

clean burning alternative fuel



Biodiesel Technology



BioDiesel Fuel - Growing a new energy economy.

A biodegradable and eco-friendly product, biodiesel fuel provides one answer to future fossil fuel shortages.

Devastating long-term ill-effects of limited fossil fuel reserves, industrial & automotive emissions and greenhouse gases have focused the attention of policy makers and others throughout the world to search for alternative energy sources.

Chemically speaking, biodiesel is the methyl ester of long chain fatty acids derived from vegetable oils and animal fats. It can be used in compression ignition engines (diesel engines) directly, the engine needing minor or no modifications.



SUPER™ BIODIESEL

TECHNOLOGY FROM JATRODIESEL, USA (SUPER CRITICAL TECHNOLOGY)

JatroDiesel's SUPER™ process is a patented single stage, catalyst free, supercritical process technology that will process feedstock with free fatty acid (FFA) up to 100% with minimal or no loss in yield, and completely eliminates the use of a catalyst such as Sulfuric Acid, Sodium Methylate or heterogeneous catalyst (solid or enzymatic). This provides a substantial savings.

In the SUPER™ (supercritical) process both esterification and transesterification are combined into a single stage and operates under high pressure and temperature. This method eliminates the usage of any catalyst. The SUPER™ process can handle feedstock with FFA up to 100% by weight.

Advantages of Super Biodiesel :

- ✧ No Catalyst is required.
- ✧ 25% to 32% savings on production cost compared to the Traditional process.
- ✧ Feedstock flexibility to blend oils with FFA up to 100% by weight.
- ✧ >98% biodiesel yield vs. Traditional plants with 89% to 96% biodiesel yields.
- ✧ Single stage reaction instead of multiple stages in a Traditional plant.
- ✧ Glycerin purity of greater than 95% by weight yields a high value than glycerin from Traditional plants.
- ✧ No soaps ever generated in the Transesterification reaction which is a labor cost issue for Traditional plants.
- ✧ Wet methanol can be used, a moisture tolerant reaction.
- ✧ Smaller footprint.
- ✧ Fast reaction rates, less than a minute.



biodegradable

low emission

higher engine efficiency

eco friendly

clean fuel

safest fuel

Fenix Technology for Biodiesel :

Fenix biodiesel process uses trans-esterification reaction followed by neutralization and washing steps. The two-step trans-esterification converts nearly 100 percent of the triglycerides in the oil or fat to biodiesel (methyl ester). The excess methanol is recovered, and the biodiesel dried in the same step. Finally, the biodiesel is filtered to remove potential impurities formed below the process temperature. In essence, the steps are, trans-esterification, washing, drying and polishing.

Glycerine Recovery

Water Recovery

Feedstock Quality

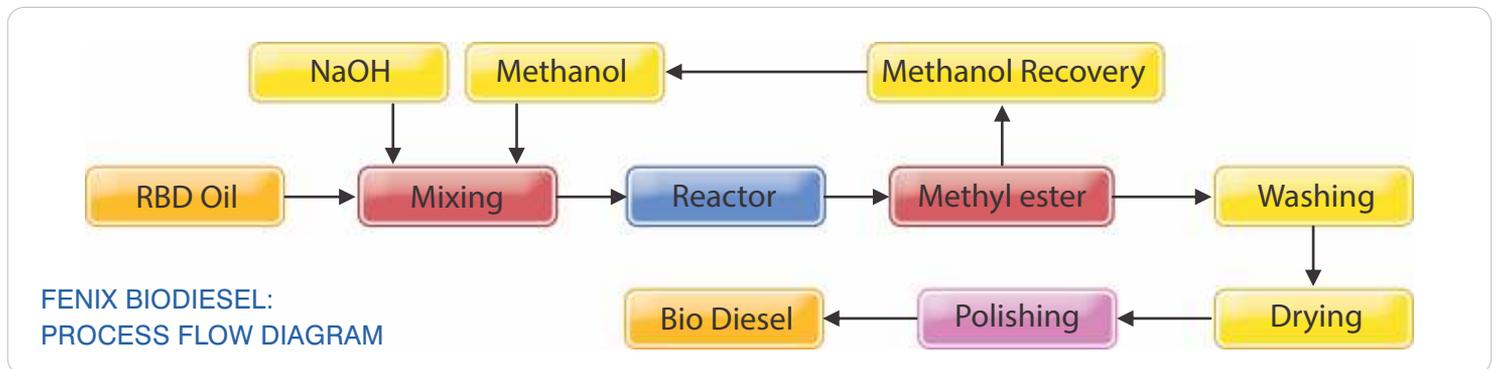
Fatty Matter Recovery

Methanol Recovery

Biodiesel Distillation

Advantages of Biodiesel Over Petrodiesel :

- ✧ Less dependence on limited fossil fuel reserves
- ✧ Improved ignition
- ✧ Higher engine efficiency
- ✧ Better lubricity
- ✧ Much lower greenhouse gas emission
- ✧ Lower particulate emission
- ✧ Not toxic, free of sulphur
- ✧ Safest fuel to store and handle
- ✧ Much higher flash point
- ✧ No aromatics or carcinogens
- ✧ Biodegradable



Raw Material for Biodiesel Production :

Biodiesel can be commercially produced from various sources (edible as well as non-edible oil seeds, dead wood and leaves, agri-wastes, food processing wastes – both kitchen and industry, etc.). Oil seeds are the most important, abundantly available and low-cost raw material.



Different regions of the world do not have the benefit of possessing the same vegetable oil or animal fat in plentiful supply. Thus raw materials for biodiesel production have become geographically region-specific. Palm oil seeds in Malaysia, animal fats in Japan, soybean seeds and animal fats in the US, canola seeds in Canada and rapeseed and animal fats in Europe are examples. India has taken up Jatropha [Jatropha curcas] seeds as the major raw material. The plant may yield more than four times as much fuel per hectare as soybean, and more than ten times that of maize (corn). One crop of jatropha from a hectare produces about 1890 litres of biodiesel.

The Fenix - Shutek Process for Biodiesel:

Fenix has **exclusive technology collaboration** with M/s Shutek Oleo S A of Costa Rica for Biodiesel.

Shutek Oleo has developed its unique process which meets all international quality standards parameters at optimal cost of operation. The Shutek process is cost wise very competitive. The process consists of the following steps which guarantee maximum yield and better quality.

- Feed preparation
- Catalyst preparation
- Trans-esterification (Batch/Continuous)
- Separation of Glycerols
- Continuous countercurrent washing of ester
- Vacuum drying
- Filtration
- Methanol recovery and rectification
- Vent scrubbing
- Glycerine purification

Advantages of Shutek Process

1. Zero effluent & Zero emission of gases - environment friendly
2. Built in accordance to API standards - increased safety
3. 100% Methanol recovery - lower operating cost
4. Continuous Glycerin separation - increased yield
5. Flexibility for batch and continuous operation
6. More than 98 % conversion
7. Incorporated heat recovery system - lower energy consumption
8. Advance process control with high degree of instrumentation - increased reliability
9. Vertical start of the plant, operator friendly layout - short project duration
10. Cost competitive with best quality product – comparatively low capital investment
11. Multi feed stock
12. Can handle any level of FFA



A FENIX-SHUTEK BIODIESEL PLANT COMMISSIONED BY US

www.fenix.in



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