

Impact of Oxygenated Additives to Diesel-Biodiesel Blends in the Context of Performance and Emissions Characteristics of a CI Engine

H.M.Mahmudul^a, Ftwi Y. Hagos^{ab}, Rizalman Mamat^{ab} and Abdul A. Abdullah^{ab}

^aAutomotive Engineering Research Group (AERG), Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

^bAutomotive Engineering Center, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

ABSTRACT

Butanol is receiving huge interest in the area of alternative fuel in the compression ignition (CI) engines. In this work, butanol is used as an oxygenated additive to diesel and biodiesel blend fuels to evaluate the performance and emission of CI engine. The commercially available pure diesel fuel (D100) and 80% commercially available diesel- biodiesel blend (5% biodiesel and 95% by volume) and 20% butanol (BU20) fuels were investigated to evaluate the effects of the fuel blends on the performance and exhaust emissions of a single cylinder diesel engine. The experiment was conducted at fixed load of 75% with the five engine speeds (from 1200-2400 rpm with an interval of 300 rpm). The engine performance parameters such as power, torque, fuel consumption and thermal efficiency and exhaust gas emissions such as nitrogen oxides, carbon monoxide, and exhaust gas temperature were analysed from the experimental data. The results shows that although butanol addition has caused a slight reduction in power and torque values (11.1% and 3.5%, respectively), the emission values of the engine were improved. With respect to the exhaust gas temperature, CO and NOx emissions, of BU20 is reported to have reduction by 17.7%, 20% and 3%, respectively than the B100. Therefore, butanol can be used as a fuel additive to diesel-biodiesel blends.

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