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Biofuels: Today's Need of Conventional Fuel Replacement

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ABSTRACT

A biofuel is a fuel that is produced through modern biological processes, such as agriculture and anaerobic digestion rather than a fuel produced by geological processes such as those involved in the formation of fossil fuel, such coal and petroleum from prehistoric biological matter. The biomass can be converted to convenient energy containing substances in three different ways: thermal conversion, chemical conversion, and biochemical conversion. This biomass conversion can result in fuel in solid, liquid or gases form. This new biomass can also be used directly for Biofuels.

Bioethanol is an alcohol made by fermentation mostly from carbohydrates produced in sugar or starch crops such as corn, sugarcane, or sweet sorghum. Cellulosic biomass derived from non-food sources. Ethanol production from sugarcane is currently the most attractive and alternative to fossil fuel a it achieves significant GHG emission reduction

The high cost of vegetable oils likely would push the biodiesel cost to over $1.00 per litre. Costs in a small plant would be about 10 % cents per litre higher than the tallow cost.

The current global scenario shows that our country deems very low percentage of utility and production, so it is challenge to our science and technology to build up utility and production of biofuel.

Keywords Biofuel, Bioethanol, Biomass, Biodiesel, Resources.

INTRODUCTION TO BIODIESEL

A biofuel is a fuel that is produced through modern biological processes, such as agriculture and anaerobic digestion rather than a fuel produced by geological processes such as those involved in the formation of fossil fuel, such coal and petroleum from prehistoric biological matter. biofuel can be derived directly from plant or indirectly from agricultural commercial domestic or industrial wastes [1]. Generally biofuel involve existing carbon fixation such as those that occur in microalgae through the process of photosynthesis. Biofuels are also made through the use or conversion of biomass (referring to recently living organism most often referring to plant or plant derived material). This biomass can be converted to convenient energy containing substances in three different ways: thermal conversion, chemical conversion, and biochemical conversion. This biomass conversion can result in fuel in solid, liquid or gases form. This new biomass can also be used directly for Biofuels.

Oil +alcohol → biodiesel + glycerine

Fig. 1. Biofuel separation.

Bioethanol is an alcohol made by fermentation mostly from carbohydrates produced in sugar or starch crops such as corn, sugarcane, or sweet sorghum. Cellulosic biomass derived from non-food sources, such as trees and grasses is also being developed as a feedstock for ethanol production. Ethanol can be use as a fuel for vehicles in its pure form, but it is usually widely use in USA and Brazil. Current plant designed does not provide for converting the lignin portion of plant raw material to fuel component by fermentation.

Biodiesel can be use for vehicle in its pure form, but it is usually used as a diesel additive to reduced level of particulate carbon monoxide and hydrocarbon from diesel powered vehicles. Biodiesel is produced from transesterification and is the most common biofuel in Europe.

NEED AND OBJECTIVES

As compared to India abroad foreign countries are being high biodiesel, biofuel as its major consumption of fuel for motorcorp, car's for transportation purpose. Majority in US rate of biofuel is 46% as compare to India very low percent.

The major drawback of conventional fuel like diesel, petrol is increases of carbon and it's unsaturated derivative results in air pollution which finally affect the mankind can also give birth to disease like lung cancer, Upper respiratory tract infection, Lower respiratory tract infection, Nasopharyngeal pneumonia. To overcome this type of disease and air pollution and finally to same biodiversity of nation, the very basic need is to use biofuel as a source of fuel.

