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"EFFECT OF KARANJA, WASTE COOKING OIL AND JATROPHA OIL – DIESEL BLEND ON PERFORMANCE OF CI ENGINE"

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1.Abstract

Using alternative fuels contribute to decreasing the internal Combustion engine's carbon footprint. Biofuels are the Significant types of alternatives fuels. There have been many Studies conducted to asses the impacts of biodiesel use of an engine operation . This review paper describes certain types of biofuels, their properties , and also how the blends are used in biofuels, their properties , and also how the blends are used in diesel engines. Working with bio- fuel on Four- stroke engine is studied in this paper. And alternative fuels are also discussed in relation in fossil fuels. This study aims at assessing the impact in relation in fossil fuels. This study aims at assessing the impact of blended fuel on engines. Some of the parameter used to study the impact of combustible are performance of engine, efficiency of gas emission.

Keywords: Biomass, biofuel, otto engine , Diesel engine etc

2. INTRODUCTION :

Biofuels are combustibles derived from biomass. Biomass is Natural material that is obtained from plants or animals. The Various raw materials that can be used to produce biofuels are primarily divided into three categories : sugar and starchy crops, cellulosic biomass , and olive trees. It has been stated
that a chemical modification of vegetable oil or a mixture with diesel fuel is required to prevent problems with early engine failure. Researchers focused on using different blends of vegetable oils in place of diesel fuel. It can therefore be confirmed that 100 per cent unmodified vegetable oil as a diesel engine fuel is unacceptable.

1.1 Evolution

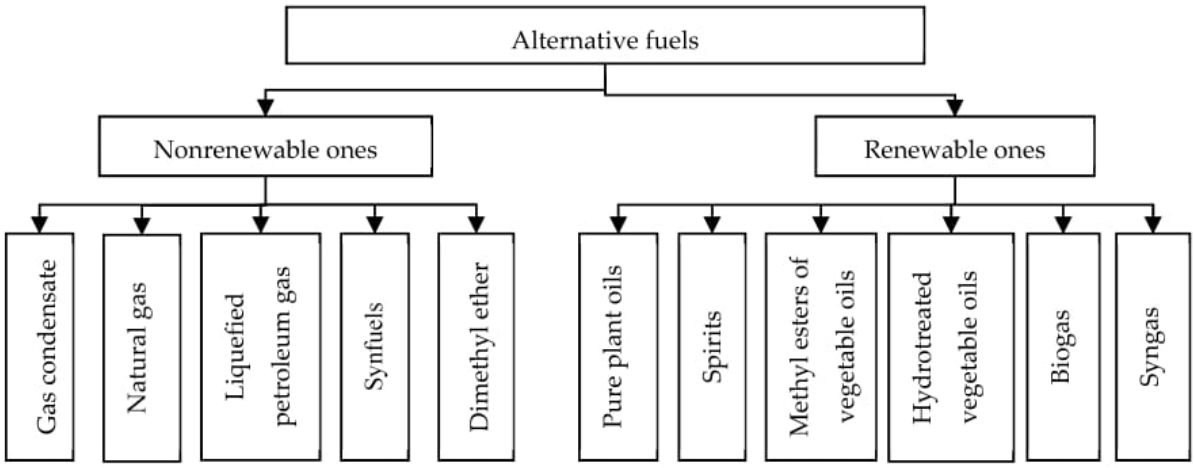
In 1942 the engine outputs of different vegetable oils were examined by a scientist 'Seedon' using the diesel engine model with satisfactory performance. Research had shown that natural oil can be used for regular working circumstances in CI engines. IN 1977 the first patent of biodiesel industrial process was filed by Expedition Parente a Brazilian scientist. Study on the use of transesterified Sunflower oil in South Africa started in 1979 . Biodiesel fuel tested on engine was completed and released worldwide in 1983. In 1981 Schoedder reported mixed results in a a series of investigation using rapeseed oil blended with diesel fuel. In the same year, Peterson and Wanger observed a scratched engine conducting short- term experiments using 100 percent rapeseed oil as an alternative fuel and no significant change was seen by heating the oil before burning it. Thus , it may be mentioned that 100% unmodified vegetable oil is unacceptable as a diesel engine fuel.

1.2 Type of alternative fuels:

The day – to – day progress in engine fuel economy and tremendous rise in vehicle numbers have increased demand for gasoline , and in the near future the petroleum – based Fuels will become

The most expensive and very scarce. Increased use and depletion of fossil fuel creates a research

Interest in the field of alternatives fuel technologies. Alternative fuels which are often divided into three classes, viz. Strong, gaseous and liquid.



1.3 Types of engine:

In internal combustion engines two primary cycles are used: Otto and Diesel. The Otto cycle takes its name from Nikolaus Otto (1832-1892) , who in 1876 invented a four- stroke engine. It is also known as spark ignition(SI) engine. Because the fuel –air mixture requires a spark to ignite. The diesel cycle engine is also called compression ignition (CI) engine, as when pumped into the combustion chamber, The fuel would auto-ignites . The cycle Otto and Diesel work on either a four- or two- stroke cycle.

