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Fuel
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Comparative study of nanoparticles and alcoholic fuel additives-biodiesel-diesel blend for performance and emission improvements (Article)

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Abstract

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This study aims to investigate a CI diesel engine characteristic of diesel-biodiesel blend with oxygenated alcohols and nanoparticle fuel additives. Biodiesel was synthesized from a complementary palm-sesame oil blend using an ultrasound-assisted transesterification process. B30 was mixed with fuel additives as the base fuel to form ternary blends in different proportions before engine testing. The oxygenated alcohols (DMC and DEE) and nanoparticles (CNT and TiO_2) were used to improve both the fuel characteristics and engine emission and performance parameters. B30 fuel was mixed with 5% (DEE) and 10% (DMC) by volume and 100 ppm concentration of CNT and TiO_2 nanoparticles, respectively, which are kept constant during this study. Engine performance and emissions characteristics were studied using a CI diesel engine with variable engine rpm at full load condition. The results were compared with B30 fuel and B10 (commercial diesel). The main findings indicated that the B30 + TiO_2 ternary blend shows an overall decrease in brake specific fuel consumption up to 4.1% among all tested fuels. B30 + DMC produced a higher 9.88% brake thermal efficiency, among other fuels. B30 + DMC ternary blend showed a maximum decrease in CO and HC emissions by 29.9% and 21.4%, respectively, collated to B30. B30 + CNT ternary blend showed a maximum reduction of 3.92% in NO_x emissions compared to B30. © 2020 Elsevier Ltd

SciVal Topic Prominence

Topic: Fuel Tests | Diesel Engines | Exhaust Emission

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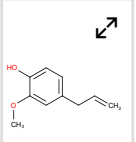
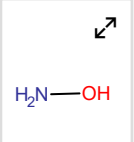
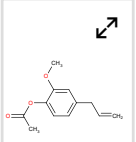
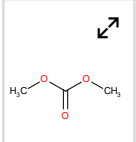
Chemistry database information

Substances

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An overview on advancements in biobased transesterification methods for biodiesel production: Oil resources, extraction, biocatalysts, and process intensification technologies
Kant Bhatia, S., Kant Bhatia, R., Jeon, J.-M.
(2021) Fuel

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Enhancement in combustion, performance, and emission characteristics of a diesel engine fueled with Ce-ZnO nanoparticle additive added to soybean biodiesel blends
Hussain, F., Soudagar, M.E.M., Afzal, A.
(2020) Energies

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Author keywords

Alternative energy | Engine performance and emissions | Fuel additives | Nanoparticles | Oxygenated alcohols | Palm-sesame biodiesel

Indexed keywords

Engineering controlled terms: Biodiesel | Brakes | Diesel engines | Nanoparticles | Oxide minerals | Palm oil | Synthetic fuels | TiO2 nanoparticles | Titanium dioxide

Engineering uncontrolled terms: Brake specific fuel consumption | Brake thermal efficiency | Comparative studies | Different proportions | Fuel characteristics | Performance and emissions | Performance parameters | Transesterification process

Engineering main heading: Fuel additives

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