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Turmeric Leaves Based Fuel in Engine

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ABSTRACT

Turmeric leaf oil has shown as potential bio-fuel in these recent years. Properties like higher calorific worth and low viscosity are the properties that are kind of like the traditional diesel. Turmeric leaves are the waste for farmers when removing turmeric plant. From that wasted leaves oil is extracted by hydro distillation method. The turmeric leaves have flammable properties. Extracted oil was accustomed run four stroke engines. Engine eliminates surroundings harmful products with turmeric leaf oil as compared to hydrocarbon and diesel. During this work turmeric leaf oil is employed in 3 completely different blends with hydrocarbon and diesel, and tested on a multi fuel engine from that the emissions are compared with every other further as BS III and BS IV standards.

Keywords: BS III and BS IV, Bio fuels, turmeric leaf.

I. INTRODUCTION

The world energy demands has for the last 20 years witnessed uncertainties in 2 dimensions. the value of conventional fuel is simply too high and has further burden on economy of importing nations and also the combustion of fossil fuels is main perpetrator in increasing the worldwide warming and depletion of standard sources are cases of concern and have prompted analysis world-wide into alternative energy sources for burning engines. Bio fuels seem to be a possible various "greener" energy substitute for fossil fuels. Search for various is continuous everywhere the globe because of finite oil resources. The event of an alternative fuels and renewable energy sources for transportation has become vital within the national effort towards most independency the corner stone of our energy security strategy.

The production of bio fuels from varied food sources result in several issues like, increase in food costs and world-wide food crisis. These issues forced the researchers to appear for the new sources of different fuels and these new alternatives are called second generation bio fuels. This project work is all regarding exploring the turmeric leaf oil as an alternate fuel. The rhizomes of turmeric are employed in some ways however the leaves of turmeric are having no use up to now. But during this work we are proposing to use the blends of oil with hydrocarbon and diesel in their several engines and notice an optimum blend with low emissions.

Conventional energy sources like oil, coal, gas are restricted that are expected to not last for Associate in Nursing extended period. As world reserves of fossil fuels are limited however it's aroused active analysis interest in non-polluting and non-petroleum fuels. Diesel and hydrocarbon engines are the key sources of power generation & transportation therefore each are getting used extensively however due to gradual impact of environmental pollution there's an pressing want for appropriate alternate fuels to be used in SI and CI engines with none modification.

II. LITREATURE SURVEY

Mr. S. I. Meshram worked over the turmeric leaf biodiesel and located that once the turmeric leaves oil was used the engine power slightly shrivelled for all engine speeds. The loss of power occurred owing to the lower calorific worth. A brake thermal efficiency of engine with turmeric leaves oil is found to be slightly less as compared to gas. The brake specific fuel consumption for lower engine speed is a lot of. The CO and HC concentrations victimisation

turmeric leaves oil was shrivelled by 13.7% and 16.94% respectively as compared to gas, whereas the Night concentration was exaggerated by 100%.

Dr V. naga Prasad Naidu, Prof. V. Pandu Rangadu, Krishna Reddy, R. Anand, G. R. Kannan, K. Rajasekhar Reddy and S. Velmathi investigated the employment of cottonseed oil as biodiesel over a 4-stroke compression ignition engine in 2 totally different experimental setups and dealing conditions. The mixing ratio was varied inside a spread of 5-40%. Each the experimentations ended that the brake thermal potency was a lot of for diesel, however the emissions were abundant reduced by the employment of biodiesel. This happened as a result of the oxygen content in biodiesel is higher, so making certain nearer to finish combustion. They conjointly found that, the biodiesel with two hundredth blending ratio attained to be the foremost economical one. It resembled the performance of diesel with lower emissions.

Sunilkumar Kumbhar tried thumba oil over a variable compression ratio diesel engine. He ascertained that, at compression magnitude relation eighteen, the brake thermal potency and brake specific fuel consumption for 100% mix and two hundredth mix whereas brake power with 400th mix showed better performance. The HC, CO and Night emissions were least for the ten and two hundredth mix, so proving best.

N. Manikanda Prabu, Dr. S. Nallusamy K. Thirumalai Ra, Pavanendra Kumar, Niraj Kumar, Vineet Tirth, Sejal Narendra Patel and Ravindra Kirar and Akha Chotai investigated the employment of rosid dicot genus seed-based oil over the 4-stroke internal-combustion engine and ascertained the performance and emission characteristics. The compression magnitude relation 18:1 showed the higher experimental results for diesel moreover as blends with least fuel consumption throughout the mixing ratio of two hundredth, whereas the exhaust gas temperature, that is that the indication of effectiveness of utilization of warmth energy, was the foremost with the blends whereas, pure diesel giving the smallest amount exhaust temperature. The pure biodiesel getting used showed the best exhaust gas temperature, which implies it exhibited highest brake thermal potency. But the problem related to this was that, the engine would be modifies to the compression magnitude relation of twenty or on top of. The emissions showed lower amounts of CO, co2 and HC compared with the exhaust gases victimisation pure diesel, whereas the Night was inherently slightly higher owing to higher gas content and exhaust gas temperature victimisation biodiesel. Conversely, in alternative experimentation, the fuel with 500th mix showed the least emissions in expense to the performance characteristics of engine.

