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USE OF BIOFUELS TO CONTROL POLLUTION IN AUTOMOBILES

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ABSTRACT: The world is presently suffering with the twin crises of fossil fuel depletion and environmental degradation. With costs of oil and coal rising, and crude imports growing, India is facing a huge energy crisis. Where does India's energy come from, and where does it go? If we are to reduce demand, boost efficiency and design small-scale, decentralized energy options, we must incorporate the consumer in decision-making The search for alternative fuels to reduce dependence on petroleum and emission of pollutants into the atmosphere has stimulated many scientific studies. The goal is to develop fuels that can be used in existing vehicles without the need for major changes in their engines. A term often used for fuel derived from renewable sources is 'biofuel', which has strong links with the concept of sustainability, whereby the use of natural resources to meet current needs should not compromise the needs of future generations.

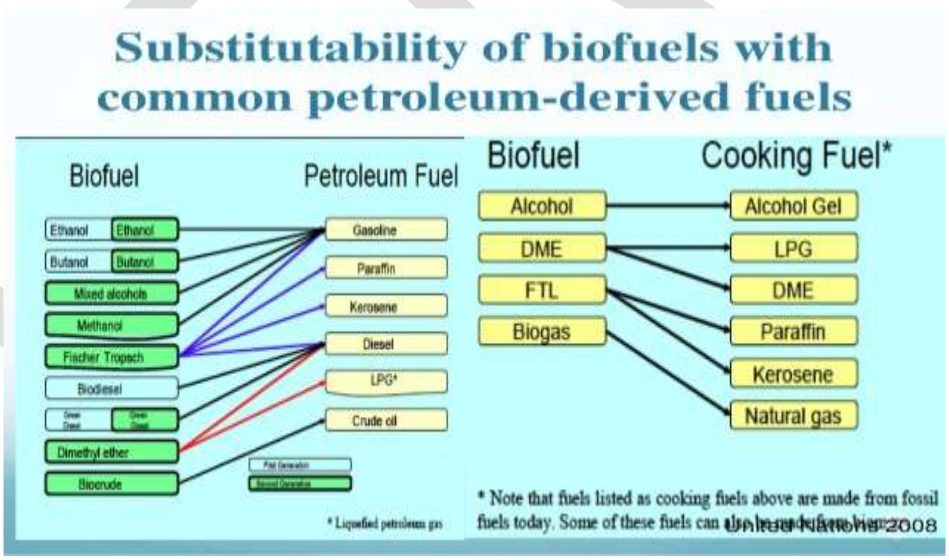
Keywords- Agricultural wastes, Biofuel, Environmental sustainability, Pollution

I. INTRODUCTION

The beginning of the 21st Century marks a change in the composition of transportation fuels, where biofuels, in addition to gasoline and diesel, power our cars. Biofuels are a liquid substitute to gasoline and diesel and are produced from biomass using dispersed production units located in oil-importing countries (e.g., the United States, Brazil, and Europe).[1] Gasoline and diesel are liquid fuels produced from crude oil whose extraction capacity is concentrated in the Organization of the Petroleum Exporting Countries (OPEC).[2] The biofuels produced from the renewable resources could help to minimize the fossil fuel burning and CO 2 production. Biofuels produced from biomass such as plants or organic waste could help to reduce both the world's dependence on oil and CO2 production. These biofuels have the potential to cut CO2 emission because the plants they are made from use CO2 as they grow. Biofuels and bioproducts produced from plant biomass would mitigate global warming.

II. BIOFUEL

All biofuels and bio-based products come from "biomass", a term that covers all living or recently living biological material which can be used as fuel or for industrial production. The term biofuel is referred to as solid, liquid or gaseous fuels that are predominantly produced from biorenewable or combustible renewable feedstocks. Liquid biofuels are important for the future because they replace petroleum fuels. The biggest difference between biofuels and petroleum feedstocks is oxygen content. Biofuels are non polluting, locally available, accessible, sustainable and are a reliable fuel obtained from renewable sources.



III. RAW MATERIALS

Crop Residues

Crops such as corn, wheat, and rice consist not just of the grains we eat or feed to livestock but also of stalks, husks, cobs, and other biomass unsuitable as direct human food. These residues generally account for about half of the total biomass in grown crops And because they are a by-product of today's primary crops, such residues can be used to produce energy without expanding the amount of land agriculture.

3.2 Wastes from Livestock

Livestock raised in very large confined animal feeding operations (CAFOs) produce nearly unmanageable concentrations of manure, which can be used for bioenergy, but also regularly pollute water supplies in many parts of the country. Fortunately, on the smaller end of the livestock production scale, farmers can use anaerobic digesters to convert manure into biogas while reaping economic and environmental benefit.

IV. TYPES OF BIOFUEL.

4.1 First-generation biofuels

The most well-known first-generation biofuel is ethanol made by fermenting sugar extracted from sugar cane or sugar beets, or sugar extracted from starch contained in maize kernels or other starch-laden crops. Similar processing, but with different fermentation organisms, can yield another alcohol, butanol. Commercialization efforts for butanol are ongoing [4], while ethanol is already a well-established industry. Global production of first-generation bio-ethanol in 2006 was about 51 billion litres [5], with Brazil (from sugar cane) and the United States (from maize) each contributing about 18 billion litres, or 35 per cent of the total. China and India contributed 11 per cent to global ethanol production in 2006, and production levels were much lower in other countries (Figure 3), with feedstocks that include cane, corn, and several other sugar or starch crops (sugar beets, wheat, potatoes). Many countries are expanding or contemplating expanding their first-generation ethanol production, with Brazil and the United States having by far the largest expansion plans. Ethanol production is expected to more than double between now and 2013 in Brazil [6], and production capacity in the United States will double from the 2006 level once new plants currently under construction are completed.

