

عنوان مقاله:

Combustion Characteristics and Emissions of Biodiesel/Natural Gas Dual Fuel Engine

محل انتشار:

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خلاصه مقاله:

Strict emission regulations together with reducing fossil fuels resources lead to more attention on new combustion strategies and alternative fuels such as biodiesel which is renewable, environmentally friendly and more cost-effective than other fuels. In this study, CONVERGE CFD software coupling with chemical kinetics mechanism is used to numerically investigation of natural gas (NG)/biodiesel dual fuel engine. The discussed biodiesel consists of ۲۵% methyl decanoate (MD), ۲۵% methyl-۹-decanoate (MD<sup>9</sup>D) and ۵۰% diesel. A comparative study of NG/diesel and NG/biodiesel fueled cases is performed to highlight the combustion characteristics of biodiesel. For all simulated cases, it is supposed that ۵% of energy is supplied by high reactive fuel (i.e., Diesel or Biodiesel) and ۹۵% is coming with low reactive fuel (i.e., Natural Gas). Results revealed that in full load condition, using biodiesel/NG led to ۸۶% lower carbon monoxide (CO) and ۹۱% unburned hydrocarbons (UHC). On the other hand, peak pressure and maximum in-cylinder temperature increased ۵% and ۸۳ K, respectively which led to ۰.۶% efficiency improvement. according to the results of different injection timing, when it was advanced from -۴ to -۲۰ crank angle degree after top dead center (CAD ATDC) for biodiesel/NG and diesel/NG, the indicated mean effective pressure (IMEP) and gross thermal efficiency (GTE) reached at their peaks ۱۸.۳ bar and ۴۸.۲% at -۱۲ CAD ATDC, ۱۸.۰۵ bar and ۴۷.۷% at -۸ CAD ATDC respectively.

کلمات کلیدی:

Dual fuel, NG/Biodiesel, NG/Diesel, Numerical simulation, Injection timing

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