



Effects of CNG flow rate on combustion, performance and emissions characteristics of biodiesel fuelled diesel engine

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Abstract : In this paper, an experimental investigation was carried out to understand the effect of CNG flow rate and jatropha biodiesel as pilot fuel under dual fuel mode on combustion, performance and emissions characteristics of an unmodified DI diesel engine. The CNG was inducted at various mass flow rates (0.2, 0.4, 0.6, 0.83 kg/h) with the incoming air through intake manifold. The pilot fuel (diesel or jatropha biodiesel) supply was regulated to maintain the desired engine power while keeping the CNG flow rate fixed. The combustion parameters (peak cylinder pressure, heat release rate, ignition delay and combustion duration), performance (brake thermal efficiency, brake specific fuel consumption and exhaust gas temperature) and emissions characteristics (NO_x, HC, CO₂, CO and smoke opacity) were analyzed for dual fuel mode CNG-biodiesel and compared with conventional diesel fuel. The performance and emissions characteristics results depicts that jatropha biodiesel as pilot fuel exhibits better fuel characterization as compared to conventional diesel fuel particularly at higher engine loads. In spite of above benefits, the higher NO_x emissions were reported with higher CNG flow rate under CNG-biodiesel operated diesel engine. However, jatropha biodiesel and CNG dual fuel combination with 0.2 kg/h flow rate of CNG is beneficial for improving combustion performance and emissions characteristics.

Keywords : Biodiesel, CNG, smoke, dual fuel, diesel.

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