

Performance and emission characteristics of a CI engine using graphene oxide (GO) nano-particles additives in biodiesel-diesel blends

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ABSTRACT

In the present study, the effects of graphene oxide (GO) nano-particles on performance and emissions of a diesel engine fueled with *Oenothera lamarckiana* biodiesel was investigated. Biodiesel was used in the blend of B20. The GO nano-particles with concentrations of 30, 60, and 90 ppm were considered for each fuel blend. Experiments were performed at a constant speed of 2100 rpm at loads of 0%, 25%, 50%, 75%, and 100%. Various parameters, such as power, exhaust gas temperature (EGT), carbon monoxide (CO), carbon dioxide (CO₂), unburned hydrocarbons (UHCs), and nitrogen oxides (NO_x), were investigated. Results showed that by using GO, power and EGT significantly increase. Furthermore, by using GO nano-particles, significant reductions in CO (~5%–22%) and UHCs (~17%–26%) were observed. However, under similar conditions, a slight increase in CO₂(~7%–11%) and NO_x (~4%–9%) emissions observed. Finally, it can be concluded that nano-graphene oxide can be introduced as a suitable alternative fuel additive for *Oenothera lamarckiana* biodiesel blends.

KEYWORDS

Oenothera lamarckiana oil; Biodiesel; Nano-graphene oxide; Diesel engine

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