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Alcohol based automotive fuels from first four alcohol family in compression and spark ignition engine: A review on engine performance and exhaust emissions

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ABSTRACT

Alcohol fuels have some significant advantages over other alternative fuels, including the ability to work in existing engines as well as the capability to reduce greenhouse gas emissions. This paper analyses the performance and emissions of compression and spark ignition engine using of alcohol fuels from the first aliphatic alcohol family; methanol, ethanol, propanol and butanol. The literature relevant to methanol, ethanol, propanol and butanol was reviewed and summarized to demonstrate its viability as an alternative fuel. The fuel properties of methanol, ethanol, propanol and butanol present the most important properties that allow such fuels as suitable candidates as an alternative fuel for compression and spark ignition engines. The performance and engine emissions indicators such as brake torque, brake power, BTE, BSFC NO_x, PM, CO, CO_2, HC and soot have been evaluated regarding tone at diesel and gasoline fuels. The results showed that alcohol fuels give different results to engine performance and emissions. Surprisingly, some research yield favorable results to the alcohol as compared to neat diesel and gasoline fuels. It can be concluded that methanol, ethanol, propanol and butanol are capable of reducing harmful engine exhaust emissions, however,at the expense of lower engine performance characteristics.