

COMPARATIVE ANALYSIS OF DIESEL, DIESEL-PALM BIODIESEL AND DIESELBIODIESEL-BUTANOL BLENDS IN DIESEL ENGINE

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ABSTRACT

To reduce the dependency on fossil-based energy resources, the utilization of renewable fuels in unmodified diesel engines is gaining more emphasis from researchers in the recent years. The aim of the current study is to take part in the efforts being made to this regard by experimentally investigating a compression ignition engine fueled with different fuels ((diesel, diesel-biodiesel (B20), and dieselbiodiesel- butanol (BU20)) for their performance and emissions comparison. The experimental study was conducted in a water cooled single-cylinder direct injection (DI) diesel engine. It was operated at a constant engine operation speed of 1800 rpm and under varied engine load conditions. It is found that BU20 shows promising results in terms of performance and emissions characteristics as compared to using B20 and D100. Butanol addition to diesel-biodiesel blends is considered as an appropriate solution of higher density and viscosity the blend and thus for the sustainable usability of biodiesel. Maximum thermal efficiency improvement of 3.18% was observed at an engine load of 75%. The NO_x emission was improved with BU20 as compared to the conventional diesel fuel (D100) at most of the engine loads. As an improvement on the engine performance and emissions is reported from the current study, the BU20 fuel blends can be used in similar engines with no further engine retrofitting. This blend can be a good environmental friendly fuel that can serve in the reduction of fossil based diesel fuels. A further study on diesel engine tribology is required.