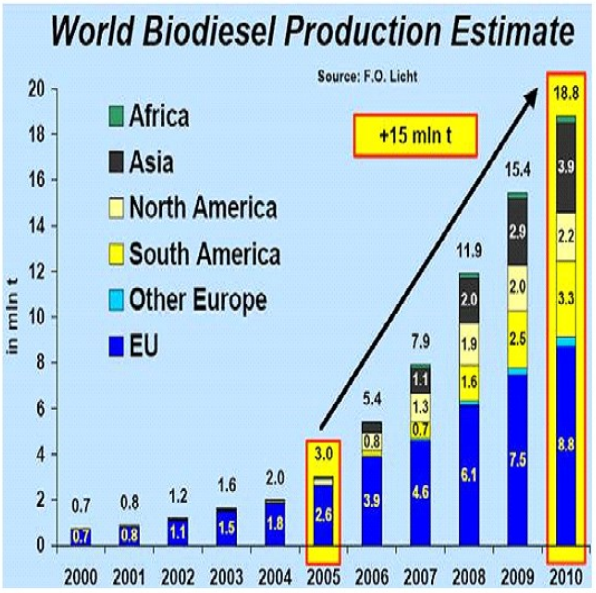


Fig. no. 2- The graph of world wise Biodiesel Production Estimation.[2]

NATURAL RESOURCES OF BIOMASS [3]

1. Sugarcane:

Ethanol production from sugarcane is currently the most attractive and alternative to fossil fuel a it achieves significant GHG emission reduction. It is obtained from renewable biomass sugarcane and biogases. Brazil and USA are the largest producers of ethanol from sugarcane with both countries according for about 86% of total Bioethanol production in 2010 in Brazil introduction of ethanol in automobiles reduced carbon monoxide emission from 50g/km in 1980 to 5.8g/k min 1995. The Brazilian economy has grown is sustainable biofuel production and consumption of ethanol.

2. Corn

The biggest biofuel in the United States right now, corn sometimes gets a bad wrap. Corn ethanol is more sustainable than petroleum, but it has been a centrepiece for debates on using agricultural crops for fuel. It's true that corn used for fuel is corn that could have been someone's dinner, but Runge explained that even once the corn oil has been extracted for ethanol, there is still a by-product of distiller corn that can be fed to animals. "It is taking food and putting it into fuel, but there is a by-product of doing that that still can go to animals. It's not one to one, but it's not all bad," Runge said. Even given the possible by-products it seems that corn is, at best, a short-term solution. Much like sugar cane, corn is one of the best options we have available now, but because the process is expensive and has high energy consumption rates, Runge felt it should be high on the list, but may fade from use over time.

3. Soy

Soy has been a popular biofuel for several years now. In a process called trans-esterification, producers squeeze the oil from seeds and use it in products such as biodiesel and jet fuel. It is a relatively easy and inexpensive rendering process, according to Runge. "You could make it in a bathtub if you really wanted to," Runge said. "I don't encourage it because there's methanol involved and methanol can make you blind. But it's very easy to do." As is the case with many agricultural crops, there is debate over the extent to which soy could be utilized. Crops like soybeans are dietary staples to many people, and researchers are reluctant to rely too heavily on traditional food crops as fuel sources. The seed oil that goes in a gas tank could have gone to someone's stomach, and it may prove difficult to say one destination is more valuable than the other. While soy is used widely, it is not as popular as corn or sugar cane, nor does it have the amount of resources that cellulose or algae provide. This makes it a short-term solution that deserves attention, but not a higher spot on the list.

4. Camelina and Jatropha

Camelina and Jatropha are both plant-based fuel sources that are found all over the world and are the up and comers for the biofuel revolution, according to Runge. These flowering plants have an advantage over other seed-based fuels like soy because they can be grown in very dry areas. Thus, they aren't diverting land that could be used for agriculture in the way soybeans are, and can be grown in a wider variety of places. While Jatropha has the added benefit of making even poor soil more fertile over time, Peter Taglia, a scientist with the renewable energy advocacy group Clean Wisconsin, still had some doubts about it and other feedstock fuels. If a fuel is successful, Taglia thinks it could expand beyond marginal land use, and this could create new problems. "If used on more fertile lands, and either displacing food crops or native ecosystems we are, perhaps, creating additional problems in our search to replace petroleum," Taglia said. Camelina and Jatropha both offer a lot of options that other feedstocks don't provide, but much of their potential has gone unrealized, leaving them in the middle of this biofuel countdown.

