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Experimental investigation on engine performances, combustion characteristics and emission of exhaust gases of VCR engine fuelled with cottonseed oil methyl ester blended with diesel

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ABSTRACT

This research work investigates the engine performances, combustion characteristics, and emission of exhaust gases of variable compression ratio engine fuelled with cottonseed oil methyl ester (COME) and diesel at different blends. The analysis showed that heat release rate and cylinder pressure is higher for diesel than COME blends. Higher BTE is obtained at the maximum load condition. The higher BTE and lower SFC are obtained for blend B15 as 42.17% and 0.2 kg/kW-hr at brake mean effective pressure (BMEP) of 4.64 bar. Also it is found that the peak cylinder gas pressure and combustion duration increases when the BMEP increases. At the BMEP of 3.51 bar,

higher HRR is observed as 18.12 J/deg. Increase in HRR is obtained as 6.07% for B30 at BMEP of 4.64 bar when compared to diesel. Ignition delay decreased by 13.16% for B100, by the increment of blend proportions when compared to diesel, at BMEP of 4.64 bar. Lower smoke, HC and CO emissions are observed when increasing the blend proportions, whereas the nitric oxide emissions increases due to the better combustion resulted in higher temperatures. At BMEP of 4.64 bar, the CO emissions are reduced to 25.24% for neat biodiesel when compared with the diesel.

KEYWORDS:

- Cottonseed oil methyl ester
- cylinder pressure
- emission
- heat release rate
- VCR Engine

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Additional information

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