Production of Biodiesel from Waste Cooking Oil

Project Overview

- This project focuses on the production of biodiesel from waste cooking oil through the transesterification process. The produced biodiesel was analyzed and tested by blending it with conventional diesel to evaluate its properties and performance in a diesel engine.

Objectives

- To produce biodiesel from waste cooking oil.
- To analyze and test the engine performance using different blends of biodiesel.
- To assess the environmental and economic feasibility of using biodiesel as an alternative to fossil fuels.

Methodology

- **Collection of Waste Cooking Oil**: Waste cooking oil was collected and filtered to remove impurities.
- **Transesterification Process:** The filtered oil underwent transesterification using methanol and a base catalyst to produce biodiesel.
- **Purification:** The produced biodiesel was purified through water washing and gravity separation methods.
- **Blending:** The purified biodiesel was blended with conventional diesel in various proportions.
- **Testing and Analysis:** The biodiesel blends were tested for properties such as viscosity, flash point, density, and calorific value. Engine performance tests were conducted to evaluate fuel efficiency and emissions.

Key Results

- The produced biodiesel exhibited properties within the ASTM standards, making it a viable alternative to conventional diesel.
- Engine performance with biodiesel blends showed comparable results to diesel, with reduced emissions and improved lubricity.
- The project demonstrated the feasibility of using waste cooking oil as a feedstock for biodiesel production, offering an environmentally friendly solution to waste disposal and fossil fuel dependence.

Tools and Techniques

- **Chemical Process**: Transesterification, Esterification
- **Testing:** Viscosity, Flash Point, Density, Calorific Value, Engine Performance
- **Equipment:** Separating Funnel, Universal Testing Machine (UTM), Water Washing Apparatus

Supervisor

- Mr. Prem Shankar Yadav, Assistant Professor, Department of Mechanical Engineering, JSS Academy of Technical Education, Noida

Acknowledgments

We extend our gratitude to the Department of Mechanical Engineering, JSS Academy of Technical Education, Noida, for providing the resources and support necessary for this project. Special thanks to Mr. Prem Shankar Yadav for his guidance throughout the project.