5. Animal Fat

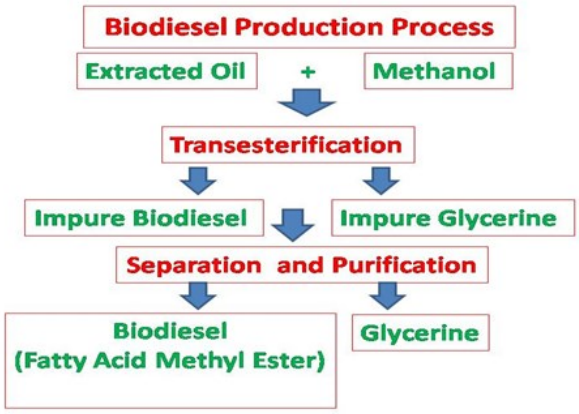
Pigs, chickens, and cows -- all are fairly common in everyday life, but they could have uncommon potential for biofuel. Leftover fat from animal food products can be rendered into oil and then used as a fuel for cars and trucks. It may seem like an odd source, but Taglia believes the benefits of animal fat are large. "Any time you can use something that was either going to a landfill or was going to be, and that's not necessarily the best use of it, then that's something we really want to be used efficiently to produce fuel," Taglia said. But gathering fat isn't as easy as picking it up from the landfill or your local fast food restaurant.

Animal fat is used in many industrial products, so there would be competition for resources. This combined with the natural limit on the resource means animal fat could never displace petroleum by itself, Taglia said, and this placesk animal fat low of the list of biofuels.

Table no.:The given table shows that the detailed agricultured biofuel potential in India[5]

Sr no.	Crop type	Oil yield potential '000l/ha
1	Micro algae	47.5 – 142.5
2	Oil palm	6.o
3	Corn	0.2
4	Rapeseed	1.2
5	Sunflower	1.0
6	Soya bean	0.5

METHOD OF PREPARATION OF BIOFUEL



How much does 1 Litre of biodiesel cost?

The high cost of vegetable oils likely would push the biodiesel cost to over $1.00 per litre. Costs in a small plant would be about 10 cents per litre higher than the tallow cost, although, when using waste cooking oil, this additional cost would be largely offset by the cheaper feedstock. •

What are some of the benefits of biodiesel?

It's safer to handle and has virtually the same energy efficiency as petroleum diesel. In addition it has lubricity benefits that fossil fuels do not. Biodiesel blends as low as B2 have been found to significantly reduce the amount of toxic carbon-based emissions.

ADVANTAGES OF BIOFUELS [4]

1. Cost Benefit: As of now, Biofuels cost the same in the market as gasoline does. However, the overall cost benefit of using them is much higher. They are cleaner fuels, which mean they produce fewer emissions on burning. Biofuels are adaptable to current engine designs and perform very well in most conditions. This keeps the engine running for longer, requires less maintenance and brings down overall pollution check costs. With the increased demand of Biofuels, they have a potential of becoming cheaper in future as well. So, the use of Biofuels will be less of a drain on the wallet.

2. Easy to Source: Gasoline is refined from crude oil, which happens to be a non-renewable resource. Although current reservoirs of gas will sustain for many years, they will end sometime in near future. Biofuels are made from many different sources such as manure, waste from crops and plants grown specifically for the fuel.

3. Renewable: Most of the fossil fuels will expire and end up in smoke one day. Since most of the sources like manure, corn, switchgrass, soya beans, waste from crops and plants are renewable and are not likely to run out any time soon, making the use of Biofuels efficient in nature. These crops can be replanted again and again.

