

Analysis of Karanja Alternate Fuel-A Review

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Abstract- Now a days there has been an increasing demand for fuels which has been a challenge for today's scientific workers. The availability of fossil fuel resources are reducing day by day and there has also been an increase in price level. Bio-Diesel seems to be a solution for future. It is an environmental viable fuel. The main purpose of a our project is to reduce the emission level of exhaust gas(i.eNOx, HC and CO) like a nitrogen oxide, hydro carbon, and carbon monoxide. There are many alternate fuels are available like soy bean, castor, jatropha, neem, undi and moha. In this project we choose karanja oil. The main reason for we choose of this oil is non-edible and non-toxic. The catalysts are KOH, NaOH.

Keywords--Karanja oil, Transesterification, Performance, Properties.

INTRODUCTION ENGINE

A heat engine is a machine, which converts heat energy into mechanical energy. The combustion of fuel such as coal, petrol, and diesel generates heat. This heat is supplied to a working substance at high temperature. By the expansion of this substance in suitable machines, heat energy is converted into Useful work. Heat engines can be further divided into two types:

- (i) Internal Combustion
- (ii) External Combustion

In a steam engine the combustion of fuel takes place outside the engine and the steam thus formed is used to run the engine. Thus, it is known as external combustion engine. In the case of internal combustion engine, the combustion of fuel takes place inside the engine cylinder itself.

POLLUTION CONTROL

[1] **Bobade S.N and Khyade V.B.**et al. This paper deals with Detail study on the Properties of Pongamia (Karanja) for the Production of Biofuel.Pongamiapinnata can be a definite source of raw material due to its easy availability in wild. Pongamiapinnata is drought resistant, semi-deciduous, nitrogen fixing leguminous tree. It grows about 15-20 meters in height with a large canopy which spreads equally wide. After transesterification of crude oil shows excellent properties like calorific value, iodine number, cetane number and acid value etc. Detail study intends to identify all advantages

and disadvantages of pongamiapinnata as a sustainable feedstock for the production of Oil equivalent to fossil fuel as per ASTM 6751-9B.

[2]**BobadeS.N and Khyade V.B.**et al.This paper deals with Preparation of Methyl Ester (Oil) from Karanja (Pongamia) Oil.Pongamia has been found to be one of the most suitable species due to its various favorable attributes like its hardy nature, high oil recovery and quality of oil, etc...As the acid value of this oil is high, so that we have to reduce it by the process of esterification followed by transesterification. The methyl ester produced by this way gives the good result. The present study deals with transesterification of karanja oil which gives 907ml of karanja oil methyl ester (KOME) and 109ml of glycerol using methanol (13%) and sodium hydroxide as a catalyst (1%). The properties like density, viscosity, flash point, cloud point and pour point have been determined as per ASTM standards for accessing the fuel quality of KOME.

[3]**D.C. Katpatal.**et al. This study deals with Optimization of Effective Parameters of Pongamia (Karanja) Oil Using Taguchi Method Mature seeds of Karanja have recently gained a great commercial relevance owing to their high oil content, which is used as an alternate source of fuel and energy In this, the optimization of experimental parameters, such as catalyst type, catalyst concentration, molar ratio of alcohol to oil and reaction temperature, on the transesterification for the production of Karanja methyl ester was performed. Alkali catalyzed method has been used for oil production process by using catalysts such as KOH, NaOH, NaOCH₃. The Taguchi method helped to understand the effect of control parameter and to optimize the experimental conditions from a limited number of experiments and contribution of each noise factor calculated by ANOVA. Finally the yield of Karanja methyl ester could be improved using control parameter which was obtained by Taguchi method.

[4] **R. K. Singh, A. Kiran Kumar and S. Sethi**et al. This study deals with the Preparation of karanja oil methyl ester. In the present studies, oil has been prepared from karanja oil several processes for oil fuel production have been developed, among which transesterification using alkali as catalyst gives high

level of conversion of triglycerides to their corresponding methyl ester in a short duration. This process has therefore been widely utilized for oil fuel production in a number of countries. In India, non-edible oils like karanja oil and jatropha oil are available in abundance, which can be converted to oil. As the acid values of this oil was more than 3, so it was converted to oil by esterification followed by transesterification process. The methyl ester produced by these methods was analyzed to a certain their suitability as diesel fuels.

[5] K.DharmaTeja et al. This study deals with the Analysis and Optimization Of Performance Parameters of Diesel Engine Using Oil. As the world is facing crisis due to the dwindling resources which is a matter of serious concern for the mankind. So there is a necessity to find alternate fuels or fuel additives. In the present study, palm oil & Nano fuel additive are used as additives to run diesel engine and check its performance. The present work aims at optimizing the total fuel consumption and brake thermal efficiency of a diesel engine with various proportionate blends of Diesel, palm oil & Nano fuel additive. This is a statistical method used to optimize the input parameters to get the maximum results. Response surface design with user defined data is considered for modelling, analyzing and optimizing the performance of the engine. A proven response has been extracted with improved efficiency and compensated fuel consumption.

