

EVALUATION OF CHARACTERISTICS OF *THEVETIA PERUVIANA* BIODIESEL AND PERFORMANCE ANALYSIS IN DIESEL ENGINE

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Abstract

Biodiesel as an alternative fuel for diesel engines is receiving increasing attention each passing day because of its suitable fuel properties and compatibility with the petroleum-based diesel fuel. As we are increasingly becoming dependent on imported crude oil to meet the national requirement of transportation fuel, it is absolutely necessary for India to look for alternatives from the energy security point of view. Utilization of resources that are available locally for production of liquid fuels has become an important area of research. In this study, seeds of Karabi (*Thevetia peruviana* Schum.), a shrub with a height of 3 to 3.9 metres, is used to produce biodiesel. It is a small and evergreen plant, mainly grown as an ornamental plant and is widespread in American, Asian and African continents. The plant produces seeds rich in oil (60 to 64%) and can be grown easily on roadsides and road dividers. Methyl esters of the oils are obtained by transesterification using methanol with potassium hydroxide as catalyst. The biodiesel produced from karabi seed oil is blended with diesel in various proportions i.e. 10%, 20%, 30% and 40% (B10, B20, B30 and B40) blending and tested for their use as a fuel in diesel engine at varying loads. The objective of the study is to experimentally evaluate the performance and exhaust emission characteristics of the engine fuelled with biodiesel. Fuel properties like calorific value, density, viscosity etc. conform to standards set for ASTM D6751, EN 14214, BS II and BS III. Performance parameters like Brake Specific Fuel Consumption, Torque and Brake Thermal Efficiency are measured at different loads for pure diesel and various blends of biodiesel. Emission studies are also carried out to study the CO, NO_x, un-burnt hydrocarbon (UHC) and smoke emissions. The present study concludes on the merit of different properties of *Thevetia Peruviana* biodiesel and its blends that it can be suitably used as a supplement of petro-diesel.

Keywords: *Thevetia peruviana* biodiesel, blending, engine performance, emission