Ramchandra S. Jahagidar Eknath R. Deore, Milind S. Patil, Purushottam S. Desale dead Associate in Nursing experimentation over the performance internal-combustion engine fueled with karanja biodiesel. He tested totally different fuel blends of karanja biodiesel, pure diesel and pure karanja biodiesel. Results showed that the brake power of the engine didn't vary abundant with any of the fuel mixtures and was almost same for all the hundreds. However, brake thermal potency was improved for the karanja biodiesel from three to eight in conjunction with volumetric potency, however it caused reduction in exhaust gas temperature. It had been conjointly ascertained that the blends of four-hundredth and hour had the optimum performance for the given conditions. Sayed shakeer et. al. [1] has centered on his work on performance and emission characteristics of diesel motor by mistreatment blends of rice bran (RB) oil with diesel and rice bran oil. Their result comes out as mix RB20 offers result that is on the point of diesel and just in case of emissions like CO, CO2, HC, smoke &Nox is a smaller amount as compare to diesel. They also find that, Air fuel quantitative relation for diesel was not up to rice bran biodiesel, conjointly for mix RB20 break thermal potency is slightly above diesel. Any exhaust emission temperature at full load was but that of diesel for blend. The mechanical potency of diesel is slightly higher than biodiesel. Guo Hejun et. al. [2] has meted out experimentation on Development of a

replacement palm oil Monoester and used as various fuel for diesel motor. They discovered that the new palm oil monoester has high cetane range resulting in one.5 0C to 2.0 zeroC earlier autoignition than diesel oil. Once the diesel motor burnt the palm oil monoester below partial masses at 1600 revolutions per minute, exhaust emissions were reduced by sixty nine.0% to 81.0%. & decrease by 51.9% to 71.4% conjointly obtained for its mixture with diesel fuel within the proportion of 1:1 by volume. For speed 2200 rpm, smoke reductions by eighty three.3% to 89.3% and by fifty one.6% to 74.1% were reached resp for brand new palm oil and its mixture by 1:1 with diesel oil. Liang Yu et. al. [3] has used jatropha Curcas Oil in diesel engine and discovered the combustion characteristics. The results shows that the timing of combustion advances, the maximum price of warmth unharness rate will increase & combustion period prolongs at rated condition for the curcas oil. Therefore jatropha curcas oil preheated to 150°C may be used as an alternate fuel for diesel motor. WANG Yan-yao et. al. [4] has studied on the employment of other fuel made from Waste oil within the diesel motor. They observed that various fuel made up of Waste Vegetable Oil is used while not modification within the engine. When fuel made up of Waste oil is employed, the fuel consumption will increase 6%~12% compared with the diesel. Also he discovered that power performance of diesel and fuel made from Waste oil has no exceptional difference; however the CO density, the co2 density and also the HC density of its exhausts reduces. That's why; the waste edible oil may be a promising various fuel foe diesel. Swarup Kumar Nayak et. al. [5] created the biodiesel from neat Mahua oil through esterification followed by Tran's esterification and by mistreatment this biodiesel blends he evaluated the performance and emission characteristics of diesel motor. They found that CO, HC, and Roman deity emissions conjointly break specific fuel consumption were less for biodiesel as compare to the diesel. The break thermal potency was less for diesel as compare to blends. The B20 had wonderful performance than diesel also as other blends. A.S. Ramadhas et. al. [6] has analysed the Performance and emission characteristics of a diesel motor fuelled with alkyl radical esters of rubber seed oil; they found that, the lower concentrations of blends found to boost the thermal potency & B10 biodiesel mix offers a higher improvement within the brake thermal potency of diesel engine. With increasing in biodiesel mix the exhaust emissions found less. Therefore finally he all over that rubber seed oil is best various fuel to the diesel oil.

