TO STUDY CHARACTERIZATION AND PERFORMANCE ANALYSIS OF DIFFERENT USED COOKING OIL (UCO) WITH SOLVENT BLENDS AS FUEL SOURCE IN IC ENGINES.

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Keywords:

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Introduction:

Current biodiesel is mainly produced by transesterification which is one out of four methods by which biodiesel can be produced. The other three methods are Micro-Emulsion, Thermal Cracking and Direct use or with blended solvents.

From literature survey of biodiesel production from other three methods, we have observed that transesterification is a tedious process requiring sophisticated equipment, Micro-Emulsion is very sensitive towards atmospheric conditions and require immense floor area and Thermal Cracking involves interference with dangerously high temperature levels to produce a good quality biodiesel. Hence In this project, blended solvent method is used and there has been no published work done particularly in this area previously. We are using used cooking oil as our primary oil source then it will be acid treated specifically with HCL followed by mixing with diesel and solvents.

Objectives:

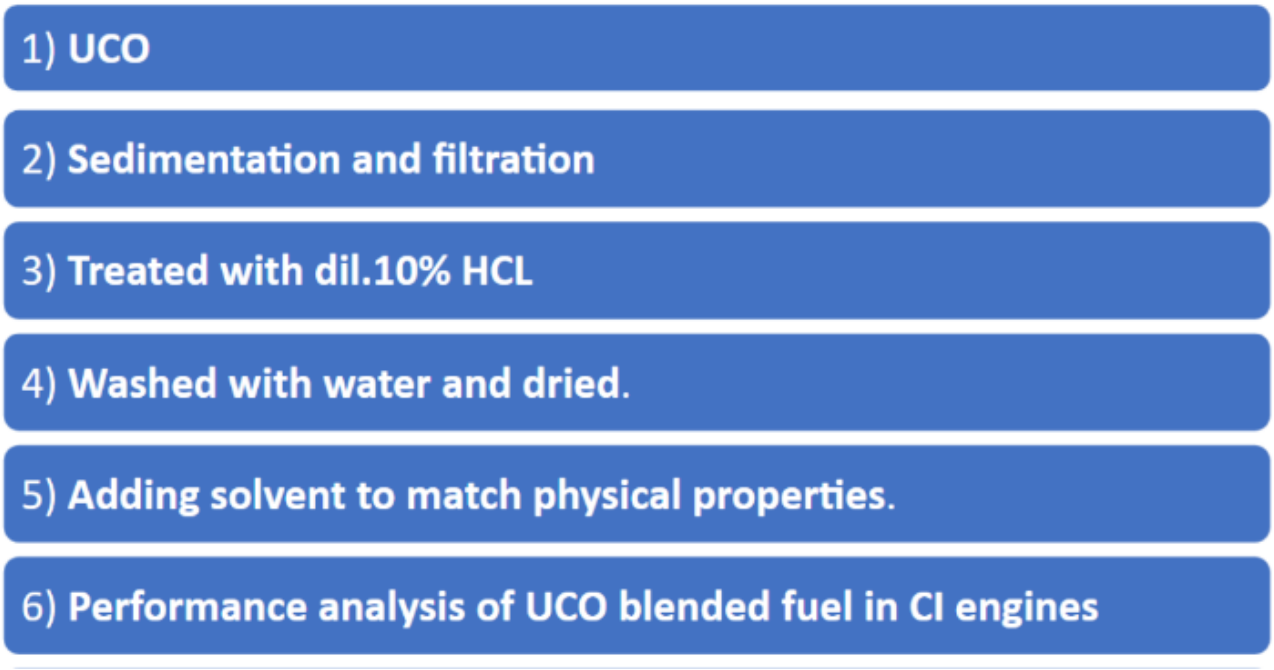
1. Studying the characteristics of used cooking oil (UCO) blended with different solvents
2. Analysing Properties of UCO blended with different solvents as per ASTM standards
3. To do the performance test of various ratios UCO blended with solvents in IC engines.
4. Emission test of various UCO blended with solvents.

Methodology:

In this method firstly the Used cooking oil (UCO) is collected from local hotels and it is allowed for the sedimentation process. Later the UCO oil is filtered and treated with dil.10% HCL. After treating with acid, the oil is washed with water and heated to 105 °C to remove moisture.

Further acid treated UCO is blended with Solvents and conventional diesel. The Blended UCO fuel is tested for physical properties as per ASTM standard 6571D. Blended fuel is subjected for performance analysis in IC engines. Further emission characteristics of UCO blends are observed.

FLOW CHART:



Conclusion:

Currently Engine Performance tests are conducting. Below is the data regarding physical properties of the samples prepared.

Sample	K.Viscosity – cSt	Flash point – °C	Fire point – °C
UCO	40.70	56	64
UCO + 2.5% Hexane	40.02	28	>35*
UCO + 5% Hexane	39.32	28	>35*
UCO + 10% Hexane	39.30	28	>35*
UCO + 2.5% Ethanol	40.53	44	56
UCO + 5% Ethanol	40.12	43	52

Sample	K.Viscosity – cSt	Flash point – °C	Fire point – °C
UCO	40.70	56	64
UCO + 10% Ethanol	39.94	41	51
B10 (UCO + 2.5% Hexane)	2.39	28	>35*
B10 (UCO + 5% Hexane)	2.17	28	>35*
B30 (UCO + 2.5% Hexane)	4.78	28	>35*
B30 (UCO + 5% Hexane)	4.39	28	>35*
B10 (UCO + 2.5% Ethanol)	3.01	34	50
B10 (UCO + 5% Ethanol)	2.07	31	45
B30 (UCO + 2.5% Ethanol)	5.55	38	49
B30 (UCO + 5% Ethanol)	5.02	36	46

(* For samples where Hexane is added as Solvent Flash point is well below room temperature and Fire point is arbitrary because Hexane evaporates at room temperature)

Scope for future work:

By segregating the input used cooking oil that is by separately taking different types of oils and studying the characters separately may lead to further detailed understanding of biodiesel produced by this method, which will help in further decentralisation of biodiesel production.