# How Much Viable Is Bio Fuel

Amid the much hype being created about this alternative fuel, sceptics are asking if it will be promoted at the cost of edible oils.

For many years now, many environmentalists and energy experts have been projecting bio-fuel as an ideal solution for the energy crunch and environmental pollution bedeviling the overcrowded and overheated planet Earth. Further, it has been considered a sound option to beat the relentless surge in global crude oil prices.

Indeed, with the crude prices hovering around US$ 100 a barrel, there has been growing demand for bio-fuel in virtually every part of the world. A study by the Washington-based World Watch Institute says that bio-fuel, such as ethanol and bio-diesel, can significantly reduce global dependence on crude oil.

On the other hand, the massive surge in vegetable oil prices in India has been attributed to the growing diversion of edible oil varieties to produce bio-fuel. India has traditionally been a oilseed-deficit country and the production of oilseeds has not been keeping pace with the growing demand. This implies that Indias import of vegetable oil would go up in the years ahead.

As imports meet more than 66% of Indias vegetable oil requirement, there is a concern that the import bill could touch Rs 20,000 crore in 2008- 09. As it is, prices of soya bean oil, rapeseed oil and palm oil in the global market have shot through the roof in recent months.

A letter from Solvent Extractors Association of India to the Government of India drives home the point that, even if the entire quantity of vegetable oil available in the world is converted into bio-fuel, it will meet only around 3% of the total fuel requirement. At the same time, withdrawal of around 5%-10% of vegetable oil varieties for non edible use could seriously impact its price as well as availability.

Arecent United Nations Conference on Trade and Development (UNCTAD) has expressed concern over the competing use of land for the production of food, animal feed and bio-fuels. For instance, corn cultivation in the USA, mainly aimed at the bio-fuel sector, has taken away a portion of the land that was hitherto under cultivation of soya bean.

According to UNCTAD, there is every possibility of bio-fuel cropcultivation causing deforestation, water scarcity and eco disruption. As such, UNCTAD is of view that a possible solution lies in going in for tropical oil-yielding plants, such as jatropha and pongamia, which can easily be raised on degraded land stretches.

However, though jatropha cultivation in certain pockets of India is picking up, farmers in general are far from happy about raising these oilbearing plants since the period of planting to maturity is around 4 years. The farmers are also sceptical of getting assured buyers for the crops.

Of course, many bio-diesel production facilities being set up in various part of India have come out with the promise of buying the oil-bearing seeds at a remunerative price. In fact, many Indian entrepreneurs are investing on bio-diesel extraction plants with an eye on the booming European bio-fuel market.

The massive demand for biodiesel in Europe is being attributed to the policy of blending bio-diesel with crude in various countries. Manufacturers in India can hope to earn at least $ 200 per ton more from exporting their product to Europe rather than sell it to the oil companies in India, for blending with diesel, says an industry spokesman.

However, across the world, everything is not hunky-dory for bio-diesel producers. Even in the USA, the worlds leading ethanol producer, in spite of generous subsidies by the Government, returns are not attractive to the producers due to high cost of operations and low ethanol prices.

The principle fuel used as a petrol substitute for road transport vehicles is bioethanol. Bioethanol fuel is mainly produced by the sugar fermentation process, although it can also be manufactured by the chemical process of reacting ethylene with steam.

The main sources of sugar required to produce ethanol come from fuel or energy crops. These crops are grown specifically for energy use and include corn, maize and wheat crops, waste straw, willow and popular trees, sawdust, reed canary grass, cord grasses, jerusalem artichoke, myscanthus and sorghum plants. There is also ongoing research and development into the use of municipal solid wastes to produce ethanol fuel.

Ethanol or ethyl alcohol ($C_2H_5OH$) is a clear colourless liquid, it is biodegradable, low in toxicity and causes little environmental pollution if spilt. Ethanol burns to produce carbon dioxide and water.

Ethanol is a high octane fuel and has replaced lead as an octane enhancer in petrol. By blending ethanol with gasoline we can also oxygenate the fuel mixture so it burns more completely and reduces polluting emissions. Ethanol fuel blends are widely sold in the United States.

The most common blend is 10% ethanol and 90% petrol (E10). Vehicle engines require no modifications to run on E10 and vehicle warranties are unaffected also. Only flexible fuel vehicles can run on up to 85% ethanol and 15% petrol blends (E85).

Ethanol can be produced from biomass by the hydrolysis and sugar fermentation processes. Biomass wastes contain a complex mixture of carbohydrate polymers from the plant cell walls known as cellulose, hemi cellulose and lignin.

In order to produce sugars from the biomass, the biomass is pre-treated with acids or enzymes in order to reduce the size of the feedstock and to open up the plant structure. The cellulose and the hemi cellulose portions are broken down (hydrolysed) by enzymes or dilute acids into sucrose sugar that is then fermented into ethanol.

The lignin which is also present in the biomass is normally used as a fuel for the ethanol production plants boilers. There are three principle methods of extracting sugars from biomass. These are concentrated acid hydrolysis, dilute acid hydrolysis and enzymatic hydrolysis.

Blending bioethanol with petrol will help extend the life of the UKs diminishing oil supplies and ensure greater fuel security, avoiding heavy reliance on oil producing nations. By encouraging bioethanols use, the rural economy would also receive a boost from growing the necessary crops.

Bioethanol is also biodegradable and far less toxic that fossil fuels. In addition, by using bioethanol in older engines can help reduce the amount of carbon monoxide produced by the vehicle thus improving air quality. Another advantage of bioethanol is the ease with which it can be easily integrated into the existing road transport fuel system.

In quantities up to 5%, bioethanol can be blended with conventional fuel without the need of engine modifications. Bioethanol is produced using familiar methods, such as fermentation, and it can be distributed using the same petrol forecourts and transportation systems as before.

## About the Author

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