Visvesvaraya Technological University

Jnana Sangama, Belgaum - 590 018, Karnataka, India

A Project report on

Characterization Of Bio-Diesel And Performance Analysis Of CI Engine By Using Garcinia Cambogia (Uppage) Oil Ethyl Ester

"Sponsored by Karnataka State Council for Science and Technology and Karnataka Bio fuel Board Bangalore"

Reference No: 36S_B_Mtech_025

Dissertation submitted in partial fulfillment of the requirements for award of the degree of

MASTER OF TECHNOLOGY

IN

THERMAL POWER ENGINEERING

Submitted By

SURESHA P

USN: 4UB11MTP19

Under the Guidance of

Kishan Naik

Assistant Professor

2012-2013

DEPARTMENT OF STUDIES IN MECHANICAL ENGINEERING

UNIVERSITY B D T COLLEGE OF ENGINEERING, DAVANGERE - 577 004

(A Constituent College of VTU, Belgaum)

ABSTRACT

Transesterification is one of the well-known process by which fats and oils are converted into biodiesel. The reaction often makes use of acid/base catalyst. Is increasingly popular because of their low environmental impact and has potential as an alternative fuel for diesel engine without any modification of the engine. Alternative renewable fuel, found in vegetable oils such as Garcinia Cambogia (Uppage) oil, which abound in monsoon forest in the Western Ghats in Karnataka and Kerala. It is characterized with high viscosities thus limiting their applications as fuel. The use of transesterified vegetable oils as fuel has been yielding successful results besides being a domestic, renewable resource that provides environmental benefits with lower emissions. In this work, laboratory scale quantities of ethyl ester of Uppage oil were produced and characterized as diesel fuel. NaOH and H_2SO_4 was selected to catalyze the transesterification process of Uppage with ethanol using 1000ml oil sample, 300ml ethanol, based on FFA certain gram of NaOH and based on FFA certain ml of H_2SO_4 at 60 ^{0}C reaction temperature and around 1hour 30 minutes reaction time. The process was triplicate and average results evaluated. The transesterification process yielded 700-800ml bio diesel .The bio diesel produced was characterized as alternative diesel fuel through tests for specific gravity, viscosity, flash point, fire point and copper corrosion test following ASTM D 6751 standard test procedures.

This project is also deals with the study of Characterization of Garcinia Cambogia (Uppage) oil and performance analysis of the single cylinder diesel engine using diesel, bio diesel and its blends with a compression ratio of 16.5 and different injection pressure of 180bar, 200bar, 220bar and 240bar .

Hence it is concluded that the Uppage bio diesel blended with diesel can be successfully used in CI engine without major engine modification, since these results in best performance characteristics of BTE, BSFC, EGT and A/F.