PERFORMANCE, EXHAUST EMISSIONS AND COMBUSTION CHARACTERISTICS OF COTTON SEED OIL BASED BIODIESEL IN CERAMIC COATED DIESEL ENGINE

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ABSTRACT

Experiments were conducted to evaluate the performance of a LHR diesel engine with ceramic coated cylinder head [ceramic coating of thickness 500 microns was done on inside portion of cylinder head] with different operating conditions [normal temperature and pre-heated temperature] of cotton seed oil in biodiesel form with varied injector opening pressure and injection timing and compared the performance with pure diesel operation on conventional engine. Performance parameters (brake thermal efficiency, brake specific energy consumption, exhaust gas temperature, volumetric efficiency, coolant load, sound levels) and exhaust emissions (smoke levels and oxides of nitrogen) were determined at various values of brake mean effective pressure of the engine, while combustion characteristics were measured at peak load operation of the engine with biodiesel operation. Conventional engine showed compatible performance, while LHR engine showed improved performance with biodiesel at recommended injection timing and pressure. The performance of both versions of the engine improved with advanced injection timing and at higher injector opening pressure with biodiesel operation when compared with conventional engine with pure diesel operation. The optimum injection timing was 33°bTDC for conventional engine while it was 30°bTDC for LHR engine with biodiesel operation.

KEYWORDS: Alternate Fuels, Biodiesel, LHR Engine, Fuel Performance, Exhaust Emissions, Combustion Characteristics