Bio Diesel Oil of Mustard:
Small Diesel a Renewable Alternative Fuel

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ABSTRACT

This paper represents the mustard oil is a kind of renewable energy and alternative fuel of the future. In order to cope with the current situation of load shedding, and reduce dependence on imported fuels, the Bangladesh government to encourage the use of renewable energy. Because the diesel engine with multiple functions, including small pumping irrigation system and backup generators, diesel fuel is much higher than that of any other gasoline fuel. In Bangladesh, mustard oil used as edible oil has been all over the country. Mustard is a widely grown plants, more than demand in Bangladesh and the mustard seed is produced annually. Therefore, to use the remaining mustard oil diesel fuel as a substitute. Fuel properties determine the standard procedure in fuel testing laboratory. An experimental device, and then a small diesel engine made in a laboratory using different conversion from the properties of biodiesel blend of mustard oil. The study found, biodiesel diesel fuel has a slightly different than the property. Also observed, and bio diesel, engine is able to without difficulty, but deviates from its optimal performance. Biodiesel was different (B20, B30, B50) of the blends have been used in engine or a fuel supply system, in order to avoid the complex deformation. Finally, it has been carried out to compare the performance of different operating conditions with different blends of Biodiesel Engine, in order to determine the optimal blends.

Keywords: Biodiesel, Calorific Value, Ester Exchange Reaction, Mustard Oil, Pyrolysis, Viscosity

1. INTRODUCTION

Modern civilization is dependent on fossil fuels. Energy derived from fossil resources is much higher than any other resource. Most of the world’s energy needs to provide a thorough petrochemical resources, coal, oil and natural gas. Fossil fuel consumption increased year by year. Since fossil resources are non-renewable, so rising fuel prices cut out the consequences of reduced supply needs.

Diesel fuel has a higher energy density than other gasoline. Therefore, heavy-duty diesel engines are widely used in transportation, power generation, and in the agricultural sector. As a result, the consumption rate of diesel fuel, gasoline fuel is far higher than the other, subsequently resulting in higher price than other gasoline and diesel fuels. In Bangladesh, pets fossil fuel resources are very limited. Therefore, the demand for energy, Bangladesh is totally dependent on imported oil from the Middle East countries. In addition, Bangladesh IM port Arabian light crude oil (ALC), thus refining related costs is enormous. In addition, the growing concern of environmental issues in the 1990s (ie, the Clean

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Air Act) increased interest in alternative fuels more money and energy research paved the way. More and more greenhouse gases (GHG) such as CO2, which is caused by global warming and climate change, as well as fossil fuels and, more importantly reserves decline, high fuel prices have a strong interest in the use of bio-oil and biodiesel increased land transportation and power generation. Sources of renewable energy, bio-fuels and bio-fuel use, to ensure that particulate matter, HC and NOX emissions environment. Therefore, biofuels can become a good alternative to fossil fuels.

Vegetable oil as an alternative fuel for diesel engines can be traced back nearly a century. Based on soil conditions and climate, different countries are looking for a different vegetable oils, for example, in the United States, in Europe rapeseed and sunflower oil, soybean oil, palm oil in Malaysia and Indonesia, the Philippines coconut oil is considered to replace diesel (Srivasata & Prasad, 2000). Mustard oil potential from biodiesel production have found a number of studies (Forhad, Rowshan, Habib, & Islam, 2009) is a promising diesel engine fuel. Mustard (Brassica juncea) in Bangladesh is an extensive development of seeds. Many countries believe that mustard oil, it has a high content of uric acid, which is harmful to the body substance called unfit for human consumption. Mustard is characterized by a yellow-green leaves and stem length circular cross-node. Brown seeds are tiny, round, reacts with water, emitting a strong smell. It is often used for cooking. Annual production of mustard seed, more than the demand in Bangladesh. Therefore, efforts to use the remaining mustard oil as an alternative to diesel fuel. This article presents the prospect of mustard oil, diesel oil as a renewable and alternative sources of energy.

2. BIO-DIESEL VS. STRAIGHT VEGETABLE OIL

Biodiesel is produced from vegetable oils. The main components of vegetable oil are triglycerides. Triglycerides are esters of glycerol with long chain acids, commonly called fatty acids. Bio-diesel is defined as mono alkyl esters of long chain fatty acids derived from renewable feed stock-such as vegetable oil or animal fats, for use in compression ignition (CI) engines (Yosimoto, Onodera, & Tamaki, 2001). This name is given to the esters when they are for use as fuel.

Problems associated with using straight vegetable oil (SVO) in diesel engine, can be classified in two groups, viz, operational and durability problems. Operation problems are related to starting ability, ignition, combustion and performance. Durability problems are related to deposit formation, carbonization of injection tip, ring sticking and lubrication oil dilution. The problems associated with using straight vegetable oil (SVO) can be listed as below:

- It has been observed that SVO when used for long hours, tend to choke the fuel filter because of high viscosity and insoluble present in the SVO;
- High viscosity of SVO causes poor fuel atomization, large droplet size, and thus high spray jet penetration. The jet also tends to be a solid stream instead of a spray of small droplets. As a result, the fuel is not distributed or mixed with the air required for burning in the combustion chamber. This result in poor combustion accompanied by loss of power and economy;
- SVO has lower energy density than fossil diesel. So this leads to higher BSFC of the engine;
- To use SVO efficiently in diesel engine, modification of fuel supply system and engine redesign is required; which is much costly.

Blending, Cracking/Pyrolysis, Emulsification or Transesterification of vegetable oil may overcome these problems. Heating and blending of vegetable oil reduces the viscosity and improve volatility of vegetable oil but its molecular structure remains unchanged; hence polyunsaturated character remains. Blending
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