

Abstract

Nowadays, the increasing oil consumption throughout the world induces crucial economical, security, and environmental problems. As a result, intensive researches are undertaken to find appropriate substitution to fossil fuels. In view of the large amount of eucalyptus trees present in arid areas, we focus in this study on the investigation of using eucalyptus biodiesel as fuel in diesel engine. Eucalyptus oil is converted by transesterification into biodiesel. Eucalyptus biodiesel characterization shows that the physicochemical properties are comparable to those of diesel fuel. In the second phase, a single cylinder air-cooled, DI diesel engine was used to test neat eucalyptus biodiesel and its blends with diesel fuel in various ratios (75, 50, and 25 by v) at several engine loads. The engine combustion parameters such as peak pressure, rate of pressure rise, and heat release rate are determined. Performances and exhaust emissions are also evaluated at all operating conditions. Results show that neat eucalyptus biodiesel and its blends present significant improvements of carbon monoxide, unburned hydrocarbon, and particulates emissions especially at high loads with equivalent performances to those of diesel fuel. However, the NO_x emissions are slightly increased when the biodiesel content is increased in the blend