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Experimental Investigation of the Effect of Compression Ratio in a Direct Injection Diesel Engine Running on Different Blends of Rice Bran Oil and Ethanol

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Abstract : The performance, emission and combustion characteristics of a single cylinder four stroke variable compression ratio multifuel engine when fueled with different blends of rice bran oil methyl ester and ethanol are investigated and compared with the results of standard diesel. Biodiesel produced from rice bran oil by transesterification process has been used in this study. The experiment has been conducted at a fixed engine speed of 1500 rpm, 50% load and at compression ratios of 16.5:1, 17:1, 17.5:1 and 18:1. The impact of compression ratio on fuel consumption, brake thermal efficiency and exhaust gas emissions has been investigated and presented. Optimum compression ratio which gives the best performance has been identified. The results indicate longer ignition delay, the maximum rate of pressure rise, lower heat release rate and higher mass fraction burnt at higher compression ratio for waste cooking oil methyl ester when compared to that of diesel. The brake thermal efficiency at 50% load for rice bran oil methyl ester blends and diesel has been calculated and the blend B40 is found to give maximum thermal efficiency. The blends when used as fuel results in the reduction of carbon monoxide, hydrocarbon and increase in nitrogen oxides emissions.

Keywords : biodiesel, rice bran oil, transesterification, ethanol, compression ratio
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