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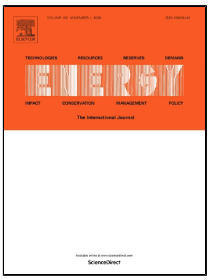

Impact of split injection strategy on combustion, performance and emissions characteristics of biodiesel fuelled common rail direct injection assisted diesel engine

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Impact of split injection strategy on combustion, performance and emissions characteristics of biodiesel fuelled common rail direct injection assisted diesel engine

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Abstract

In this work, the effect of single and split injection strategy on combustion, performance and emissions characteristics of biodiesel was experimentally investigated on a common rail direct injection assisted diesel engine. In single injection strategy, Nozzle opening pressure and fuel injection timing was varied from 200 to 600 bar and 19° to 27° CA bTDC respectively. Experimental results revealed that B100 had the maximum brake thermal efficiency of 35.74% at 500 bar and 25° CA bTDC. Engine exhaust emissions of unburned hydrocarbon and smoke were decreased, whereas nitric oxide emission increased in B100 fuel at higher nozzle opening pressure and advanced fuel injection timing. In split injection strategy, start of main injection timing and post injection timing was varied from 19° to 25° CA bTDC and -5° CA bTDC to 5° CA aTDC respectively. The results exhibited that the B100-90%-10% has the maximum brake thermal efficiency of 34.43%. Minimum unburned hydrocarbon and smoke emissions were obtained in B100-75%-25%. Maximum nitric oxide emission was obtained in B100-90%-10%. Thus, the experimental studies clearly states that advanced injection strategy reduces the exhaust emissions and improves the engine performance.

Keywords: Common rail direct injection; Emissions; Heterogeneous catalyst; Split injection strategy; Waste frying oil methyl ester.