III. TURMERIC LEAF BIODIESEL

Preparation of biodiesel

The vegetable oil once extracted from the resources contains fatty acids, water, sterols, phospholipids, odorants and impurities. If it's directly injected into the diesel motor, it's going to cause various severe issues. These might occur because of high viscosity, low volatility and poor cold low properties. These might result in engine deposits, contrivance choking, seal protruding, etc. Thus, it becomes obligatory to create some chemical processes over the oil so as to create it appropriate for the engine while not any modifications in existing elements. For this purpose, varied chemical strategies are used. The effective strategies used for fulfilling the objective are:

1) Pyrolysis

2) Micro-emulsification

3) Dilution

4) Trans-esterification

Trans-esterification method

The trans-esterification method involves sure range of reactions and processes as shown within the figure higher than. The steps involved within the trans-esterification method are as follows:

1) Compounding of alcohol and catalyst: A nominal quantity of wood alcohol is else with a measured amount of NaOH that acts as catalyst, into a flask.

2) Reaction: This mixture is then else into a closed reaction vessel and therefore the

individual edible fat is else and heated to 60-80oC. This reaction converts the fats into the esters. Sometimes, an additional quantity of fuel may be else so as to make sure complete conversion of fats to organic compound

3) Separation of biodiesel and glycerine: once the completion of reaction, 2 merchandise exist: biodiesel and alcohol. The quantity of alcohol varies as per the type and amount of edible fat.

4) Removal of alcohol: The mixture of biodiesel and alcohol is het to 60oC, so manufacturing the steams, that separates the amount of glycerine from the mixture. The wood alcohol is sufficiently dry so as to recirculate it back to the reaction.

5) Glycerine neutralization: The alcohol by-product contains unwanted amount of catalyst and soap and wishes to be neutralized with an acid.

6) Methyl ester wash: this can be the ultimate section that ensures the whole removal of unwanted contents from the biodiesel, so as to create it compatible with the diesel motor

PERFORMANCE analysis

The performance parameters investigated were torsion, brake mean effective pressure (BMEP), brake power, specific fuel consumption (SFC), and thermal potency. Monoxide (CO), carbon dioxide (CO2), hydrocarbons (HC) and oxides of atomic number 7 (NOX) exhaust emissions levels are conferred. The results showed that torsion and BMEP were slightly lower once the turmeric leaves bio-fuel was used as fuel as compare to gasoline on all engine speeds.

IV. CONCLUSION

Innovative plan to create Turmeric leaf oil as a Universal secondary fuel is mentioned and 3 different blends are accustomed realize a final optimum mix which supplies high performance and low emissions. Turmeric leaf oil is extracted from turmeric leaves that could be a waste for majority of the farmer. We look for the event of the new supply of the choice fuel. We used the agricultural waste of the turmeric crop and that we evaluated the fuel on the single cylinder spark lighted engine and compared it with the gasoline. Once the turmeric leaves oil used the engine power slightly weakened for all engine speeds. The loss of power are often attributed to the low calorific value, which is slightly lower as compare to gasoline.

REFRENCES

[1] Sayed Shakeer, M.C. Navindgi, an Experimental Analysis of Performance, Combustion and Emission Characteristics of Rice Bran Biodiesel and Its Blend on C I Engine, IJMER, ISSN: 2249-6645, Vol.4 Iss.8 Aug. 2014

[2] Guo Hejun Zhang Zhili Jiang Bing Huang Xianxiang, Development of a New Palm Oil Monoester Used as a Clean Alternative Diesel Engine Fuel. 978-1-4244- 8039-5/11/$26.00 ©2011 IEEE

[3] Liang Yu, Zhou Li-ying, Wang Zi-yu, Guo Jian, Luo Fu-qiang, Experimental Investigation on the Combustion Characteristics of a Diesel Engine Fueled with Jatropha Curcas Oil, 978-1-61284-752-8/111$26.00 ©2011IEEE

[4]WANG Yan-yao, SHANG Shu-qi, Study on the Use of Alternative Fuel Made from Waste Vegetable Oil in the Diesel Engine, 978-1-4244-9577-1/11/$26.00 ©2011 IEEE

[5]Swarup Kumar Nayak, Bhabani Prasanna Pattanaik, Experimental Investigation on Performance and Emission Characteristics of a Diesel Engine Fuelled with Mahua Biodiesel Using Additive, 4th International Conference on Advances in Energy Research 2013, ICAER 2013

[6]A.S. Ramadhas, C. Muraleedharan, S. Jayaraj, Performance and emission evaluation of a diesel engine fueled with methyl esters of rubber seed oil, Renewable Energy 30 (2005) 1789–1800

[7]K R Patil, Prof. P.M.Khanwalkar, Dr. S.S.Thipse, K.P.Kavathekar, S.D.Rairikar, Development of HCNG Blended Fuel Engine With Control Of Nox Emission, Second International Conference on Emerging Trends in Engineering and Technology, ICETET-09, 978-0- 7695-3884-6/09 $26.00 © 2009 IEEE