REVIEW ON PERFORMANCE

[6] Purushotham Nayaka D and Sreekantha A et al. This study deals with the Effect of Injection Parameters on CI Engines Performance and Emissions Using Sesame and Pongamia as fuel. The Oil are derived from vegetable and animal fats. In this present work, transesterification of pongamia (Pongamia) oil to reduce the viscosity of the vegetable oil. The processed oil is used to operate four strokes, single cylinder diesel engine with blends of methyl ester of pongamia. The influence of different parameters like performance and emission characteristics on the performance of diesel fuel blends are studied with an aim to obtain comparative measures emission like hydro carbons, carbon monoxide, carbon dioxide, and oxides of nitrogen with petroleum diesel. At 200 Bar injection pressure and 30°C injection timing the engine performance is found to be better.

[7] Dr. S.N. Varma and Dr. Mukesh Pandey et al. This study deals with the Comparative study of the Behavior of Oils of Different origins on the Diesel

Engine Performance and Emission. In the Present investigation a comparative study has been carried out to examine the Performance parameters and exhaust emission of a diesel engine fuelled with Oil of two non-edible oil sources. Tests have been carried out in four cylinder direct injection diesel engine with different loading conditions. Performance parameters investigated are Brake thermal efficiency, Brake specific fuel consumption (BSFC) and Brake specific Energy consumption (BSEC), the emission parameters investigated are CO, HC, NO_x, and smoke. The result showed that the Oil derived from Jatropha oil Showed comparable performance and can be a good replacement to petroleum diesel.

[8] N. Stalin and H. J. Prabhu et al. This study deals with the Performance test on IC engine using Karanja Oil blending with diesel Oil production is a modern and technological area for researchers due to constant increase in the prices of petroleum diesel and environmental advantages. This study presents a review of the alternative technological methods that could be used to produce this fuel. Oil from karanja oil was produced by alkali catalyzed transesterification process. Performance of IC engine using karanja oil blending with diesel and with various blending ratios has been evaluated. Parameters like speed of engine, fuel consumption and torque were measured at different loads for pure diesel and various combinations of dual fuel. The test results indicate that the dual fuel combination of B40 can be used in the diesel engines without making any engine modifications. Also the cost of dual fuel (B40) can be considerably reduced than pure diesel.

[9] S. Antony Raja and D.S. Robinson smart et al. This study deals with Oil production from karanja oil and its characterization. The fuel of bio origin may be the OIL obtained from edible or non-edible vegetable oil through transesterification process. Most of the properties of OIL compare favorably with the characteristics required for diesel fuel. The utilization of liquid fuels such as oil produced from karanja oil by transesterification process represents one of the most promising options for the use of conventional fossil fuels. The karanja oil is converted into methyl ester known as oil prepared in the presence of homogeneous acid catalyst. The performance and emission characteristics were found out for karanja oil. The same characteristics study was also carried out for the diesel fuel for analysis. The values obtained from the karanja oil is closely matched with the values of conventional diesel and can be used in the existing diesel engine without any modification.

[10] **Dr. Ramesha D Ket al.** This study deals with Injection Characteristics of a CI Engine Fuelled with Pongamia Pinnata Methyl Ester. Compression ignition engine is a popular prime mover in rural areas, particularly in the places where electrical power is not available Pongamia oil is non-edible vegetable oil. Experiments are conducted on 10 HP single cylinders, four stroke, water cooled CI engine using Pongamia oil methyl esters to study the engine performance at different injection pressures and different injection timing.

The effect of injection pressure on the performance at three different working pressures of 180, 200, and 220 bar and at three different timing of 230, 270 and 300 are studied. Non-edible Pongamia oil was tested for their use as substitute fuels for diesel engines. The results showed a better performance at an injection pressure of 200 bar and injection timing 300 bar TDC.

CONCLUSION

The present investigation evaluates the performance and emission tests which were conducted for a four stroke diesel engine. The major following conclusions were drawn from the tests which are:

1. The thermal efficiency indicates that the Karanja oil has slightly more efficiency compared to the pure oil with the varying load conditions.
2. The hydrocarbon emission is slightly lesser when compared to that of emission levels in pure diesel. The total fuel consumption is nearer to that of pure diesel thereby increasing the overall performance of engine.
3. Therefore it can be concluded that emission characteristics of Karanja oil is slightly higher than that of pure diesel.

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BIOGRAPHIES



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