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Comparative analysis of different type of Biodiesel with Diesel

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Abstract - *The increasing awareness of the depletion of fossil fuel resources and the environmental benefits of biodiesel fuel has made it more attractive in recent times. Its primary advantages deal with it being one of the most renewable fuels currently available and it is also non-toxic and biodegradable. It can also be used directly in most diesel engines without requiring extensive engine modifications. However, the cost of biodiesel is the major hurdle to its commercialization in comparison to petroleum-based diesel fuel. now this time available on different type of biodiesel. this paper main objective compare the different type of bio diesel.*

***Key Words*: Biodiesel, Mahua biodiesel, karanja seed biodiesel, ratanjot,**

1. Introduction

In the recent years, the world was hit by energy crisis. Now days, the world major energy demand is fulfilled by conventional energy sources such as coal and fossil. The global are now concern about the source for petroleum based fuel are very limited reserves and only concentrated in certain regions of the world. It is well known that most of transportation vehicles use fossil fuel such gasoline, liquid petroleum gas, and diesel fuel as fuel. Thus exploring new energy sources, such as biodiesel has become more importance in recent years. Biodiesel which is also popularly known as biofuel is an alternative diesel fuel made from conventional vegetable oil or fats. Biodiesel commonly defined as alkyl esters class of long chain fatty acids derived from vegetable oil. Vegetable oil will react with alcohol to form alkyl esters and glycerol in the presence of catalyst. Biodiesel are being considered as the most preferable oil as diesel fuel substitute ever known. The combustion resulted by using biodiesel shown no decreasing in performance, instead its produce more cleanly exhaust emission. Three main criteria that biodiesel has been recognized as major renewable energy resources around the world are its renewable resources that could be sustainable developed in the future, environmental friendly and give significant economic potential that can be developed in the near future. Its special characteristic, combine with its environmental friendly promises a bright future in the fuel industry.

2 Biodiesel Production:

Biodiesel is produced from vegetable oils, yellow grease, used cooking oils, or animal fats. The production process, called esterification, converts oils or fats into chemicals called long-chain mono alkyl esters. When the alkyl chain alcohol is methanol (most common), these are called fatty acid methyl esters, or FAME. When FAME is used for fuel, it is commonly referred to as biodiesel. Roughly speaking, 100 pounds of oil or fat are reacted with 10 pounds of a short-chain alcohol (usually methanol) in the presence of a catalyst (usually sodium hydroxide [NaOH] or potassium hydroxide [KOH]) to form 100 pounds of biodiesel and 10 pounds of glycerin (or glycerol). Glycerin, a co-product, is a sugar commonly used in the manufacture of pharmaceuticals and cosmetics. Although the process is relatively simple, homemade biodiesel is not recommended. Users risk engine damage, loss of warranty, and operational problems from fuel that does not meet rigorous specifications.

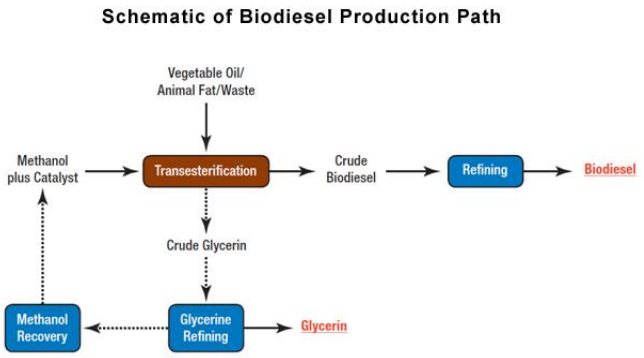

Fig -1: Schematic of biodiesel production path

3 Plant seed and animal fats as alternative Biodiesel

The biodiesel is factory-made biomass. The Biodiesel be allowed solid (vegetable seeds and allocation of the central and industrial wastes) liquid (Bio-alcohols and Biodiesel) or volatilized (Biogas and hydrogen) type. Renewable biodiesel could be a fuel that purpose for use in engine that's designed to Compression Ignition engine. Biodiesel is usually made from the harvest that takes dioxide out of the air throughout the season. The Biodiesel is made grain harvest (wheat, corn), oil harvest (mustard, soybean, etc.) and sugar

harvests. Biodiesel is the mono-alkyl organic compound of long chain carboxylic acid out fitted from renewable oil and animal fats, for use in C.I. engine. It has been fictional that combustion engine that alcohol may be used as a motor fuel. It'll be time intense and high-priced for an outsized quantity of fuel modification. The massive quantity of providing kinematic body of oil than that of diesel resulting in higher pumping load, poor atomization, carbon deposits on the piston, plate, grooves. A lot of non-edible plant oil has been established to be in position oil for production of biodiesel.

