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PERFORMANCE EVALUATION OF THE BIO FUELS DERIVED FROM WASTE COOKED OIL

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Abstract

Almost all countries are dependent on petroleum fuel to fulfill their energy requirements Increase in energy demand due to growth in population has affected the underground fossil fuel resources . In order to counter this problem, researchers are looking for alternative sources of energy. Biodiesel is one of the potential alternatives to petroleum dies el, as its properties are very comparable to dies el. Moreover, biodiesel is mainly derived from renewable feeds tocks like edible, non -edible oils or animal fats. In recent decade, the main focus it to prepare biodiesel from edible oils like cottonseed oil, sunflower oil, coconut oil. Producing biodiesel from edible oils may leave negative effect on agriculture in terms of scarcity of food crops so non-edible oils are preferred for production of biodiesel. The main advantages of using biodiesel are it's portability, being readily available, better combustion efficiency, lower sulphur content, higher cetane number, higher bio degradability, domestic origin, higher flash point and improved lubrication property. Researchers have found that with us e of biodiesel nitrogen oxides (NOX) emission increases whereas hydrocarbon (HC), carbon monoxide (CO), and particulate matter emissions (PM) decrease in comparison to dies el fuel. The present paper, therefore, focuses on the emissions from biodiesel fuelled dies el engine operation.

Keywords: *Bio-diesel, HC,CO, NOx, PM.*

1. INTRODUCTION

The Indian economy depends on transportation, and transportation depends almost entirely on oil. This dependence on oil as the nation's only significant transportation fuel creates risk of economic shock. The increased production and use of biofuels could significantly reduce the amount of oil needed to fuel Indian cars and trucks. Creating an abundant supply of biofuels and the accompanying national production and distribution network — would ensure a more prosperous and secure future for India.

The principal objections about biofuels concern the effects of production at very large scale. Like anything else such a task can be managed badly, and it is important to understand the potential impacts of poor decisions and the benefits of good ones.

Figure 1.1: Sunflower seeds and used oil

2. OBJECTIVE

- Production of Bio-diesel using transtrification process.
- To study the Performance characteristics of waste cooking oil.

3. METHODOLOGY

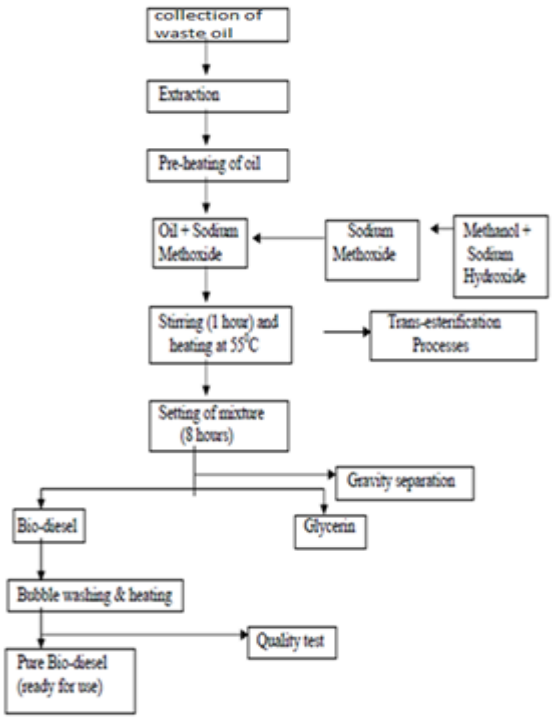

Figure 1.2: Biodiesel production for Waste cooking oil

Figure 1.3: Transesterification unit

Table1.1 Biodiesel Properties of Waste Cooking Oil

PROPERTY	DIESEL	Waste Cooking Oil
FLASH POINT	65°C	165°C
FIRE POINT	78°C	170°C
VISCOSITY	2.86 poise	4.82 poise
S.G	0.827	0.877
CV	44030 kJ/kg K	40873 kJ/kg K

4. EXPERIMENTATION

Figure 1.4: Four Stroke Diesel Engine

Brake Horse Power : 6 BHP

Orifice diameter : 0.025m

RPM: 1500rpm

Fuel: Diesel oil

Cylinder: multi

Bore diameter : 85mm

Stroke length : 80mm

Working cylinder : 4 stroke

Compression ratio : 18:1

Starting : Centrifugal Governor

Dynamometer : Mechanical/Rope

Cooling : water cooled

5. RESULT AND DISCUSSION

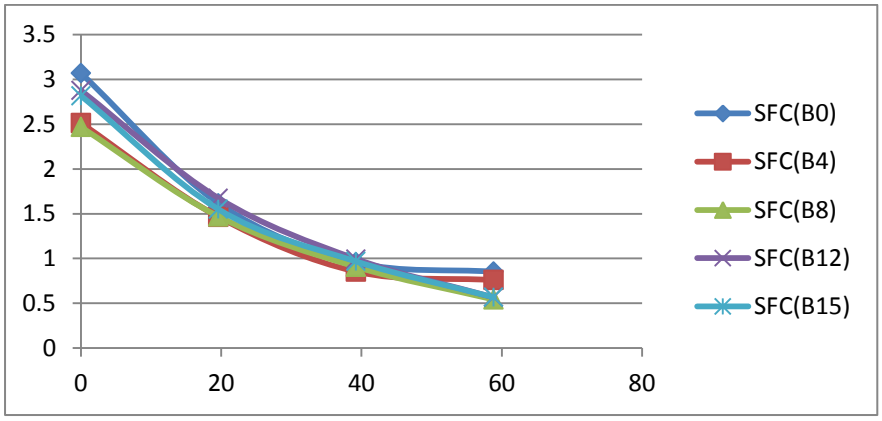

Figure 1.5: SFC Vs Load

Figure 1.5 shows SFC V/S Load. In the above figure shows that specific fuel consumption in the blend decrease with increase in load when compare to all blends. Because of load carrying capacity of the engine is maximum in blend zero. Even the fluctuation of the load leads to decrease the specific fuel consumption, constant injection pressure.

