بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
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Ain Shams University

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Mechanical Automotive Department

NO_x Control of a Diesel Engine Using Waste Cooking Oil via EGR

A Thesis submitted in partial fulfillment of the requirements of the degree of Master of Science in Mechanical Engineering
(Automotive Engineering)

By

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Bachelor of Science In Mechanical Engineering

(Automotive Engineering)

Faculty of Engineering, Military Technical college, 2010

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Ain Shams University-Faculty of Engineering

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Statement

This thesis is submitted as a partial fulfilment of Master of Science in Mechanical Engineering (Automotive Engineering), Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Abstract

Nowadays, internal combustion engines are the essential parts of transportation and mechanized agricultural system. So, the consumption of diesel and petroleum has been up surged. As petroleum is a non-renewable source and recent surge in petroleum prices have regenerated interest in Bio-fuels, Bio-fuels is considered as an environmentally friendly alternative diesel fuel. It has shown that biodiesel-fueled engines produce less CO, unburned HC and smoke emissions compared to diesel fuel, but higher NO_x emissions. Exhaust Gas Recirculation (EGR) is an efficient technique to reduce NO_x emissions as it lowers the flame temperature in the combustion chamber. The objective of this work is to reduce NO_x emissions from Waste Cooking Oil (WCO) (prepared using the usual transesterification process) fueled single cylinder naturally aspirated DI Diesel engine. Experiments were performed using different mixed concentrations of biodiesel and diesel fuels, including B0, B10, B20 and B30.

The effect of a water-cooled Exhaust Gas Recirculation (EGR) rates as 0%, 10%, 20%, 25% and 30% on diesel engine performance characteristics and exhaust emission were investigated.

The results show that with increase of % EGR rates, values of CO and HC emissions increase but values of NO_x and EGT emissions decrease.

Whereas 25% EGR with blend B10 (90% pure Diesel and 10% Biodiesel) exhibited reduction in both NO_x emissions and BSFC by 24% and 22% respectively, 30% EGR demonstrated a reduction in NO_x emission by 25% and an increase in BSFC by 12% with respect to the pure petroleum diesel.

The recommended EGR is 25% which exhibited reduction in NO_x emission and improved BSFC.

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