3.1 Jatropha oil (Ratanjot oil)

The Jatropha oil has higher cetane number compared to diesel. It's an honest various fuel requiring no engine modification. However most non-edible oils, Jatropha contain the high level of carboxylic acid that is inexpedient because it lower of Biodiesel. Table 1.1 shows the Jatropha Oil Chemical Composition.

Fig.2 Jatropha plant flower

Fig.3 Jatropha plant Seed

3.2 Karanja oil (Pongamia pinnata oil)

The principal carboxylic acid of Karanja oil (Pongamia pinnata oil) is mono unsaturated omega-9 carboxylic acid (oleic acid) 51.6%, unsaturated omega-6 fatty acid carboxylic acid (linoleic acid), 17.7%, hexadecanoic acid 10.1%, octadecanoic acid 7.2%. The properties of karanja oil mix with diesel and n-butanol and located that kinematic viciousness of karanja oil was 10.9 times conjointly than that of diesel oil that reduced with the rise in diesel quantity within the mix. Karanja oil flash and fireplace purpose and its ethyl group organic compound were found to be bigger than 378K that is simple to storage and handling.

Fig.4 Karanja seed

3.3 Mahua

Mahua oil is an underutilized non-edible vegetable oil, which is available in large quantities in India. The fuel properties of the mahua oil biodiesel where found to be within the limits of biodiesel specification of many countries. Fuel properties of diesel mahua oil and blends are comparable. The calorific value of mahua oil was found as 96.30% on volume base of diesel. It was found that mahua could be easily substituted up to 20% in diesel without any significant difference in power output, brake specific consumption and brake thermal efficiency.

Fig.5 mahua plant flower & seed

3.4 waste cooking oil

Biodiesel can be produced from vegetable oil, and also from waste cooking oil. The largest possible source of suitable oil comes from oil crops such as cotton seed, soya bean or sunflower. The cost for the raw materials too expensive and the post production for the preparation for the biodiesel will be more than the fossil fuel, so we comes with an alternate solution , by using waste vegetable oil as a better source for the preparation of biodiesel. Biodiesel has many environmental benefits. The main benefits is of bio diesel is low emission of aromatic components. The advantages of vegetable oils compared to diesel fuel are ready availability, renewability, lower sulphur and aromatic content. Vegetable oil does not harm environment as it does not contain sulphur and therefore problems associated with sulphurous emissions can be reduced effectively. By using biodiesel as an alternative fuel main advantage is we don't want to modify existing engine designs.

Table -1: Property of oil

Property	Unit	Ratanjot	Karanja	Mahua	WCO
Density	g /cm3	0.92	0.924	0.955	0.930
viscosity	mm2/s				
Kinematic viscosity	mm2/s	50.73	40.2	24.58	42
Saponification value	mgKOH/g	198	187		207
Acid value	mgKOH/g	10-38.8	4-12	38	1.32-3.6
Iodine	gI2/100g	13	86.5		83

Table -2: Property

Property	Unit	Diesil	Ratanjot biodesil	Karanja biodiesel	Mahua biodiesel	Wco biodiesel
Density	g /cm3	0.820	0.880	0.860	0.872	0.896
Kinematic Viscosity	mm2/s	2.98	4.328	4.78	3.9	6.3
Acid value	mgKOH/gm	0.35	0.32	0.42	0.5	0.12
Cloud point	°C	-16		6		
Flash point	°C	144	140	74	205	196
Cetane number		49.0	57	41.7	52	46
Calorific value	Kcal/KG	4285	4000	3700	3900	1042
Moisture	%	0.02	0.03	0.02	0.03	0.015
Ash content	wt %	0.02	0.02	0.05	0.02	0.02

3. CONCLUSIONS

Now this review paper main objective is compare the different type of biodiesel with diesel. We can identify which biodiesel property is nearest of diesel. And next analysis we bland the biodiesel with diesel on B10, B20 ratio perform

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