E3S Web of Conferences **399**, 06003 (2023) https://doi.org/10.1051/e3sconf/202339906003
ICONNECT-2023

Investigate the emission characteristic of biodiesel from waste cooking oil

V. Rathinam[1], *K* Srinivasan[2], *M.* Prabhakaran[3], *P.* Munusamy[4], *B.* Radha Krishnan[5*]

[1]Assistant Professor, Department of Automobile Engineering, VNR Vignana Jyothi Institute of Engineering and Technology, Hyderabad, Telangana - 500090.
[2]Professor, Department of Mechanical Engineering, Adhiyamaan College of Engineering, Hosur - 635109,
[3]Professor, Department of Mechanical Engineering, Podhigai College of Engineering and Technology, Tirupattur, India.
[4]Assistant Professor, Department of Mechanical Engineering, Er. Perumal Manimegalai College of Engineering, Hosur,
[5]Associate Professor, Department of Mechanical Engineering, Nadar Saraswathi College of Engineering and Technology, Theni, India.

Abstract. This paper aims to investigate the emission characteristics of biodiesel prepared from the waste cooking oil. The characterization of the performance of the blended fuel in diesel engines results in an improvement and a reduction in hydrocarbon and carbon monoxide emissions. Various amounts of fuel were mixed with leftover cooking oil to create the final product. In order to explore the performance function, combustion range, and emission properties of diesel engines, the setup described here was developed. The combustion properties, including exhaust gas emissions of NOx, CO, CO2, HC, smoke, and O2, have been examined under various load scenarios.

1 Introduction

There are multiple reasons to consider biodiesel as an alternative fuel for internal combustion engines. Biodiesel offers several advantages over conventional fossil fuels. Due to its low carbon content, it is a promising alternative for diesel engines. By using biodiesel, we effectively recycle carbon in the atmosphere instead of releasing stored carbon. The carbon stored in plants during growth is released when biodiesel is burned, creating a positive energy balance. Energy balance is the ratio of energy stored in the fuel to the energy required for its growth, processing, and distribution. Biodiesel has an energy balance ratio ranging from 2.5 to 1, indicating a positive value. Additionally, biodiesel is environmentally friendly, easily degradable, and non-toxic. It degrades at a rate similar to sugar, with pure biodiesel degrading 85-90% in water within a month. Biodiesel can also aid in the breakdown and degradation of oil spills. It can be safely stored and handled, with similar requirements to traditional diesel storage, although containers made of tin, zinc, copper, and lead should be avoided. To ensure energy security, organized biodiesel storage

* Corresponding author: radhakrishnankrce@gmail.com