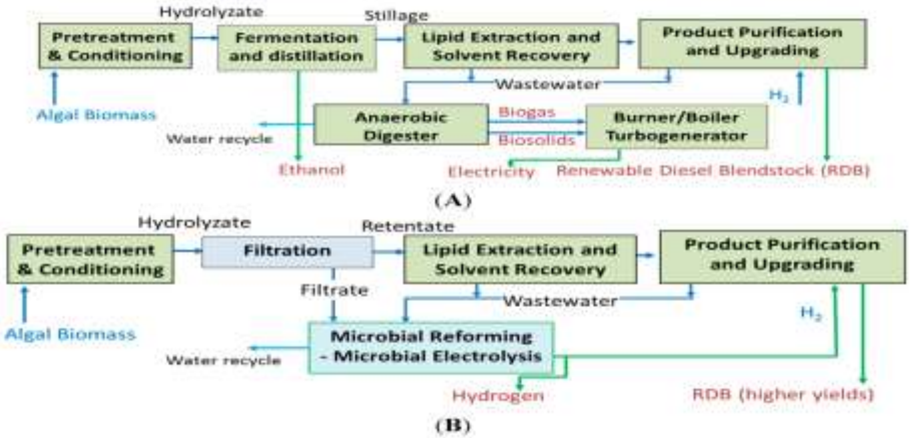
- **Biodiesel**
- **Bioethanol**
- **Butanol**
- **Methanol**

Table 2. First-generation biofuels

Pros	Cons
• Simple and well-known production methods	•High-cost feedstocks lead to high-cost production (except Brazilian sugar cane ethanol)
• Scalable to smaller production capacities	• Fungibility with existing petroleum-derived fuels
• Experience with commercial production and use in several countries	• Feedstocks compete directly with crops grown for food
• High-cost feedstocks lead to high-cost production (except Brazilian sugar cane ethanol)	• Low land-use efficiency

4.2 Second-generation biofuels

Second-generation biofuels share the feature of being produced from lignocellulosic biomass, enabling the use of lower-cost, non-edible feedstocks, thereby limiting direct food vs. fuel competition. Second-generation biofuels can be further classified in terms of the process used to convert the biomass to fuel: biochemical or thermochemical. Second-generation ethanol or butanol would be made via biochemical processing, while all other second-generation fuels discussed here would be made via thermo chemical processing. Second-generation thermochemical biofuels may be less familiar to most readers than second-generation ethanol, because there are no first-generation analogs. On the other hand, many second-generation thermochemical fuels are fuels that are already being made commercially from fossil fuels using processing steps that in some cases are identical to those that would be used for biofuel production (Figure 6).



4.3 Third-generation biofuels

Production of third-generation biofuels (mainly from algae) is still at the research and development stage. The most accepted definition of third-generation biofuels is 'fuels that are produced from algae-derived biomasses. This has a very distinctive growth yield compared with classical lignocellulosic biomass. Algae-based fuels are likely to play an important role in third-generation biofuel production, as they are considered a sustainable feedstock for biofuels and bioproducts from biorefineries.

V. BENEFITS OVERVIEW

Benefits Of Biodiesel Production

Cleaner Environment: Biodiesel is proven to Reduce Dangerous Emissions, Which Contribute to Climate Change: Biodiesel is the only alternative fuel to voluntarily perform EPA Tier I and Tier II testing to quantify emission characteristics and health effects. That study found that B20 (20% biodiesel blended with 80% conventional diesel fuel) reduced total hydrocarbons by up to 30%, Carbon Monoxide up to 20%, and total particulate matter up to 15%. =Pure biodiesel does not contain sulfur and therefore reduces sulfur dioxide exhaust from diesel engines to virtually zero. Biofuels, when blended with conventional fuels, reduce air pollutant emissions such as sulfur, particulates, carbon monoxide and hydrocarbons.

Health Benefits:

Biodiesel is Safer for People to Breathe: Research conducted in the US shows Biodiesel emissions have decreased levels of all target polycyclic aromatic hydrocarbons (PAH) and nitrated PAH compounds, as compared to petroleum diesel exhaust. PAH and nPAH compounds have been identified as potential cancer causing compounds. Targeted PAH compounds were reduced by 75 to 85 percent, with the exception of benzo(a)anthracene, which was reduced by roughly 50 percent. Target nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene reduced by 90 percent, and the rest of the nPAH compounds reduced to only trace levels. All of these reductions are due to the fact the Biodiesel fuel contains no aromatic compounds.

National Security:

Biodiesel Reduces our Dependence on Foreign Oil: Biodiesel can play a major role in expanding domestic refining capacity and reducing our reliance on foreign oil. The 500 million gallons of biodiesel produced in the U.S. in 2007 displaced 20 million barrels of petroleum, and increased production and use of biodiesel will further displace foreign oil. In addition, biodiesel is an extremely efficient fuel that creates 5.54 units of energy for every unit of fuel that is required to produce the fuel.

VI. CONCLUSIONS

Biofuels are promoted in many parts of the world and concern of environmental and social problems have grown due to increased production of this fuels. Production of biofuels promises substantial improvement in air quality through reducing emission from burning of the fuel used in vehicle engines. Some of the developing countries have started biofuel production and utilization as transport fuel in local market.

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