



Effects on Nano Additives on Performance and Emission Characteristics of Calophyllum inophyllum Biodiesel

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Abstract: The non-renewable energy sources are depleting at higher manner so there is more energy demand. Biodiesel is a replacement for diesel fuel in compressed ignition engines due to its significant environmental benefits. The use of biodiesel leads to reduction in PM, HC and CO emissions and the increase in fuel consumption and the increase in NO_x emission on diesel engines without any modification. The addition of nano particles in biodiesel increases the thermal efficiency and decreases the NO_x emission. The present investigation is to study the effect of Nano fuel additives (cobalt(II,III)oxide (Co₃O₄) and Titanium dioxide(TiO₂)) on the performance and emission characteristics of Calophyllum inophyllum biodiesel (B100) in a single cylinder, four stroke, water cooled, compression injection diesel engine. The Nano additives are prepared by hydrothermal process. The obtained particle size range in below 100nm, The nanoparticles are characterized by using scanning electron microscope (SEM), zeta potential and X-ray diffraction(XRD). The Nano particles (150 mg/l) were dispersed in the biodiesel by an Ultrasonicator and Magnetic stirrer. According to the results of this experiment, additives are the best method for obtaining the reduction in the particulate matter (PM), carbon monoxide (CO) and unburned hydrocarbons (UHC) emissions but minimum increase in the nitrogen oxides (NO_x) emission. If the additives are added in the biodiesel at appropriate proportion, it will helpful to increase the engine combustion and performance characteristics. Nano additives are reduces the fuel consumption and improves the thermal efficiency during combustion the additives release the energy to the fuel.

Keywords: Calophyllum inophyllumoil, Biodiesel, Transesterification, NanoAdditives, Cobalt Oxide, Titanium dioxide, Comperssion Ingintion Engine.

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