International Energy Journal, Volume 10, Issue 2, June 2009

A Comparative Analysis on the Performance and Emission Characteristics of Thevetia Peruviana Seed Oil (TPSO) with other Non-edible Oil in CI Engine

T. Balusamy, R. Marappan

Abstract

The methyl ester of vegetable oils, known as biodiesel are becoming increasingly popular because of their low environmental impact and potential as a green alternative fuel for diesel engine. In this study, different kinds of methyl ester of vegetable oil are derived by transesterification process. Experimental investigations have been carried out to examine properties, performance, combustion and emission characteristics of five different methyl ester of biofuels namely thevetia peruviana seed oil, jatropha oil, pungamia oil, mahua oil and neem oil at blend ratio of 20/80, in a standard, fully instrumented, four stroke, direct injection, Kirloskar 'TV1' diesel engine. The series of tests are conducted using each of the above fuel blends, with the engine working at a speed of 1500 rpm. The performance, combustion and emission parameters like, brake thermal efficiency, bsfc, volumetric efficiency, air-fuel ratio, P-θ curves, instantaneous heat release, cumulative heat release, exhaust gas temperatures, CO, HC, NOx, CO_2, and smoke are measured and analyzed. It is observed that methyl ester of thevetia peruviana seed oil has comparable engine performance with less emission compared to other blends. Hence, it is suggested that 20% of methyl ester of thevetia peruviana seed oil blended with diesel can be substituted as an alternate fuel for the diesel engine without any engine modification.