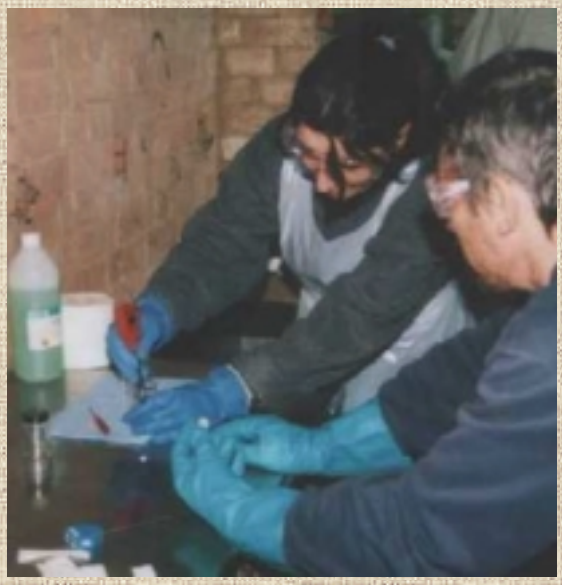
low-impact living initiative

LILI

LILI information sheet
biodiesel

what is biodiesel?

Biodiesel is a biofuel – that is, a renewable source of energy made from plants. It is very much like diesel that is used in cars, buses and lorries, but instead of being drilled from under the ground it is made from plant oils such as peanut, sunflower or rape seed – in fact any plant oil can be made into biodiesel. It can also be made from waste cooking oil. Scientists who have tested biodiesel in vehicles have found it to be cleaner burning than normal diesel with only a very slight loss in range (how far a vehicle can go on a full tank) of 3-5%. No engine conversion is necessary, so you can use it in any vehicle with a diesel engine and mix it in any ratio with normal diesel. Biodiesel can also be used as a heating fuel.



titration: *Participants on a LILI 'How to Make Biodiesel' course carry out a titration test to calculate how much catalyst to use to make biodiesel from this batch of waste cooking oil*

why is it good for the environment?

Climate change: use of biofuels can help to slow down global warming. Most scientists now agree that the earth's temperature is rising much faster than would naturally occur, because of human activity. Even a small rise in average temperatures could melt polar ice caps and raise sea levels, increase the rate of desertification and soil erosion, threaten the habitat of species such as the polar bear, and cause human misery due to famine and flooding. A major cause of global warming is the build-up of greenhouse gases in the atmosphere, which allow the short-wave radiation from the sun to pass through the atmosphere, but absorb the long-wave radiation reflected back from the earth, preventing the heat from escaping. The most important greenhouse gas is carbon dioxide (CO_2), which is emitted by the burning of fossil fuels such as petrol, diesel, gas and coal. Burning biodiesel also emits CO_2, but this is offset by the fact that the crop used to produce it uses CO_2 from the atmosphere to grow. For this reason, biofuels are often called 'carbon neutral'.

However, there is one drawback. There is not enough land to grow crops to replace all diesel with biodiesel. It has been estimated that for Russia to replace all its diesel use with biodiesel, it would have to use 7% of its land to grow the crops needed – a huge land area, but feasible. However, this figure

biodiesel is a biofuel, *made from plant oils, not fossil fuels. Biofuel crops absorb the carbon dioxide emitted when biofuels are burnt*

ingredients and by-products: *clockwise from left – wash-water, glycerine, finished biodiesel, potassium hydroxide, methanol*

rises to 30% in the USA, and over 100% in the UK. Biofuels will have to be used in combination with fossil fuels, and with other renewables as fossil fuels run out.

Emissions: other pollutants, such as nitrous oxides, alkanes, carbon monoxide (CO) and particulates are also reduced, and with a catalytic converter, and an alteration to the engine timing, can be reduced even further. Sulphur is almost completely eliminated. As well as being good for the atmosphere, this can increase operator safety on vehicles such as waste collection trucks, and the smell is much more pleasant than with conventional diesel vehicles. Also, biodiesel is more lubricating than mineral diesel, and so increases engine life

Waste reduction: it can reduce waste by recycling used oil. (100,000 tonnes of waste cooking oil are produced each year in the UK).

Spills: it reduces the risk of oil spills from tankers. Small spills and leaks from vehicles are harmless, as it is biodegradable.

what can I do?

Buying biodiesel: biodiesel is not yet available at most petrol stations, it can however, be bought in bulk by farmers and transport companies. The tax on biodiesel was reduced by 20 pence per litre as of April 2002. The government hopes that this reduction will encourage the use of biodiesel on a larger scale.

Making Biodiesel: biodiesel can be made on the home or farm scale. You can buy used cooking oil cheaply as well as the other chemicals that are needed, and make biodiesel in a simple reactor – an oil drum for instance. Oil is mixed with alcohol and potassium hydroxide (KOH), which acts as a catalyst. When the mixture settles the biodiesel is poured off the top, leaving a layer of glycerine (which can be used to make soap and other useful products). The biodiesel must then be very finely filtered and de-watered. If you make biodiesel you have a responsibility to declare the usage to Customs and Excise and to pay tax to them.

Extreme care must be taken when making biodiesel, as the process requires the use of potentially hazardous materials.

resources

- Joshua Tickell (2000): *From the Fryer to the Fuel Tank,* Tickell Energy Consulting, Tallahassee, Florida. (Copies can be ordered from Bookmasters, PO Box 388, Ashland, OH, 44805, USA. email – order@bookmaster.com)
- www.veggievan.org - a mine of biodiesel information
- www.journeytoforever.org - biofuels library - tons of info on biofuels and many other alternative technologies
- see the links page of *LILI's* website for many more biodiesel websites
- *LILI* run residential weekend courses on how to make biodiesel. Visit our website or contact us for more details.

Contact us to find out more about **LILI**. We run a range of residential weekend courses on practical environmental topics, and install facilities directly. For an annual subscription of £10 you can become a 'Friend of **LILI'**, and receive our biannual newsletter, discounts on our literature and courses, and help us to make a difference.

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