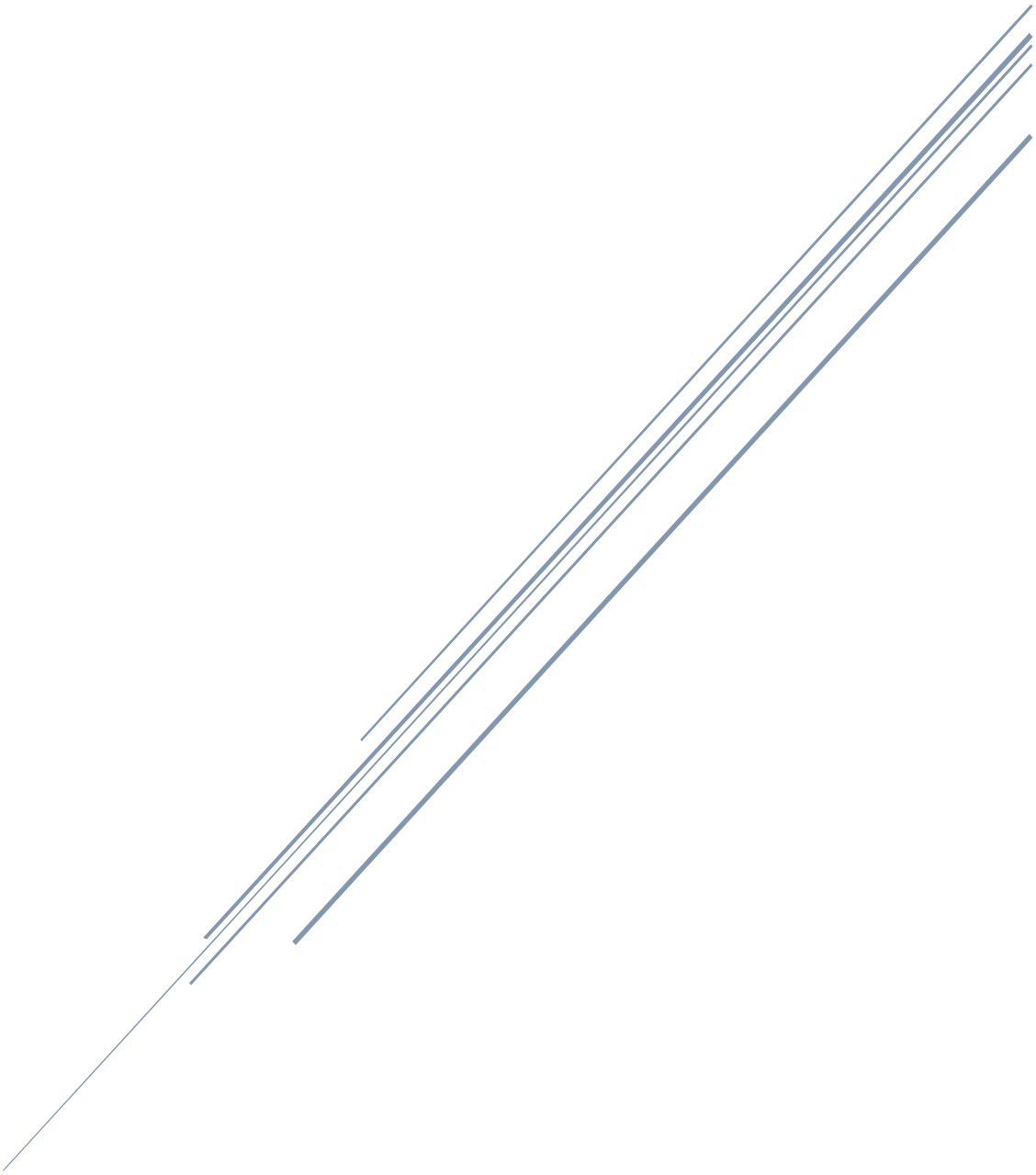
CHEMISTRY ASSIGNMENT

BIODISEL



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Engineering Chemistry Assignment

Biodiesel

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In this Document, we have discussed one of the most important substances that humans need in present days. Acceptance of this substance in their daily life is not only good for the human race but it is also good for the wellness of the world.

Keywords: Biofuel, biodiesel, bioliquid, Fuel efficiency.

