













reduced up to (75.85%, 65.65%), CO<sub>2</sub> emission was increased by about (80.87%, 75.26%), and UHC emission is reduced by (58.56%, 55.68%) respectively, compared to gasoline. A20 exhibited comparable results with E20, better performance compared to neat gasoline in terms of the performance and emission parameters, and cost-effective (33.33% reduced) compared to E20. Therefore, it can be used as an alternative fuel in SI engines if blended with gasoline up to 20%v/v.

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