2. LITERATURE REVIEW:

Rajak, Nashine and Verma, 2020)[1]This study, the effect of the 20, 40, 60 and 80 per cent volume-based spirulina microalgae biodiesel (SMB) blends were investigated at different loads in a naturally aspired diesel engine. Analyzes of output, combustion and emission wed that of the injection timings (23.0 b TDC) with a 220 bar injection pressure .Results show that MB (20 percent of the biodiesel spirulina microalgae and 80 percent of the petrol) produces lower exhaust and der pressure, brake thermal efficiency (BTE), rise pressure and exhaust temperature compared to diesel. Specific fuel consumption and delay results increased to 3.4%, 8.3% and BTE decreased to 3.03% while the spirulina microlage mixture increased to 20% at the higher load.

(Shrivastava et al, 2020)/2]Theses days, for the full replacement of diesel fuel, the biodiesel production from non-consumable vegetable oil feedstock is getting a lot of attention than the consumable vegetable oil. Based on their case of availability, Roselle and Karanja oil blends (RB10 and KB10) with diesel fuel were selected for the present investigation. Cost analysis for different biodiesels, energy losses for different fuels to varying engine load conditions and experimental work wore carried out in the current research, and their effects on the characteristics of the diesel engine were analyzed

(Pham, 2019)[3]In the modem trend in technology and computer science growth, it is becoming easier to apply computer software to solve technical difficulties in engine dynamics and combustion. Small researchers and researchers in developing countries like Vietnam, however, have very high prices for commercial software packages and are hard to reach. Diesel-RK is considered very good open source software for young researchers in that field, since it is free and capable of simulating diesel engine combustion and thermodynamics well enough

(Xu et al., 2017)[4]The aim of the current research is to unfold the effect of fuel supply factors such as Fuel Injection Pressure (FIP). Start of Injection Timing (S0I), Pilot-main Injection Intervals (PM11) on the efficiency and emission characteristics of a

20 percent blend of Jatropha curcas biodiesel (J20) under a diesel engine light load activity. The experiments were conceived using experiment design based on the Response Surface Methodology (RSM) fractional factorial design.

(Bharathiraja, Venkatachalam and Tiruvenkadam, 2016)[5]Throughout this paper a low-cost exhaust gas is attempted after the treatment procedure called water- scrubbing. We produce an emission treatment system which is mounted in the engine exhaust. This takes the exhaust gas and sprays water in the exhaust, going through the silica gel-containing container. An effort is made to experimentally investigate the performance and emission characteristics of a direct injection (DI) diesel engine with diesel fuel (DF), diesel-Karanja oil blend (DKB) and diesel- Jatropha oil blend (DJB), with and without water injection at the exhaust. After ntreatment system the exhaust gas helps to minimize NO_x, CO and particulate matter. The engine output has also been traded to evaluate if the engine has any drop in performance while using the configuration and it is ticed that the engine performance is not improving

Kattimani et al, 2015)[6]They examined fuel properties such as specific gravity, viscosity, gross calorific value, fire point and flash of Waste cooking oil methyl ester and its mixtures with traditional diesel oil in the proportions of 20:80 (820), 40:60 (B40), and 60:40 (B60), 80:20 (B80). has noticed that the fuel properties have been found to deviate further with those of diesel oil with the percentage of methyl ester rising in the blend. The B20 blend properties were also found to be very similar to those of conventional diesel oil.

(Krishna, Bandewar and Dongare, 2014)[7] It presents experimental findings on a 4-cylinder 39 kW gen-set diesel engine with petrol, karanja oil and kranja oil and diethyl ether (DEE) mixture as primary fuels. Data on brake thermal performance, fuel consumption, and emissions are provided here, namely un-burnt hydrocarbon (HC). carbon monoxide (CO), and NOx. The paper also provides important details about engine efficiency with various blended fuel substitutions at a wide range of load conditions. When using 25% DEE mixture with karanja oil, the brake thermal efficiency was and to be 26.73% compared to 23.21% of karanja oil and 27.01% of pure diesel operation respectively.

1. CONCLUSION

Studying the properties of fuel plays a significant role in preparing to use a liquid as fuel, Mixing two or more fuels become very common recently, as it strengthens these el properties and also enhances engine performance. This paper illustrated the emission characteristics of ordinary diesel and biodiesel - diesel blend in Diesel Engines as well as, after comparing the results, it can be noted that Jatropha oil blend with diesel engines shows the highest efficiency output, performance and gas emission parameters

It can be concluded from the results, when Jatropha is 20% mixed with 80% diesel. Jatropha shows maximum efficiency in all the parameters. Following are the results fem which we can conclude that Jatropha is the best alternative.

.The results of piston Engine Power. Showed that Jatropha is the best blend giving the highest value 6.12223 kW.

. The results of Brake Torque showed that Jatropha gives the highest value i.e 38.975Nm.

. The result showed that Jatropha gives the maximum cylinder temperature and pressure value; 1943.7K

92.772bar respectively.

. Jatropha shows the highest mechanical efficiency 0.8503 when compared with pure diesel and other oil blends. Emission from Jatropha is also least when compared.

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