:

- Different blends of different alternative fuels with additives can be tested.
- The effects of the various shapes of grooves on swirl generation can be investigated.
- Several other arrangements of grooves can be investigated in conjunction with other possible turbulence inducement methods like bluff bodies.
- The performance of engine can also be studied in a multi cylinder engine.