List of abbreviation:

EIA = Energy Information Association

ASTM= American Society for Testing and Materials

EPA=Environment Protection Agency

RFS= Renewable Fuel Standards

Today Our environment is very polluted because of the combustion of the fossil fuels by motor vehicles. So, In order to reduce the pollution caused by this fossil fuels and to conserve them from the verge of extinction, We are in need if a better alternative.

Current Parameters: -

Our industries civilization greatly depends upon abundant, low-cost energy, which could be produced without any political intervention and suppression. Despite recent oil discoveries, in the areas such as the Gulf of the Mexico, The Tupi and the Guara fields off south east Brazil, Sudan, The Caspian Sea and in the artic regions are limited and are limited and nowadays no longer constituent cheap and reliable raw materials.

Energy policy: -

The world Economy depends only on the two Significant energy carriers, namely the hydrocarbons which includes of the natural gas, gasoline and diesel or the heating oil and the electrical current. Whereas the primary energy supply differs greatly from nation to nation, hydrocarbons are the main means of storing the

energy. At present the consumption of the energy is increasing globally which results the global high demand on the fossil fuels, as shown in the table below.

(*It includes of the Gasoline, Diesel, Aviation fuel, Marine bunker, Middle Distillates)

Energy Source	Developed countries	Developing countries
Biomass	3	35
Natural gas	24	7
Solid fuels	26	28
Crude Oil*	35	23
Hydropower	6	6
Nuclear	6	1

(Source**:** Biodiesel science and technology : From soil to oil by Bart,Jan C.)

Biofuel: -

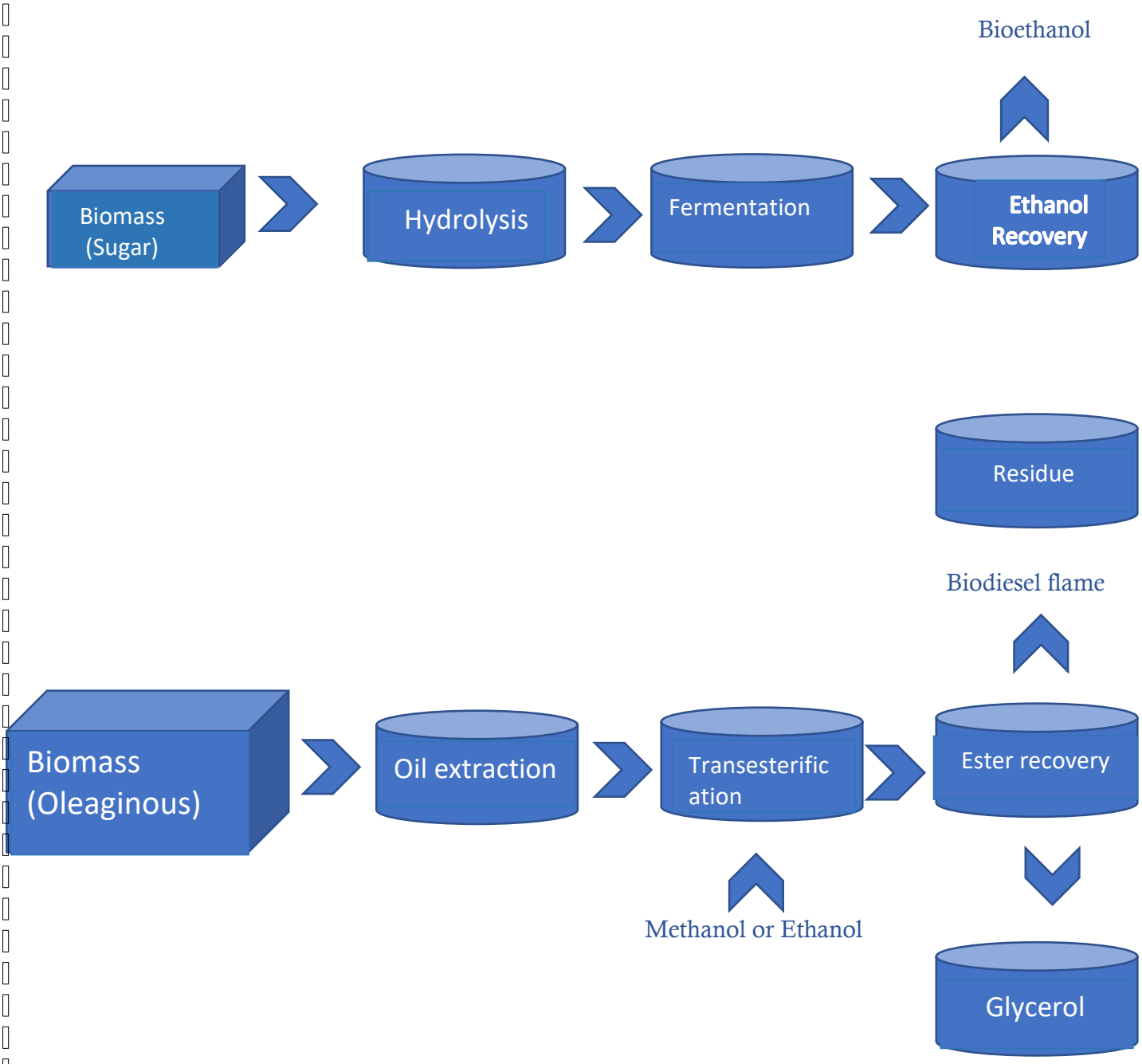
Biofuel is a fuel that is delivered throughout a brief time frame range from biomass, as opposed to by the exceptionally sluggish normal cycles engaged with the development of petroleum derivative, like oil. Since biomass can be utilized as a fuel straightforwardly (e.g., wood logs), certain individuals utilize the words biomass and biofuel reciprocally. Nonetheless, the word biofuel is generally held for fluid or vaporous powers utilized for transportation. The U.S EIA follows this naming practice

