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Experimental investigations on a variable compression ratio (VCR) CIDI engine with a blend of methyl esters palm stearin-diesel for performance and emissions

A. R. Babu , G. Amba Prasad Rao & T. Hari Prasad

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ABSTRACT

The present work deals with an experimental evaluation of the existing diesel engine with a blend of methyl esters of palm stearin (PS) oil and petro-diesel under varying injection pressures and compression ratios (CRs). It was observed that the brake thermal efficiency of engine was high with PSME40 at an injection pressure of 210 bar and CR of 16.5 when compared to other fuel injection pressures of 190 and 230 bar. However, the engine performance was superior with CR 19 at the rated injection pressure of 190 bar. Higher peak pressures are observed with higher CR. The engine emissions in terms of hydrocarbons, carbon monoxide and smoke opacity were lower but the nitrogen oxides were found to be increased due to the better combustion. It is

observed that CR and fuel injection pressure simultaneously played a vital role in the reduction of emissions. The study revealed that PS could be explored as a source for producing biodiesel effectively with environmental concerns.

KEYWORDS:

- CI engine
- PSME40 blend
- fuel injection pressures
- compression ratios
- engine performance
- exhaust emissions

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Disclosure statement

No potential conflict of interest was reported by the authors.

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