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Production of Producer Gas from Sugarcane Bagasse and Carpentry Waste and Its Sustainable Use in a Dual Fuel CI Engine: A Performance, Emission and Noise Investigation

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Abstract: Due to increasing use of conventional fuels and an improper utilization of biomass, air pollution and GHG (Green House Gas) emissions are the major areas of concern. Due to this, the world is now interested in shifting towards the synthesis and use of alternate fuels, that can replace the conventional fuels. Such an experimental investigation was carried out in which, two different biomass materials – sugarcane bagasse and carpentry waste in 1:1 ratio were used to synthesize producer gas in a downdraft gasifier with a gas flow rate of 5.07Nm³/hr. By blending this gas with diesel it was fired in a dual fuel CI engine, which showed a smooth working and was tested for 6 load variations for noise characteristics and various performance and emission parameters. A maximum of 45.7% and 69.5% reduction in fuel consumption and NO_x emissions respectively was reported with a slight increase (~3.4dB) in the noise.

Keywords: Bioenergy; Biomass; Gasification; Dual fuel engine; Performance characteristics; Emission studies.

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