

## Performance and emissions of gasoline blended with fusel oil that a potential using as an octane enhancer

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### ABSTRACT

Fusel oil produced in small quantities as a by-product obtained through the fermentation of some agricultural products. Thereby the possibility of using fusel oil to replace gasoline or blending at high percentage unavailing. The fusel oil has both high research and motor octane rating RON and MON (106 and 103). This paper examines the impact of using fusel oil as an octane enhancer for gasoline fuel on the performance, combustion and emissions of 4-cylinder spark ignition engine. The test was achieved at two ratios of fusel oil -gasoline blends and pure gasoline at different speeds and loads. The fusel oil is showed to be a novel and useful octane enhancer for gasoline blendstocks in a spark ignition engine. Furthermore, fusel oil is a suitable candidate fusel for octane enhancer on-demand applications and further experimentation in spark ignition engine warranted. The high octane number and oxygen content of fusel oil lead to improving the engine performance under high engine speed and rich mixture ( $\lambda < 1$ ) due to the complete combustion. The brake power and BTE enhanced with fusel oil compared to gasoline while BSFC increased. The NO<sub>x</sub> emission decreased as the fusel oil used While the HC and CO<sub>2</sub> emissions increased.

### KEYWORDS:

Engine performance; fusel oil; NO<sub>x</sub> emissions; octane number; SI engine