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Experimenting and Analysing of Alternate Fuel by Using Bio Disel

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Abstract: ***This paper deals with the manufacturing process of Biodiesel from neem oil. This paper mainly involves "Esterification". Factors effecting the biodiesel production (reaction temperature, reaction rate & catalyst) areanalyzed. The esterification procedure converts neem oil to its methyl esters. The important properties of the biodiesel oil such as flashpoint, viscosity, calorific value, density is comparable with the diesel. The viscosity of biodiesel oil is nearer to that of diesel and the calorific value is about 16% less than that of diesel. This paper study supports the production of biodiesel from non edible neem oil as a Viable alternative to the diesel fuel.***

I.INTRODUCTION

Diesel engines have provided power units for road transportation systems, ships, railway locomotives, equipment used for farming, construction, and in almost every type of industry due to its fuel efficiency and durability. However, Diesel engines are the major sources of NOx and particulate matter emissions which are environmental concerns. For automotive industry the reduction of NOx and PM emission is the most important task. National governments are imposing stringent emissions on automotive sector to reduce NOx and PM emissions .

Diesel engine will be the major power source for automobiles in the twenty-first century. To reduce emissions and solve the energy crisis, designing diesel engines with low emission and less energy consumption has always be an objective for researchers across the globe. However, with the development of new technologies, today's diesel engines have better emission characteristics and the less energy consumption compared with its predecessor. But, there is still lot to do on diesel engines aimed to achieve our goal of clean and effective diesel engine. Accordingly, research on a clean burning fuel instead of conventional fuel is advisable, which could not only decrease exhaust gas to a great extent, but, also provide more options of energy sources. The use of alternative fuels for internal combustion engines has attracted a great deal of attention due to fossil fuel crisis. Alternative fuels should be easily available, environment friendly, and techno-economically competitive. Successful alternative fuel should fulfill environmental and energy security needs without sacrificing engine operating performance. Renewable resources offer the opportunity to tap local resources and reduce dependency on fossil energy resources. Most biodiesel oils, particularly of the non-edible type can be used as fuel in diesel engines. One of the promising alternative fuels considered for diesel engine is biodiesel.

Oil provides energy for 95% of transportation and the demand of transport fuel continues to rise. The requirement of Motor Spirit is expected to grow from little over 7MMT in 2001 –02 to over 10 MMT in 2006-07 and 12.848 MMT in 2011-12 and that of diesel (HSD) from 39.815 MMT in 2001-02 to 52.324 MMT in 2006-07 and just over 66MMT in 2011-12. The domestic supply of crude will satisfy only about 22% of the demand and the rest will have to be met from imported crude. Our dependence on import of oil will continue to increase in the foreseeable future. It has been estimated that the demand for crude oil would go up to 85 MMTPA from about 50 MMTPA in 2001-02while the domestic production will be around 22% of the demand. The crude prices and availability are subject to great volatility depending upon the international situation and, therefore, attempt needs to be made to reduce dependence on imports. In bio fuels the country has a ray of hope. Bio fuels are renewable liquid fuels coming from biological raw material and have been proved to be good substitutes for oil in the transportation sector. As such bio fuels – ethanol and biodiesel- are gaining worldwide acceptance as a solution to environmental problems, energy security, reducing

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imports, rural employment and improving agricultural economy. Ethanol is used as fuel or as an oxygenate to gasoline.

II.LITERATURE REVIEW

1. AMAR PANDHARE and ATUL PADALKAR
Investigations on Performance and Emission Characteristics of Diesel Engine with Biodiesel (Jatropha Oil) and Its Blend

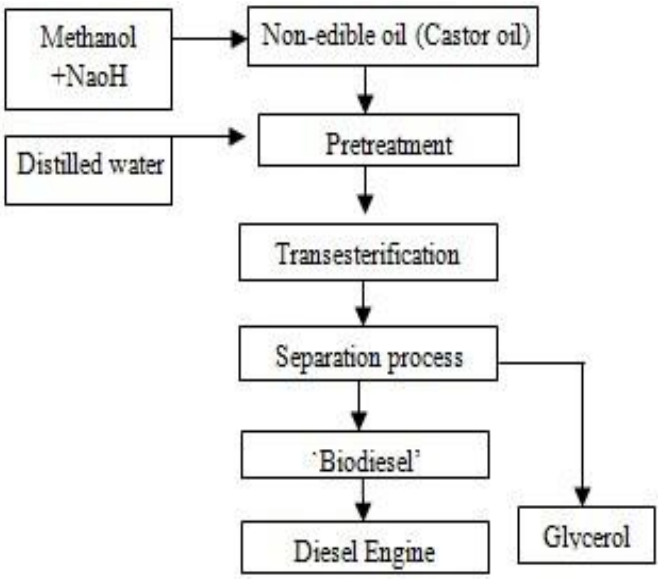
2. AVINASH KUMAR AGARWAL, PARAS GUPTA and ATUL DHAR
Combustion, performance and emissions characteristics of a newly developed CRDI single cylinder diesel engine
Investigations on Performance and Emission Characteristics of Diesel Engine with Biodiesel (Jatropha Oil) and Its Blend

III.PROCEDURE FOR PREPARATION OF BIODIESEL

The vegetable oils and fats are made up mainly of triglycerides. When, these triglycerides react chemically with alcohols in presence of a catalyst (base/acid) result in fatty acid esters. This methyl esters show striking similarity to petroleum derived diesel and are called "Biodiesel". Biodiesel is produced by transesterification of oil obtains from the seeds.

