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THEORETICAL AND EXPERIMENTAL PREDICTION OF THE PERFORMANCE OF VEGETABLE OIL OPERATED CIENGINE

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Abstract

A theoretical model was developed to evaluate the performance characteristics and combustion parameters of vegetable oil esters like Jatropha, Mahua and Neem and they are compared to diesel fuel. The predicted results of these fuels are compared with experimental result and also compared with the result of diesel fuel for the validity of the theoretical model. The combustion characteristics and performance parameters are predicted for different vegetable oil esters and for various engine loads condition. From the predicted results. It is found that the heat release and work done are reduced by about 4% for jatropha, 6% for Mahua and 8% for Neem oil esters when compared to diesel .However, slight increase is observed for specific fuel consumption. The experimental work is carried out in a single cylinder computerized diesel engine test rig. This develops 5.2 kW at 1500 rmp and loaded by eddy current dynamometer at various engine conditions. The harmful pollutants such as HC, CO,NO_X and smoke are reduced in the vegetable oil esters than that of diesel fuel. The predicted values of performance and emissions for all fuel more or less equal to the experimental values'. From the investigation it lis concluded that the performance of vegetable oil esters such as Jatropha, Mahua and Neem are much better. Thus the developed model is highly capable for simulation work with bio-diesel as a suitable alternative fuel for diesel.

Keywords : Compression ignition engine, injection timing, Cone angle, Vegetable oil esters, Performance.