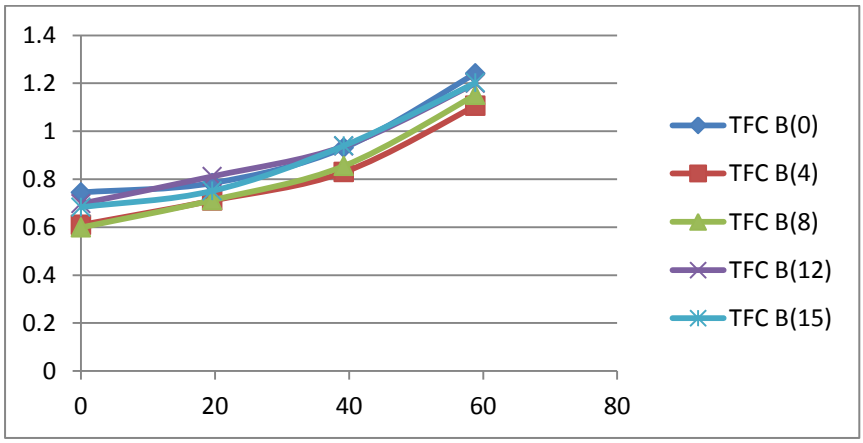

Figure 1.6: TFC Vs Load

Figure 1.6 shows TFC V/S Load. In the above figure shows that Total fuel consumption in the blend increases with increase for all the loads. Total fuel consumption is depends on as many parameter that is leads to increase total fuel consumption with the load. Due to blends ratio are small TFC increases continuously with load for all blends.

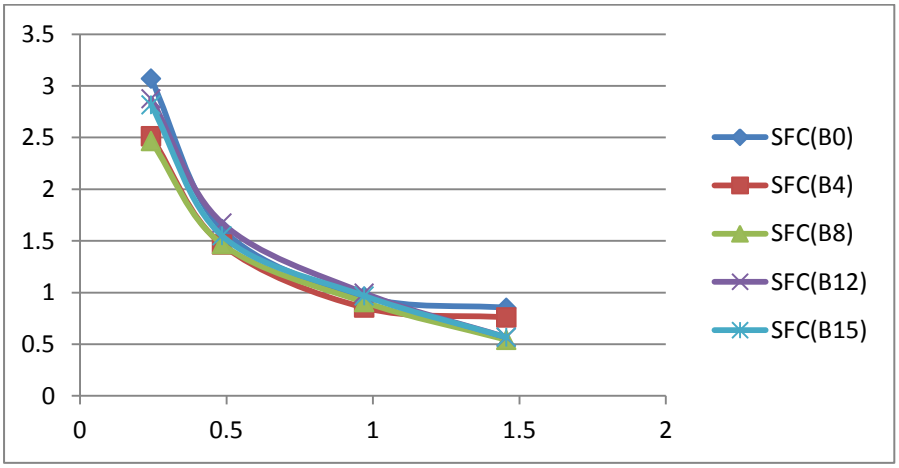

Figure 1.7: SFC vs BP

Figure 1.7 shows SFC V/S BP. In the above figure shows that specific fuel consumption in the blend decreases with increase of brake power for all blends. Specific fuel consumption is depends on as many parameter that is leads to increase specific fuel consumption with the brake power. Due to blends ratio are small SFC decreases continuously with load for all blends.

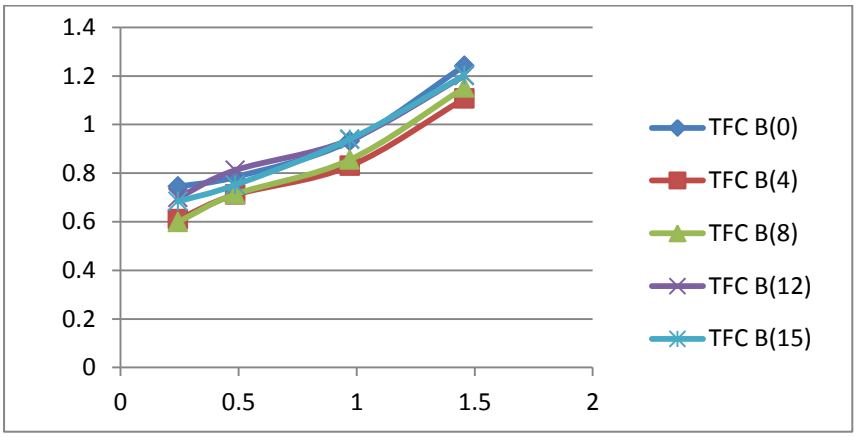

Figure 1.8: TFC Vs BP

Figure 1.8 shows TFC V/S BP. In the above figure shows that Total fuel consumption in the blend increases with increase of brake power for all blends. Total fuel consumption is depends on inlet pressure and temperature, intake manifold diameter , exhaust temperature and so on that are leads to increase Total fuel consumption with the brake power. Due to blends ratio are small TFC decreases continuously with load for all blends.

6. CONCLUSION

Biodiesel is an effective fuel for conventional diesel and can be fuel in an engine without any modifications to

the engine

It has many positives like high biodegradability, reduction in greenhouse gas emission, non- sulfur emissions, non-particulate matter pollutants, low toxicity, excellent lubricity and is obtained from renewable source like vegetable oil, animal fat etc.Waste cooking oil is cost effective and promising feedstock.

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