

## ENGINE PERFORMANCE ANALYSIS ON BIO-DIESEL

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**Abstract—** Looking for a reasonable fuel contrasting option to quick draining fossil fuel and oil saves and in genuine thought of the ecological issues connected with the broad utilization of fills in view of petrochemicals, examination work is in advancement around the world. The three eras of biodiesel food stocks depicted in this report are nourishment crops, non-sustenance crops, waste item from businesses and microalgae-determined biodiesel. In this report original bio fuel (FGBF) are examined alongside its imperatives and concerns. In second era biofuel waste result of vegetable oil industry called as corrosive oil was chosen as a possibility for exploration. Non palatable mahua oil was additionally utilized as a SGBF hopeful as a part of the present study. The third era bio fuel (TGBF), microalgae is the main source that can be reasonably created later on. Microalgae can be changed over straightforwardly into vitality, for example, biodiesel, and along these lines seem, by all accounts, to be a promising wellspring of renewable vitality. Microalgae based biofuels have been examined in writing survey..

**Key words:** FGBF, SGBF, TGBF.

### I. INTRODUCTION

The world is instantly stood up to with the emergencies of fossil fuel exhaustion. As indicated by the late World Energy Outlook (IEA, 2007a), if governments around the globe proceed with current approaches, the world's vitality needs would be 55 % higher in 2030 than in 2005, with China and India representing quite a bit of this rising interest. Somewhere in the range of 84 % of the expansion in essential vitality interest will need to originate from fossil powers [1]. Vitality creation and use, especially of fossil fills, have various ecological effects including air contamination, nursery gas discharges and unfriendly effects on biological communities. Since the center of the nineteenth century, the World Fuel Consumption (WFC) bend displays generally exponential practically perpetual development at a rate of around 2.3% every year, i.e., generally multiplying like clockwork (Figure 1-1). All out WFC amidst nineteenth century was as low as 550million

tons, and by the late twentieth century these qualities increment by a variable of 25. The Global Temperature Anomaly (dT) bend has the age-long direct pattern expanding by +0.059°C each 10 years. By the end of twentieth century, the worldwide dT expanded by 0.6-0.8°C contrasted with the mid twentieth century. The WFC and worldwide dT flow have two key contrasts as takes after:

1) The age-long increment in WFC is approximated by a type, while the age long Increase in worldwide dT shows a straight pattern.

2) Unlike repetitively and exponentially expanding WFC, the progression of worldwide dT with the foundation of a direct, age-long pattern experiences semi cyclic Fluctuations with a period around 60 years There is, consequently, an interest to create elective energizes persuaded by the decrease of the reliance on fossil fuel because of the restricted assets. A few oxygenated energizes are known not the potential for use as the option gas and diesel fuel.

## A. Motor Emission

In the same IEA reference situation, if no further move is made to diminish the vitality request, vitality related CO<sub>2</sub> emissions will increment by 49 % by 2030 contrasted with 2005 levels and all districts will confront higher vitality prices in the medium-to long haul. In everywhere throughout the world individual are utilizing gas and diesel fuel as a part of an automobile. Diesel fumes incorporate vaporous and particulate stage segment. The vaporous stage comprises of CO<sub>2</sub>, CO, NO<sub>x</sub>, unburned and incompletely hydrocarbon (HC), abundance air and numerous other constituent. NO<sub>x</sub> emissions are of specific sympathy toward diesel motor because of their generally high commitments to emanation inventories. NO<sub>x</sub> formation in the diesel motor where, because of high temperature and weight happening in the diesel motor barrel, environmental nitrogen can be settled at to yield NO as a noteworthy item. CO and THC outflow from diesel motor stem from deficient ignition [3]. The particulates stages comprise of component carbon, natural carbon, follow metals and other inorganic segments. Particulate matter is framed in the chamber of the motor amid the burning procedure. Carbonaceous residue or component carbon is shaped in the focal point of the fuel shower where the air-fuel proportion is low.

