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Study of Engine Performance and Exhaust Emissions on Multi-Cylinder Turbo-Charged Diesel Engine Operated with B5 Biodiesel Blend

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Abstract : In the last three decades the world has been confronting an energy crisis caused by the decreased of fossil resources, and increased of environmental problems. This situation resulted in a search for an alternative fuel. Non-edible vegetable oils are promising sources for producing liquid fuels. In the present experimental investigation, the engine tests were carried out for performance and exhaust emissions on 2.5 L Turbo-charged diesel engine fuelled with 5% biodiesel blend obtained from non-edible vegetable oils such as Jatropha, Karanja, and Castor Seeds. The engine tests were carried out at full throttle position with various engine speeds of 1500, 1750, 2000, 2250, 2750 and 3000 rpm respectively. After test, it was observed that 5% Jatropha biodiesel blend have highest brake power of 46.65 kW and less brake specific fuel consumptions of 225.8 kg/kW-hr compared to other two biodiesel blends of brake power of 45.99 kW, 45.81 kW and brake specific fuel consumption of 234.34, 236.55 kg/kW-hr respectively. The brake specific fuel consumption of biodiesel blends increase at increasing speeds for all biodiesel blends. NOx emissions for biodiesel blends were observed to be higher compared to diesel fuel during the entire range of engine operations. The emission characteristics like CO, HC and smoke were lowered at all engine speed conditions compared to diesel fuel.

Keywords : biodiesel blend, brake power, brake specific fuel consumption, emission, performance
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