In the preparation of biodiesel five distinct stages will be involved,

1. Heating of oil.
2. Preparation of alkaline mixture.
3. Adding of alkaline alcohol to oil and stirring the mixture.
4. Settling of separation of glycerol.
5. Washing of ethyl ester with water.



IV. METHODOLOGY

V.RESULT & DISCUSSION

We used neem oil for blend in bio diesel for testing mechanical efficiency, brake power , Brake thermal efficiency, emission, indicated thermal efficiency. The resultant of testing is attached in a graph model fig 01 is the Brake power efficiency in (Kw) of Neem bio diesel and following graphs are of various testing's

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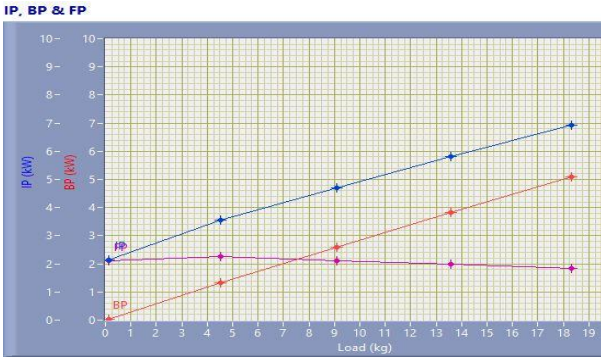

VI.CONCLUSION

The main objective of the present investigation was to evaluate the suitable neem-diesel and jetropha-diesel blend in terms of engine performance and emissions. The performance and emissions tests were conducted with jetropha biodiesel, and blends of neem oil at different loads

The Break thermal efficiency, Mechanical efficiency and efficiency ratios are higher for jetropha biodiesel Break Specific fuel consumption is lower and Break Power is almost similar with minor variations for the neem and jetropha biodiesel due to enhanced combustion.

Indicated mean effective pressure is higher for the neem bio diesel due to efficient combustion. The various emissions namely CO, CO2, HC, SOx and O2 decreasing for the both bio diesel. The NOx emission increasing for all the bio diesel due to increase of cylinder temperature. The Smoke emission is also lower for both bio diesel at higher loads due to enhanced combustion.

Based on the performance and emissions of Bio fuel, it is concluded that the bio fuel oil represents a good alternative fuel with closer performance and better emission characteristics to that of a diesel. From the analysis the bio fuel shows better performance compared to the Diesel in the sense of better performance characteristics like Brake thermal efficiency, Specific fuel consumption, Mechanical efficiency, A/F ratio. Hence the bio fuel can be used as a substitute for diesel.

The main objective of the present investigation was to evaluate the suitable jatropha-diesel blend in terms of engine performance and emissions. The performance and emissions tests were conducted with diesel, and blends of jatropha biodiesel and neem biodiesel at different loads .

VII.REFRENCES

[1]. Forson F.K., Oduro E.K., Hammond-Donkon E., "Performance of jatropha oil blends in a diesel engine". Technical note, Renewable Energy, Vol.29, 2004, 1135-1145.

[2]. Venkateswara Rao T., Prabhakar Rao G. and Reddy K. Hema Chandra, "Experiemntal Investigation of pongamia, jatropha and NeemMethy Esters as Biodiesel on C.I. Engine". JJMIE, Vol.2, 2008, 117-122.

[3]. Raheman H., Ghadge S.V., "Performance of diesel engine with biodiesel at varying compression ratio and ignition timing". Fuel, Vol.87, 2008, 2659-2666.

[4] N.L. Panwar, Hemant Y Shrirame, N.S. Rathore, Sudhakar Jindal, A.K.Kurchania. 2009. Performance evaluation of a diesel engine fueled with methyl ester of castor seed oil. Appl. Therm. Engg.(2009),doi:10.1016/j.applthermaleng.2009.0.

[5] S. Jindal, B.P. Nandwana, N.S. Rathore, V. Vashistha. 2009. Experimental investigation of the effect of compression ratio and injection pressure in a direct injection diesel engine running on Jatropha methyl ester, Appl. Therm. Eng. (2009), doi:10.1016/j.applthermaleng.2009.10.004

[6] Nabi, M.N., Akhter, M.S., Shahadat, M.M.Z. 2006. Improvement of engine emissions with conventional diesel fuel and diesel–biodiesel blends. Bioresource Technology 97 (2006) 372–378.

[7] Sendzikiene, E., Makareviciene, V. and Janulis, P. 2006. Influence of fuel oxygen content on diesel engine exhaust emissions. Renewable Energy 31(2006) 2505-2512.

[8] Nagaraju V, Henein N, Quader A, et al. Effect of Biodiesel (B-20) on Performance and Emissions in a Single Cylinder HSDI Diesel Engine. SAE Technical Paper Series, 2008-01-140