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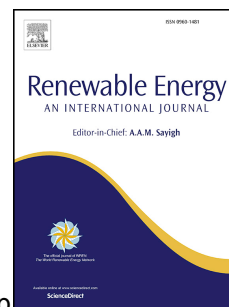
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Experimental investigation on performance, combustion and emission characteristics of a single cylinder diesel engine fuelled by biodiesel derived from Cymbopogon Martinii

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Abstract

Biodiesel from Palmarosa oil can be used as an alternative fuel in diesel engine. Experimental investigation was carried out to investigate the performance and emission characteristics of a diesel engine fuelled by biodiesel derived from Palmarosa oil and its blends of 25%, 50% and 100% and standard diesel fuel separately. In this study, the chemical composition of biodiesel derived from Palmarosa oil was determined by using GC-MS (Gas chromatography-mass spectrum) and FT-IR (Fourier transformed infrared) spectroscopic techniques. The results indicated the production of lower CO emission (up to 19.02%), HC emission (up to 31.25%) and smoke emission (up to 29.75%) through the use of biodiesel. However, a slight increase in NO_x emission (up to 15.21%) was observed for biodiesel blends. BSFC increased by 7.41%, 19.35% and 26.47% for PMO25, PMO50 and PMO100 fuel blends respectively compared to diesel fuel. The BTE for biodiesel blends decreased when compared to diesel fuel. The combustion analysis showed a considerable increase in combustion pressure and heat release rate with shorter ignition delay and longer combustion duration.

Keywords: PMO (Palmarosa oil methyl ester), diesel, performance, emission, combustion

1. Introduction

Biodiesel known for its adequate oxygen content and as sulphur free is one of the alternative fuels to petroleum-based fuel with enough oxygen content and sulphur free. Biofuel business in India is estimated to touch \$7.85 billion by 2022, based on the demand for petroleum based fuels in the country. Presently, the biodiesel and ethanol industry has reached \$0.94 billion. This is mainly due to ethanol procurement [1]. Use of edible oil as source for the production of biodiesel in India is not feasible due to factors such as its expensive feature and problems with food supply. Therefore, the application of

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