PRODUCTION AND OPTIMISATION OF BIO-DIESEL FROM WASTE TEMPLE OIL

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ABSTRACT:
This study involves production of biodiesel from nonedible oil (Waste Temple Oil). And optimizing the same by varying the process parameters (temperature, time, methanol to oil ratio, catalyst concentration) to get the maximum yield. Due to the environmental problems caused by the use of fossil fuels, considerable attention has been made to biodiesel production as an alternative to petro-diesel. Indian refineries import over 80% of their crude oil feedstock which affects the Indian Foreign reserves. This weakens the value of Indian National Rupee (INR). Biodiesel is an eco-friendly, alternative diesel fuel prepared from domestic renewable resources i.e. produced from vegetable oils and animal fats. The general method to produce biodiesel is transesterification of oil with methanol in the presence of either base or strong acid catalysts. This work describes the fuel properties of biodiesel, production process (transesterification) and the most important variables that influence the transesterification reaction.

OBJECTIVES
1. To reduce the dependency on fossil fuels.
2. To produce biodiesel from waste temple oil using base catalyst.
3. To determine and compare various chemical properties for temple oil and Waste. Temple Methyl Ester (WTME) and neat diesel.
4. To optimise biodiesel by varying different parameters.
5. To help the growth of nations economy.
6. To reduce air pollution and hence, global warming.

PROJECT METHODOLOGY
The execution of the project occurs in five stages. The first stage involves literature reviews on the historical background of various biodiesels already in use in India and other parts of the world. The various available biodiesels in India were studied in brief. The second stage of the project involves selection of a suitable oil for the production of biodiesel. After a short survey involving various criteria, we have chosen waste temple oil as the suitable oil for production of biodiesel. The third stage involves determination of Free Fatty Acid (FFA) in the oil, based on the content of FFA in the oil, suitable process is chosen to convert it into biodiesel (single stage/double stage). The fourth stage involves the conversion of waste temple oil to biodiesel, and optimisation of waste temple oil biodiesel. The fifth stage involves the study of chemical and physical properties of waste temple oil biodiesel.

CONCLUSION:
The objective of this study was to characterize WTO, WTOB and how the properties changed when the oil is treated with varied parameters and also compare it with neat diesel oil.

Waste temple oil could be trans-esterified. A two-stage transesterification process has been studied which comprised of alkali transesterification and post treatment. The alkali catalyzed transesterification with 7gm of NaOH at 60±1 0C for 120 min at 03;10 methanol to oil ratio(w/w) this combination giving optimum reaction conditions for alkali transesterification of waste temple oil, followed by thrice gentle washing of the Bio-diesel with distilled water at 600C. The kinematic viscosity and specific gravity of the waste temple oil has reduced to a great extent by the
transesterification process and calorific value has slightly increased. The Bio-diesel obtained by means of this process (there is no un-reacted oil and glycerol) is suitable for use in direct injection diesel engines.

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