## B. Biodiesel handling from microalgae

Figure 1-3 demonstrates a schematic of the generation of biodiesel from microalgae. The initial step is the determination of a suitable species with the applicable properties for the particular society conditions and items. The way of life conditions, including light, temperature, pH, air (carbon dioxide) and supplement focus, must be considered. Microalgae can be collected utilizing microscreens, sedimentation, centrifugation, flocculation or film filtration. The reaped biomass is then dried under vacuum to discharge water until it achieves a steady

weight. The dried biomass is pummeled with a mortar and pestle before the oil is removed. After extraction, the oil is changed over into biodiesel. D. Preferred standpoint and Disadvantage of small scale green growth

Favorable position of biodiesel from green growth oil

- Enhanced efficiencies or lessening in expense. The expenses connected with the collecting and transportation of microalgae are moderately low contrasted with those of different biomass materials, for example, trees and products. Likewise, they don't straightforwardly influence the human sustenance production network, wiping out the nourishment versus fuel question.

- Microalgae don't seek land with yields utilized for sustenance creation, grain and different items. As above study, the development of microalgae does not require an expansive region of area contrasted with other plant sources.

- Microalgae can be developed in various situations that are unsatisfactory for developing different harvests, for example, new, saline or salt water or non-arable terrains that are inadmissible for ordinary horticulture. Likewise, they can be developed on homesteads or in bioreactors. Due to this non particular development, microalgae produce an unrivaled yield for every hectare with enhanced environmental execution.

- The most regular microalgae have oil levels in the scope of 20 to half by weight of dry biomass, however higher productivities can be come to. Microalgae normally twofold their biomass inside 24 h, yet exponential development rates can bring about a multiplying of their biomass in periods as short as 3.5 hour.

- Microalgae produce significant co-items or by-items, for example, biopolymers, proteins, sugars and lingering biomass, which might be

utilized as food or compost. Likewise, development of microalgae does not require herbicides or pesticides.

- Micro green growth are thought to be an effective natural framework for gathering sun based vitality to use in the generation of natural mixes, and in view of their little size, they can be effortlessly artificially treated.

- Microalgae are equipped for settling carbon dioxide in the environment, encouraging the diminishment of climatic carbon dioxide levels, which are currently viewed as a worldwide issue. Moreover, microalgae biomass generation can influence the bio obsession of waste carbon dioxide, decreasing outflows of a noteworthy nursery gas (1 kg of dry algal biomass requires around 1.8 kg of CO<sub>2</sub>).

- Microalgae lipids are generally nonpartisan lipids because of their high level of immersion, and their aggregation in the miniaturized scale green growth cell at various phases of development (contingent upon the strain) makes small scale green growth lipids a potential diesel fuel substitute.

#### Burden of smaller scale green growth

- Most of algal lipids have lower calorific worth than diesel fuel.
- The expense of development is higher contrasted with normal product oils as of now.
- The centralization of bio mass is low.
- Algae based bio fuel can't be transported by pipelines since it can't stream well in low temperature.
- Precious work is required for gathering and oil extraction from green growth.

## II. PREPARATION AND CHARACTERISATION

### A. Preparation of Second era biodiesel (SGBD):

"Biodiesel is characterized as mono-alkyl ester of long chain unsaturated fat got from vegetable oil or creature fats." In this report, Non palatable Mahua oil and corrosive oil (waste item) from ground nut oil industry is utilized as a second era bio fuel.

### B. Esterification Process:

Esterification is the substance procedure for making esters, which are mixes of the synthetic structure R-COOR', where R and R' are either alkyl or aryl bunches. The most widely recognized technique for planning esters is to warm a carboxylic corrosive, R-CO-OH, with a liquor, R'-OH, while expelling the water that is shaped. A mineral corrosive impetus is normally expected to make the response occurring at a valuable rate.

### C. Transesterification process

Biodiesel will be set up from crude non eatable oil mahua and corrosive oil for the present study. The general transesterification procedure was taken after for bio diesel planning talked about beneath. Biodiesel is by and large created by transesterification of triglyceride; a triglyceride responds with a liquor within the sight of a solid corrosive or base, delivering a blend of unsaturated fats alkyl esters and glycerol. The general procedure is an arrangement of three sequential and reversible responses, in which diandmonoglycerides are framed as intermediates. The stoichiometric response requires 1 mol of a triglyceride and 3 mol of the liquor. Nonetheless, an overabundance of the liquor is utilized to expand the yields of the alkyl esters and to permit its stage partition from the glycerol shaped.