4. Reduce Greenhouse Gases: Fossil fuels, when burnt, produce large amount of greenhouse gases i.e. carbon dioxide in the atmosphere. These greenhouse gases trap sunlight and cause planet to warm. The burning of coal and oil increases the temperature and causes global warming. To reduce the impact of greenhouse gases, people around the world are using biofuels. Studies suggest that Biofuels reduces greenhouse gases up to 65 percent.

5. Economic Security: Not every country has large reserves of crude oil. For them, having to import the oil puts a huge dent in the economy. If more people start shifting towards biofuels, a country can reduce its dependence on fossil fuels. More jobs will be created with a growing biofuel industry, which will keep our economy secure.

6. Reduce Dependence on Foreign Oil: While locally grown crops has reduce the nation's dependence on fossil fuels, many experts believe that it will take a long time to solve our energy needs. As prices of crude oil is touching sky high, we need some more alternative energy solutions to reduce our dependence on fossil fuels.

7. Lower Levels of Pollution: Since Biofuels can be made from renewable resources, they cause less pollution to the planet. However, that is not the only reason why the use of biofuels is being encouraged. They release lower levels of carbon dioxide and other emissions when burnt. Although the production of Biofuels creates carbon dioxide as a byproduct, it is frequently used to grow the plants that will be converted into the fuel. This allows it to become something close to a self sustaining system.

DISADVANTAGES OF BIOFUELS [4]

1. High Cost of Production: Even with all the benefits associated with Biofuels, they are quite expensive to produce in the current market. As of now, the interest and capital investment being put into biofuel production is fairly low but it can match demand. If the demand increases, then increasing the supply will be a long term operation, which will be quite expensive. Such a disadvantage is still preventing the use of Biofuels from becoming more popular.

2. Monoculture: Monoculture refers to practice of producing same crops year after year, rather than producing various crops through a farmer's fields over time. While, this might be economically attractive for farmers but growing same crop every year may deprive the soil of nutrients that are put back into the soil through crop rotation.

3. Use of Fertilizers: Biofuels are produced from crops and these crops need fertilizers to grow better. The downside of using fertilizers is that they can have harmful effects on surrounding environment and may cause water pollution. Fertilizers contain nitrogen and phosphorus. They can be washed away from soil to nearby lake, river or pond.

4. Shortage of Food: Biofuel are extracted from plants and crops that have high levels of sugar in them. However, most of these crops are also used as food crops. Even though waste material from plants can be used as raw material, the requirement for such food crops will still exist. It will take up agricultural space from other crops, which can create a number of problems. Even if it does not cause an acute shortage of food, it will definitely put pressure on the current growth of crops. One major worry being faced by people is that the growing use of Biofuels may just mean a rise in food prices as well.

CONCLUSION

On the basis of above study we have to conclude that the utility and production of biofuel in our country is very poor. All the required natural sources or biodiesel production are available in all over India e.g. Sugarcane, Soy, Corn, Animal fat but current global scenario shows that our production and utility is poor so it is challenge to our technology to build up production of biofuel and hence also utility. The major drawback of conventional fuel like petrol, diesel, gasoline is increase of various harmful disease and also air pollution, hence it required to control it to save biodiversity of nation, the very basic need is to use biofuel as a source of fuel.

Conflicts of interest: The authors stated that no conflicts of interest.

REFERENCES

1. Mukta M. Abhyankar , Supriya G. Jagtap, Textbook of Natural Drug Technology, Semester VII. Page no-10.32.
2. https://images.search.yahoo.com/yhs/search;_ylt=A86J77iHldaoQ4AngoPxQt.
3. https://w.w.w.seeker.com/top10_sources_for_biofule1769457447.html.
4. Juliet Ben lwo vasilde manovic Philip conghurst by renewable and sustainable energy Reviews, volume 63, sep.2016, page no- 172-192.
5. Aculom G, Purohit P, Fisher G, (2013), Second generation biofuel potential in India, sustainability concideration 8th edition, *conference on sustainable development of energy, water and environment system, Dubrovnik Croatia, Dubrovnik Neretva.*