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Emission and Combustion Characteristics of Vegetable Oil (*Jatropha curcus*) Blends in an Indirect Injection Transportation Engine

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Abstract

*The scarce and rapidly depleting conventional petroleum resources have promoted research for alternative fuels for internal combustion engines. Among various possible options, fuels derived from vegetable oils present promising "greener" substitutes for fossil fuels. Vegetable oils due to their agricultural origin are able to reduce net CO₂ emissions to the atmosphere along with import substitution of petroleum products. However, several operational and durability problems of using straight vegetable oils in diesel engines are reported, which are because of their higher viscosity and low volatility compared to mineral diesel. In the present research, an experiment was designed to study the effect of reducing *Jatropha* oil's viscosity by blending it with mineral diesel, thereby eliminating its effect on combustion characteristics of the engine. In the present experimental research, vegetable oil (*Jatropha curcus*) was used as substitute fuel. Experimental investigations have been carried out to examine the emission and combustion characteristics of an indirect injection transportation diesel engine running with mineral diesel and vegetable oil blends. Engine tests were performed at different engine loads ranging from no load to 100% rated load at a constant engine speed (2000 rpm). A careful analysis of engine emissions, cylinder pressure rise, instantaneous heat release and cumulative heat release was carried out vis-à-vis mineral diesel to find the suitability of *Jatropha* oil blends in an unmodified IDI medium duty transportation diesel engine.*

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