### D. Preparation of bio diesel from Mahua oil

Mahua oil was acquired from Agrawal oil plants close Udaipur, Rajasthan, India. Before readiness of bio diesel the property of oil preferences substance creation of oil, corrosive quality, iodine worth and FFA and so forth ought to be known for building up technique for bio diesel. Mahua biodiesel was readied utilizing two stage forms, in which starting stride is corrosive esterification process and second one is transesterification process. Examinations were led in a research facility scale setup. All chemicals including methanol (99.5%) and sulfuric corrosive (99% pure) were of scientific reagent (AR) grade. The KOH in pellet structure was utilized as a base impetus for transesterification reaction. Crude foul mahua oil was tanish yellow in shading. This oil had an underlying corrosive estimation of 20.34 mg KOH/gm of oil comparing to a FFA level of 10.17%.

### III. CHARACTERIZATION OF SECOND GENERATION

#### BIO DIESEL

A quality demonstrating the measure of free corrosive present in a substance, equivalent to the quantity of milligrams of potassium hydroxide expected to kill the free unsaturated fats present in one gram of fat or oil likewise called corrosive number. Figure 3-1 demonstrates corrosive estimation of various Oils and biodiesel.

$$AV = (v - b) \times N \times 56.1/w$$

Where, v is the titration volume in ml b is the clear in ml N is the typicality of the KOH arrangement w is the heaviness of test in gm. Christo Ananth et al. [2] proposed a system, this fully automatic vehicle is equipped by micro controller, motor driving mechanism and battery. The power stored in the battery is used to drive the DC motor that causes the movement to AGV. The speed of rotation of DC motor i.e., velocity of AGV is controlled by the microprocessor controller. This is an era of

automation where it is broadly defined as replacement of manual effort by mechanical power in all degrees of automation. The operation remains an essential part of the system although with changing demands on physical input as the degree of mechanization is increased. Vaibhav J Limbachiya, Prof Dhaval M Patel, "An investigation of Different Material on Abrasive water plane machine". Hypothetical MRR discovered equivalent to the trial MRR. In this paper examination for three unique materials like en8, acrylic and aluminum is done utilizing Taguchi outline of analysis strategy. Analyses are completed utilizing L25 Orthogonal cluster by changing Material cross pace and rough mass stream rate for every material respectively. Christo Ananth et al. [8] discussed about E-plane and H-plane patterns which forms the basis of Microwave Engineering principles. T. Nguyen, D.K. Shanmugam, J. Wang, "Impact of fluid properties on the steadiness of a grating water plane". The impact of fluid properties subsequent to including polymeric added substances the dependability of a grating slurry (or suspension) plane (ASJ) is given and examined a perspective to upgrade the plane solidness for ASJ machining. It is demonstrated that plane crumbling is a consequence of the plane interior unsettling influences connected with the liquid properties and the outer air grating following up on the plane surface. A plane turns out to be more steady with the expansion of polymeric added substances, which is observed to be essentially credited to the expansion of liquid consistency. In light of the discoveries of the trial examination, a parametric model is then created utilizing a dimensional investigation way to deal with anticipate the plane minimal length, i.e. the length of the plane stable district. The created model is at last checked tentatively, which demonstrates that the model expectations are in great concurrence with the test information. On the off chance that the slurry is consistently blended, the molecule speed might be thought to be equivalent to the water arrangement speed or fly speed (v) at the spout exit. In framing an

ASJ, it is trusted that there are vitality or energy misfortunes in the flying framework because of spout divider erosion, liquid stream unsettling influences and the compressibility of the slurry. It has been demonstrated that the fluid thickness is the significant plane interior component that adds to the plane union, and the option of polymeric added substances expanded the fluid consistency and henceforth the plane strength. A parametric model has been created for foreseeing the plane strength, checking the fluid properties and streaming parameters [9]. Consequently swaying frequencies (10-14 Hz) and little wavering edges (4-61) are suggested for expanding the profundity of cut in spout swaying cutting [10].

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## IV. CONCLUSION AND DISCUSSION

Portrayal of Mahua biodiesel and Acid Oil biodiesel was completed in-house furthermore at some authorize research facilities from Gujarat. It was watched that corrosive oil biodiesel has the comparative calorific worth as that of diesel and its consistency likewise coordinates well with that of diesel. To some degree lower calorific estimation of mahua biodiesel was acquired when contrasted with that of diesel and its consistency was somewhat higher than that of diesel. Results acquired for these biodiesel energizes as far as FFA qualities, corrosive qualities, Calorific worth, pour point, cloud point, blaze and fire point and thickness qualities were coordinating great with that of diesel.