What is biodiesel?

Biodiesel is a type of diesel fuel got from plants or creatures and comprising of long-chain unsaturated fat esters. It is regularly made by synthetically responding lipids, for example, creature fat soya bean oil or another vegetable oil with a liquor, delivering a methyl, ethyl and propyl ester by the course of transesterification.

Not at all like the vegetable and waste oil used to fuel changed over diesel motors, biodiesel is a drop in biofuel, meaning it is viable with existing diesel motors and conveyance foundation. Nonetheless, it is normally mixed with peterodisel (regularly to under 10%) since most motors can't run on unadulterated Biodiesel without change. Biodiesel mixes can likewise be utilized as warming oil.

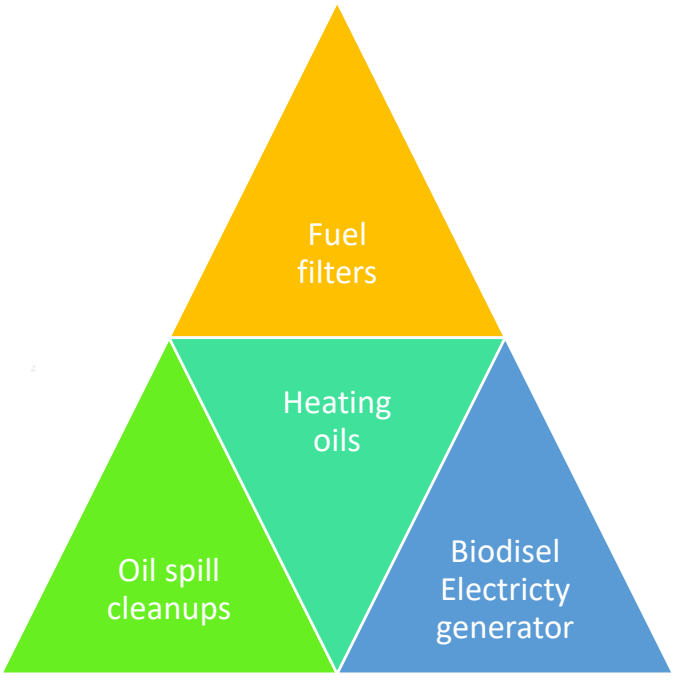
The US Normal Biodiesel Board characterizes "biodiesel" as a mono-alkyl ester.



