

Making of Biodiesel from Castor Oil and Performance Test of a Diesel Engine with Neat Diesel Fuel and Diesel-Biodiesel Blends

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Abstract

The diesel engine exhausts are of many types and of them oxides of nitrogen (NO_x), particulate matter (PM), total unburnt hydrocarbon (THC) is responsible for atmospheric pollution. Many research and development works have been done in recent year for the reduction of diesel engine emissions. In the present investigation fuel combustion and exhaust emissions with neat diesel fuel and diesel-biodiesel blends have been investigated. In this investigation, the making of biodiesel from non-edible castor oil has been done firstly by esterification. Biodiesel fuel (BDF) is chemically known as a mono-alkyl fatty acid ester. It is renewable in nature and is derived from plant oils including vegetable oils. BDF is non-toxic, biodegradable, and essentially free from sulfur and carcinogenic benzene. In the second phase of this investigation, experiment has been conducted with neat diesel fuel and diesel-biodiesel blends in a four stroke naturally aspirated (NA) direct injection (DI) diesel engine. However, compared with neat diesel fuel, diesel-biodiesel blends showed lower carbon monoxide (CO), and smoke emissions but higher NO_x emission. Compared with conventional diesel fuel, NO_x emission with diesel-biodiesel blends was slightly reduced when EGR was applied.

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