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Performance and Exhaust Emission of a SI Engine Fueled with Potato Waste Ethanol and Its Blends with Gasoline

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Abstract

The main aim of this study is to investigate the performance and the pollutant emissions of a four stroke SI engine operating on different ethanol-gasoline blends (0-20%). Fuel properties of ethanol-gasoline blended were examined by the standard ASTM methods. The results showed that increasing the ethanol content in the blend fuel will decrease the heating value of the blended fuel and increase the octane number. Exhaust gas emissions were evaluated and analyzed for Unburned Hydrocarbons (UHC), Carbon Dioxide (CO₂), Carbon Monoxide (CO), Oxygen (O₂) and Oxide of Nitrogen NO_x at different engine speeds and loads (1000-5000 rpm). The results revealed that using ethanol-gasoline blended fuels will marginally increase the brake power and the torque output, the brake thermal efficiency, the relative air-fuel ratio and the volumetric efficiency. Moreover, using ethanol-gasoline blends will decrease the brake specific fuel consumption, CO and HC emissions concentration. This improvement was due to the high oxygen percentage in the ethanol. However the CO₂, NO_x concentration and the exhaust gas temperature was noticed to be increased.

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