Applications of biodiesel: -

Blends of 20% biodiesel and lower can be used in diesel equipment with no, or only minor modifications, although certain manufacturers do not extend warranty coverage if equipment is damaged by these blends. The B6 to B20 blends are covered by the ATSM specification. Biodiesel can also be used in its pure form (B100), but may require certain engine modifications to avoid maintenance and performance problems. Blending B100 with petroleum diesel may be accomplished by:

- Mixing in tanks at manufacturing point prior to delivery to tanker truck
- Splash mixing in the tanker truck (adding specific percentages of biodiesel and petroleum diesel)
- In-line mixing, two components arrive at tanker truck simultaneously.
- Metered pump mixing, petroleum diesel and biodiesel meters are set to multiply the total volume,

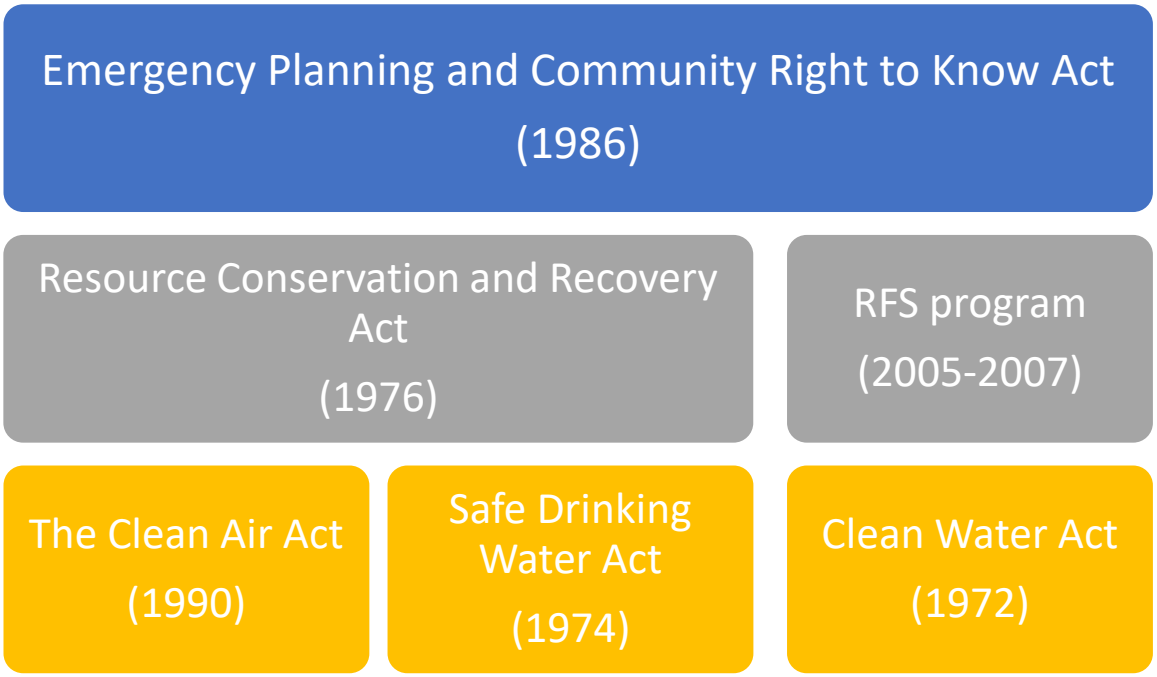


Biodiesel Regulation : -

The Environmental Protection Agency (EPA) has strict guidelines governing the Manufacturer and the distribution of the Biodiesel fuel. Energy manufacturers must adhere to various EPA regulations and seek clarification on various relevant environmental laws.

The EPA mandates compliance with the following acts and programs:

- Prevent, reduce, and eliminate pollution in the nation's water in order to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters".
- Maintains and directs drinking water quality standards.
- Reduce greenhouse gas emissions and expand the nation's renewable fuels sector while reducing reliance on imported oil.
- Safe and acceptable air quality for the entire nation.
- Control hazardous waste from cradle to grave.
- Help communities plan for chemical emergencies.



Methods involved in production of the biodiesel : -

The biodiesel production usually involves the following steps:

1. *Feedstock Pre-Treatment*

Most Feedstocks used in Biodiesel production are of low grade and contain impurities that reduce the catalyst efficiency in trans esterification and hence have to be pretreated.

2. *Transesterification And/or Acid Esterification*

This is the main reaction in biodiesel production which involves the conversion of the triglycerides and/or fatty acids into methyl esters. The conversion costs depend on yields, feedstock quality, choice of catalyst (Sodium Methoxide, Sulphuric acid or Enzyme), process routes, energy consumptions, etc.

