

## Use of Jatropha Oil

For lighting



For cooking



In engines



For soap making



Other uses



Chemical composition of the oil	Properties of the oil

### Jatropha Oil in Comparison with Diesel Fuel

Parameter	Diesel	Jatropha Oil
Energy content (MJ/kg)	42.6 - 45.0	39.6 - 41.8
Spec. weight (15/40 °C)	0.84 - 0.85	0.91 - 0.92
Solidifying point (°C)	-14.0	2.0
Flash point (°C)	80	110 - 240
Cetane value	47.8	51.0
Sulphur (%)	1.0 - 1.2	0.13

## Jatropha oil for lighting



Different persons & organisations made efforts to develop lamps for plant oil.

The Jatropha lamp of "The Binga Trees Project" in Zimbabwe  
is the simplest and most appropriate solution so far!



	now on field test in Guatemala	<ul style="list-style-type: none"> <li>• <a href="#">Short description (with pictures) of the plant oil cooker (2002) as pdf-file for downloading</a></li> </ul>
<b>Other links to plant oil burners / cookers:</b>		
<a href="#"><u>Babington Oil Burner for WVO (waste vegetable oil)</u></a>	<a href="#"><u>Multi Fuel Burner</u></a>	<a href="#"><u>Manolo WVO Burner (waste vegetable oil)</u></a>

# Plant Oil Engines

**Test of plant oil as fuel  
and lubrication oil in an  
Indian type engine  
(Fieldmarshal) -  
Summary, (pdf-file 21 kb)**

**Why plant oil as fuel makes  
sense !**

**Frequently asked  
Questions !**

The concept of using plant oil as fuel is not new. Already Rudolf Diesel, the inventor of the Diesel engine, used plant oil to run his first diesel engine in 1895. Rudolf Diesel demonstrated his new engine with peanut oil at the World Exhibition 1900 in Paris.

During the following years both, the engines and the fuel, made a development towards optimisation. So at present we have a big variety of modern Diesel engines, well optimised to use the standard diesel fuel.

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**see list of 7 parameters to compare SVO with BD for use as fuel**

Efforts to replace the fossil fuel diesel by plant oil as a renewable fuel started after the two energy crises in the Years 1973 and 1978. These efforts resulted in two different ways:

**Modification of the engine to run  
on plant oil**

**Elsbett Technology**

**Vereinigte Werkstätten für  
Pflanzenöltechnologie**

**Rapsmarketing (only German)**

**Project in India**

**Modification of the plant oil to be used  
by unmodified diesel engines**

**Information on biodiesel on this  
website**

**Information on biodiesel  
by Journey to Forever**

The efforts to create an special plant oil engine did not succeed in the mass production of such an engine. The Elsbett engine, which runs perfectly with plant oil, was opposed by the big car and engine manufacturers.

<a href="#"><u>Indian Type Lister Engines</u></a>	<a href="#"><u>Elsbett Technology</u></a>	<a href="#"><u>Running cars on pure plant oil</u></a> Folkecenter Denmark	<a href="#"><u>Conversion of Car Engines</u></a>	<a href="#"><u>Further Links</u></a> Link list Folkecenter Denmark
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*bagani*



**An Indian diesel engine of RCAC run with Jatropha oil**



**An Indian diesel engine of RCAC run with Jatropha oil**

## Village Electrification Using Jatropha curcas Oil

by Carl Bielenberg,

The Better World Workshop, RFD 1,

Marshfield, Vermont 05658, USA

published in the BWW-newsletter Nr. 5, summer 1998



Jatropha curcas oil, powering conventional small diesel generators, provides a low cost method of providing electricity for illumination to thousands of African villages. This practice complements the use of wood-fired power plants and hydroelectric power for grid electrification, serving large cities and secondary towns. Jatropha curcas oil is a more expensive energy source than wood, but is economical for the small amounts of electricity required for village electrification. Small autonomous village electrification projects can be implemented at a small fraction of the cost required to extend grid electrification to rural areas.

The efficiency of the diesel generator and wood-fired power plant is very similar; roughly 20 to 25% of the energy in the fuel is converted to electricity. A diesel generator consumes roughly 0.4 liters (0.36 kg) of Jatropha curcas oil per kilowatt-hour of electricity produced. At a price \$0.50 per liter, currently practiced in Senegal, the energy cost per kilowatt-hour is \$0.20. By comparison, a wood-fired power station uses 1 kg of air dried wood per kilowatt-hour, though at a cost of only \$40 per ton (\$0.04 per kg); this gives an energy cost of \$0.04 per kilowatt-hour. Costing five times as much as wood, Jatropha curcas oil is clearly uneconomic for large scale power generation, just as it cannot compete with wood as fuel for cooking. Its important niches are for small stationary diesel engines, where fuel consumption is modest, and for transportation, where wood is at best an inconvenient fuel.

The affordability of village electrification based on Jatropha curcas oil depends on the efficiency with which the electricity is distributed and used. We envision distribution within a small radius, probably no more than 500 meters, from a centrally located generator. While inexpensive aluminium and even steel fence wire may be used for distribution because of the short distances and low amperages, the wire should be properly sized to keep distribution loss below 10%. The European standard 220 volt 50 hertz service gives lower line loss than U.S. 110 volt service, and can be used for village scale electrification, avoiding the need for expensive transformers.

The capital cost of village electrification can be reduced by using a single engine to power the village generator (alternator) and cereal mill. The engine would be placed between the two loads so that the transmission belts can be moved from the mill to the alternator or vice-versa. A more could drive the mill or alternator. This would allow continual service while one engine undergoes maintenance. It is not advisable to use electricity from the alternator to drive the mill via electric motor because the combined losses of the alternator and motor would increase fuel consumption for milling by about 25%. This would require a more powerful engine and alternator. In the case of larger village electrification systems, the alternator capacity would be substantially larger than the load of the village cereal mill (5 to 8 kilowatt) and electricity may be needed during the daytime for refrigeration and

... and electricity may be needed during the day time for irrigation and other purposes.

Village electricity users will use the same 20 and 40 watt florescent tubes as their urban counterparts, having probably less than 100 watts of lamps per family. Assuming that three hours of light are provided per day, a family would use : roughly 10 kilowatt-hours of electricity per month, requiring four litres of *Jatropha curcas* oil at a cost of \$2.00. Poorer families would use less than half this much energy. Families would be billed according to the total wattage of their installed lamps and appliances, on the assumption that these would be used continuously for the duration of electric service. This would avoid the high cost of metering each household. Such a system could be operated by existing village governance, on the basis of popular consent and arbitration.

Village electrification is almost non-existent in most African countries, and villagers often respond to the idea with incredulity or skepticism, believing that rural incomes are too low to support the 1 costs. On the other hand, when asked whether the use of electricity would improve their quality of life, villagers almost uniformly believe it would. Village women in particular mention the difficulty of cooking and caring for their children after dark, particularly during the rainy season, when they are busy in the fields during the day. While many villages will not be able to afford the capital cost of electrification, those that have cash crops like coffee, cocoa, or cotton are in a good position to do so. The production of electricity from a locally grown fuel is essential to its long-term affordability, and provides income to farmers who grow *Jatropha curcas* seed, who extract oil from the seed, or who use the seed cake to fertilize their crops.

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