CSO Biodiesel Production through Hybrid Reactor and Performance Testing at Variable Compression Ratio

A major project submitted in partial fulfilment of the requirement for the award of a degree in

MASTERS OF TECHNOLOGY

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Submitted by

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of

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CERTIFICATE

This is to certify that the major project report entitled **"An Experimental Analysis on Biodiesel production from Cottonseed Oil and Its Performance Testing on a VCR Engine"** submitted by Sh. Shashank Mohan (R. No. 2K11/THE/18) for the partial fulfilment for the award of the Degree of Masters of Technology in Thermal Engineering of Delhi Technological University. It is an authentic record of student's own work carried out by him under our guidance and supervision.

This is also certified that this dissertation has not been submitted to any other Institute/University for the award of any degree or diploma.

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ABSTRACT

The increasing industrialization and motorization of the world has led to a steep rise for the demand of petroleum products. Petroleum based fuels are obtained from limited reserves. These finite reserves are highly concentrated in certain regions of the world. Therefore, those countries not having these resources are facing a foreign exchange crisis, mainly due to the import of crude oil. Hence, it is necessary to look for alternative fuels, which can be produced from materials available within the country. This project deals with development of a biodiesel production test rig based on combined hydrodynamic cavitation and mechanical stirring method and comparison of performance of various blends of Cotton Seed oil with diesel (B20, B40 and B60) also has been made against pure diesel at variable compression ratios. The performances of these biodiesel blends have been tested by evaluating the performance parameters like torque, brake power, brake thermal efficiency and brake specific fuel consumption, brake specific energy consumption, exhaust gas temperature, air fuel ratio and emission characteristics like smoke opacity. Performance testing has been performed on 4-stroke, single cylinder, water cooled Kirloskar C.I. engine. Performance parameters has been obtained from the computer (software is “Engine soft”) which is incorporated with the engine panel box. Smoke opacity has been checked by the A.V.L smoke meter. The results obtained show that various blends of Cotton seed oil with diesel (B20, B40 and B60) can be acceptably used as an alternative fuel when C.I engine is operating at high compression ratios.

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LIST OF ABBREVIATIONS

A/F	Air fuel ratio
BIS	Bureau of Indian Standards
BMEP	Brake mean effective pressure
BP	Brake power
BSFC	Brake specific fuel consumption
BSEC	Brake specific energy consumption
BTHE	Brake thermal efficiency
BTHEff	Brake thermal efficiency
CSO	Cotton seed oil
CSO B20	20%Cotton seed oil & 80% Diesel
CSO B40	40%Cotton seed oil & 60% Diesel
CSO B60	60%Cotton seed oil & 40% Diesel
CSOME	Cotton seed oil methyl ester
EGR	Exhaust gas recirculation
EXT	Exhaust temperature
FMEP	Frictional mean effective pressure
FP	Frictional power
IMEP	Indicated mean effective pressure
IP	Indicated power
IThE	Indicated thermal efficiency
MechE	Mechanical efficiency
MoEF	Ministry of Forests and Environment
NOVOD	National Oilseed and Vegetable Oil Development Board
PPM	Parts per million
Voleff	Volumetric efficiency

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