(Image source: DVC process technologists)

3. *Glycerine Recovery*

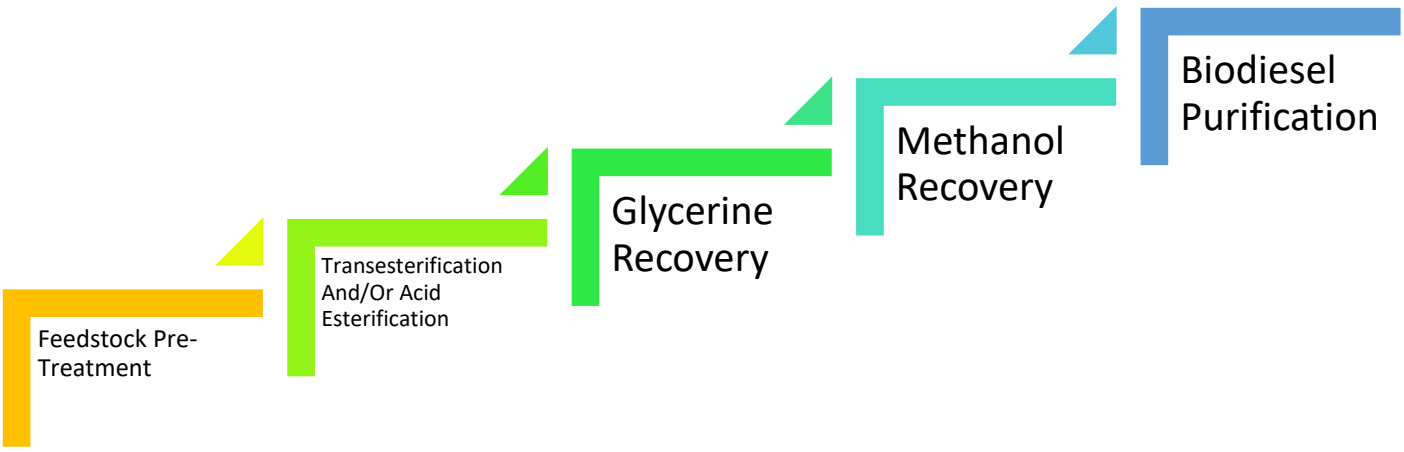
The glycerine obtained from biodiesel production must be further purified, concentrated & distilled to get technical grade or pharmaceutical grade of glycerine.

4. *Methanol Recovery*

The excess methanol from the various streams is recovered to be re-used again for the transesterification process.

5. Biodiesel Purification

Biodiesel Purification involves washing of the methyl ester phase and drying. For higher quality of biodiesel, methyl ester distillation may also be necessary.



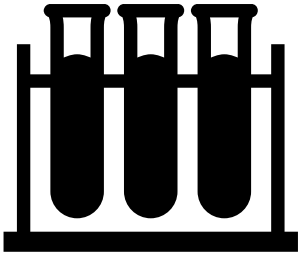
Drawbacks and disadvantages of Biofuel : -

- Not Suitable for the usage in Low Temperatures.
- Variation in the quality of the biodiesel.
- Biodiesel could harm the rubber houses of some of the engines.
- Biodieseel is way moreexpensive than petroleum.
- Causes food shortage in some parts of worlds.
- It will increase the usage of Fertilizers.

- Results in the clogging in the engine of automobiles.
- Some regions are not suitable for the construction or usage of the oil-producing plants.
- Pays a way for the shortage of Water.
- Usage of Petroleum-Diesel to produce Biodiesel.
- Increase in the nitrogen oxide emmision.
- Causes an acid rainfall.
- Due to high demand and easy yielding capacity the crops that is used in the production of the biodiesel will be cultivated by everyone and this will results in the shortage of a particular plant in a region and may also lead to extinction of the plant species itself from the world.

Conclusion : -

From the avove disscussed details it is evident that the biodiesel is a better alternative for Petroleum products in some cases and becomes a Hazard in some areas.This set of informations will be an eye-opener for those who want to knoe what biodiesel is ? and it causes & cosequenses.



Referance : -

1. Biodiesel science and technology : From soil to oil by Bart,Jan C.J
2. Wikipedia
3. Biodiesel Guide – Sources, Production, Uses, & Regulations by IFSolutions.com
4. DVC process technologists

Tabulated data source: Biodiesel science and technology : From soil to oil by Bart,Jan C.J