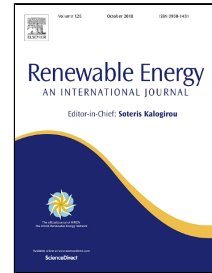


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Hanbey Hazar, Huseyin Sevinc



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Investigation of the effects of pre-heated linseed oil on performance and exhaust emission at a coated diesel engine

Hanbey Hazar^{*a} Huseyin Sevinc^a

^{*a} Department of Automotive Engineering, Technology Faculty, Firat University, Elazig 23119, Turkey

ABSTRACT : In this study, the efficiency of using the linseed oil, one of the vegetable oils, in a diesel engine by applying pre-heating was investigated. For this purpose, the pure linseed oil was mixed with diesel fuel at volumetric rates of 30% and 50% and this mixed fuels was used in a four-stroke, single-cylinder, and air-cooled diesel engine. In order to improve the combustion efficiency and reduce the loss of energy of the diesel engine, the parts of the combustion chamber (piston, exhaust, and inlet valves) were coated at a thickness of 300 μm with Cr_3C_2 , which is a ceramic material having a low thermal conductivity and resisting to high operating temperatures. Plasma spray method was used as the coating method. It was determined that the pre-heating process reduced the viscosity of the linseed oil and also provided a more favorable fuel flow and the coating process had a positive effect on diesel emissions (CO, HC, Smoke, Exhaust Gas Temperature, Brake Thermal Efficiency) of poor quality oils, however pre-heating and coating processes increased the NO_x emission.

Keywords: Linseed oil; Diesel engine; Thermal barrier coating; Exhaust emissions.

1. Introduction

The thought of reducing the petroleum dependency and overcoming the petroleum crises, which likely occur in the future, with minimum damage has led to the search for alternative fuels and the increasing of the works on their improvement as engine fuels [1-

* Corresponding author at: Department of Automotive Engineering, Technology Faculty, Firat University, Elazig 23119, Turkey

E-mail address: hanbeyhazar@hotmail.com, hhazar@firat.edu.tr

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