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Effects of biodiesel fuel obtained from *Salvia macrosiphon* oil (ultrasonic-assisted) on performance and emissions of diesel engine



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ABSTRACT

The purpose of this study is to investigate the possibility of biodiesel production from *Salvia macrosiphon* oil (SMO) using the ultrasonic system. The major properties of *Salvia macrosiphon* methyl ester was compared with ASTM standards and the specifications met the requirements of biodiesel standards. This allows *Salvia macrosiphon* oil to be utilized for biodiesel production and be a potential substitute to diesel fuel; it can also be blended with diesel fuel. The performance and the exhaust emissions of a diesel engine operating on *Salvia macrosiphon* biodiesel-diesel blended fuels have been investigated. The experimental test results indicated that by using biodiesel-diesel blends, brake power, torque and concentrations of the CO₂ and NO_x emissions increased while the specific fuel consumption (SFC) and concentration of CO and HC emissions decreased. The results obtained revealed that high oxygen content of *Salvia macrosiphon* biodiesel resulted in significant overall improvements in the combustion reaction especially in B20 (20 vol% biodiesel and 80 vol% diesel fuel). CO and HC were reduced by up to 25% and 31.82% respectively in B20 compared to neat diesel fuel (B0). The innovated fuel blend also increased engine performances, which are the power and torque, by up to 18% and 15.8% respectively, and decreased specific fuel consumption by 4.6%.