A Project Report on

**“*Performance and emission testing by using Biodiesel*”**

**By**

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**Guide**

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**JSPM’s Narhe Technical Campus, Narhe, Pune**

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**JSPM’S NARHE TECHNICAL CAMPUS, NARHE, PUNE**

## DEPARTMENT OF MECHANICAL ENGINEERING

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## CERTIFICATE

This is to certify thatMr. Karale Sachin M, Mr. Devale Prasad G, Mr. Nanaware Avinash M, Mr. Phule Omkar M**.** has successfully completed the Project stage - I entitled “Performance and emission testing by using Biodiesel in the partial fulfillment of Bachelor of Engineering - **Mechanical Engineering**, of **Savitribai Phule** Pune University, Pune under the session 2020-2021.

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**List of Symbols**

|  |  |
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| **Symbol** | **Illustration** |
| Φ | Pressure Angle Radian |
| Τ | Shearing Stress N/mm2 |

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**Abstract**

Development of biofuels from renewable resources is critical to the sustainability of the world’s economy and to slow down the global climate change. Currently, a significant amount of bioethanol and biodiesel are produced as biofuels to partially replace gasoline and diesel, respectively, in the transportation sector worldwide. However, these biofuels represent a tiny portion (<4%) of the total fuels consumed. Furthermore, bioethanol is produced predominantly from sugarcane and corn, and biodiesel from crop and plant oils. Production of these raw materials is competing for the limited arable land against food and feed production. It is not feasible to tremendously increase biofuel production using the current technologies. Therefore, it is critical to investigate advanced or 2nd generation biofuel production technologies.. Biodiesel and bioethanol are the two potential renewable fuels that have attracted the most attention. The efficiency of ethanol production has steadily increased and valuable co-products are produced, but only tax credits make fuel ethanol commercially viable because oil prices are at an all-time low. The original motivation for fuel-ethanol production was to become more independent of oil imports.

1. **INTRODUCTION**

Society is continuously developing and evolving to enhance daily life. Energy has been, and always will be, required to achieve desired technological advances. As different methods of harnessing energy are discovered, they will possess the ability to transform society’s surroundings. Petroleum based fuels have been used as one of the main sources of energy, however fossil fuel sources are projected to diminish as population increases in the next century. The combustion of these fossil fuels potentially releases hazardous chemicals and pollutants. In the past 30 years there has been a shift in awareness as to the negative impacts of fossil fuels on ecosystems and climates. As a result fuels derived from plants, geothermal energy, solar energy and more have been targeted as promising alternatives. An ideal fuel for the future should be both energetically competitive with current fuels but also have a better environmental contribution. Interest in biodiesel has been a result of the growing need for a cleaner burning fuel that is also compatible with most current diesel engines. Unlike petroleum-based diesel fuel, biodiesel is produced from renewable organic sources. Although its stored energy content is comparable to petroleum diesel, there are multiple differences in their chemical, physical and emissions contents and properties. Worcester Polytechnic Institute (WPI) has the capability to produce biodiesel fuel. This biodiesel as well as petroleum based diesel were compared using an Espar diesel combustion heater. The setup of this heater was designed in a previous MQP project focusing on the analysis on the energy contents and efficiencies of these different fuels

**1.1 Problem Statement**

The study of BioDiesel fuel is very timely because of arising problems such as the rising cost of fuel in the market, global warming phenomenon, and health problems such as respiratory diseases caused by the harmful byproducts of burning petroleum-based fuels

**1.2 Objectives**

1. The main objective of this study is To find the best alternative Biodiesel over (D-100) Pure Diesel.
2. To Study properties of Biodiesel & compare with Diesel.
3. To conduct performance Test in diesel engine using Biodiesel.
4. To Study properties of Biodiesel & ethanol & compare with Diesel.
5. The main objective of this study is To find the best alternative Biodiesel.
6. Reduce toxic emission during combustion of Biodiesel.

**1.3 Scope**

Biodiesel to diesel allowed us achieve 24% and 31% lower PN emissions under the NEDC and WLTC, respectively. the higher oxygen content of the biodiesel (compared to diesel) allows one to achieve more complete combustion. Exhaust emissions of the WLTC are more sensitive to biodiesel-blended fuels than the NEDC.

**1.4 Methodology**

**2. LITERATURE REVIEW**

**M.Suresh et al [1]:** Researcher has reviewed and promulagated on the use of oils that are non-edible such as waste fried oil pyrolysis oil waste cooking oil, jatropha curcas etc.and there esters for the purpose of blending and complete substitution of for standard diesel fuel those oils were also found to suitable for biodiesel production under experimental condition,Using biodiesel as alternet fuel in diesel engines.Emission observations at various condition and study of other parameters.Engine performance is increased or decreased at various CR slightly as compare to standard diesel fuel engine

**M.M.Rahman et al [2]:** The biodiesel and diesel blend made with from different origins have bin reviewed to summarize the Properties of biodiesel-diesel blends and the effects on combustion characteristics engine perform- mance and emissions. Calorific value of blends is lower than that of diesel fuel Flashpoint is higher than those of diesel Peak cylinder gas pressure is slightly higher than that of ordinary diesel fuel Common problems identified like failure of fuel pump filter plugging and injector cooking.

**A. Devaraj et al [3]:** This paper has presented a detailed overview of castor oil, the properties of castor oil and its biodiesel, the performance, emission and combustion 1.Globle production is about 1.8 million ton per annual &recentlyit is used as high quality lubricant in chemical industry 2.methodology used seed collection.Drying and moisture Oil extraction techniques .Raw oil 3.Tranesterification process is used to prepare biodiesel 4.Castor oil biodiesel density is 10.6% higher than diesel .Calorific value is less than diesel 6.Flash point is higher it makes safer.

**S.JAYARAJ et al [4]:** This paper aims to evaluate the performance and exhaust emisions of a diesel engine using jatropha biodiesel blend by including nano additives.Nano additives such as CNTS,TIO2,AL2O3 are used for enchancing the fuel characteristics .Jatropha biodiesel blend with Al2O3 nano additive J20Al100 achieved performance parameters improvement. Jatropha biodiesel blend with CNTs nano additive achieved lower CO, smoke and NOx emissions.