

(54) Title of the invention : Alternative biofuels with enhanced efficiency and their key performance indicators

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(57) Abstract :

According to the literature, using neat biodiesel instead of petro-diesel in DI engines is restricted. There are two possible explanations for the above statement. 1.More 'NO' is released as a result of the total use of oxygenated biodiesel. 2.Oil dilution in the crankcase at lower loads. Because IDI engines are more compatible in terms of executing better and total combustion, any fuel with a lower cetane number or lower quality can be used in them. IDI engines significantly reduce crankcase oil dilution. Experiments are carried out on a variable speed IDI engine to reduce the problem of crank case oil dilution in this thesis. Additionally, efforts are made to improve engine performance and reduce tailpipe emissions such as NO and other pollutants. Biodiesel (Jatropa Methyl Ester) is being used to completely replace diesel fuel, and preheating the fuel is being used to improve spray properties by lowering the viscosity to that of conventional fuel. The most cost-effective preheating temperature is determined, and it is determined that heating the biodiesel to 600 C is the most viable in a variety of performance aspects. JME is heated to 60, 70, 80, 90, and 100 degrees Celsius before being tested individually on a laboratory-based IDI engine to assess the engine's performance in all aspects, including vibration to assess combustion smoothness and possible knock and detonation. A data logger was used to plot pressure and crank angle diagrams, and combustion propensity characters such as heat release rates were calculated to compare with conventional fuel and verify the effect of using 100 percent biodiesel in a diesel engine. The engine's emissions at various loads were plotted and compared to determine the best possible preheating temperature. To assess out knocking and detonation with the new fuel, FFT plots with acceleration and velocity amplitudes were recorded with the least count below one degree revolution of the crank angle. The engine's speed was used to verify the mean effective pressures. Finally, it was determined that biodiesel heated to 600 degrees Celsius is the best fuel for use in the IDI engine.

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