biodiesel

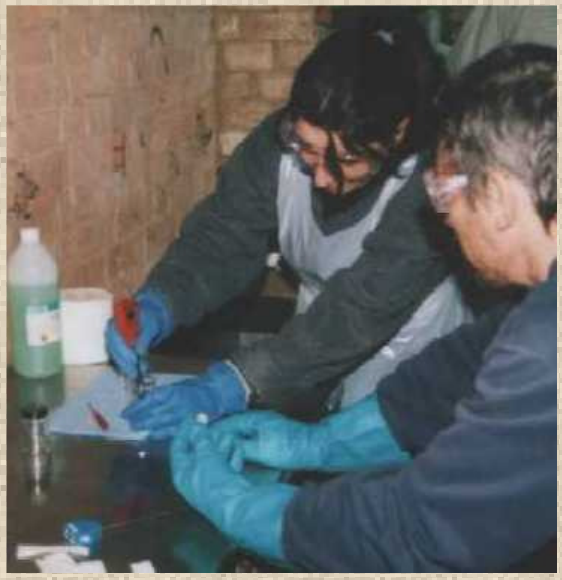
what is it?

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 be made perfectly well 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; either neat, or in a mix with mineral diesel. Biodiesel can also be used for generators, boats, or as a heating fuel.

what are the benefits?

LILI is only interested in biodiesel made from used cooking oil. We don't think it's a good idea to take up more land to grow crops for vehicles when there are so many people who don't have enough food, and there is so much pressure on natural habitats. Some companies are now producing biodiesel from palm oil grown in huge plantations in West Africa or SE Asia. We think that biodiesel from these sources is at least as environmentally damaging as mineral diesel, and probably more so. For more information on this, see Biofuel Watch. This of course means that we are not advocating a wholesale change to biodiesel for all the world's diesel vehicles, as there's nowhere near enough waste cooking oil. But it's something that can be done on a small scale, using a locally-produced waste product. Ultimately, we need to find ways to reduce our fuel use - more efficient vehicles, car sharing, cycling, public transport, working from home and holidaying without flying.

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

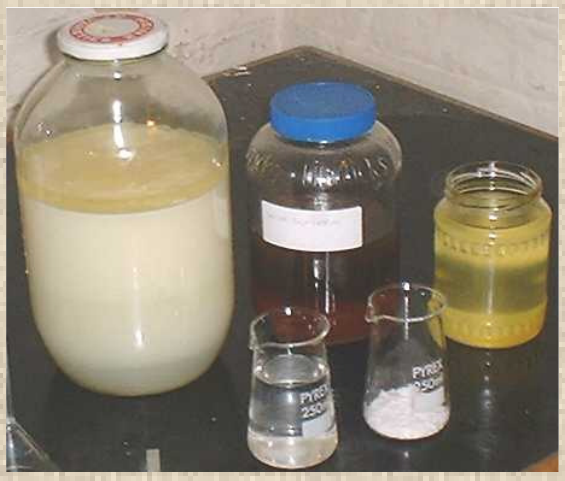


titration: *participants on a LILI 'How to Make Biodiesel' course carry out a titration test to calculate how much catalyst to use to make biodiesel from this batch of waste cooking oil*

climate change: 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 it comes from plants, and plants use CO_2 from the atmosphere to grow.

emissions: other pollutants, such as alkanes, carbon monoxide (CO) and particulates are also reduced; only nitrous oxides may stay the same or increase, but can be reduced with a catalytic converter, and / or by altering the engine timing. 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).



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

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

energy balance: biodiesel has an energy balance of 3:1, i.e. it provides 3 times the amount of energy used to produce it. (1:1 for mineral diesel).

what can I do?

You can buy biodiesel, or make it - either on your own, or you can club together with friends to buy or build a processor. We recommend using 100% biodiesel in the summer, and a 50:50 blend with mineral diesel in the winter. As biodiesel is a strong solvent, you need to change your fuel filter after the first 500-1000 miles after using biodiesel for the first time, as it could remove material from the walls of your fuel tank and deposit it in the fuel filter. This should only happen once though.

buying biodiesel

Biodiesel is not available at most petrol stations; it can, however, be delivered in IBCs (see LILI's website). Also, Biodiesel Filling Stations (resources) list places to buy biodiesel.

making biodiesel

Biodiesel can be made on the home or farm scale. You can buy used cooking oil cheaply (or get it for free from local restaurants) as well as the other chemicals required, and make biodiesel in a simple processor. An off-the-shelf home processor might cost a few thousand pounds, but if you are at all handy, it's possible to make one with a couple of oil drums, a pump, filter, copper pipe and plumbing fittings. Oil is mixed with alcohol and a catalyst - potassium hydroxide (KOH). 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 HM Revenue & Customs and to pay duty to them. The duty on biodiesel was reduced by 20 pence per litre in April 2002. The government hoped that this reduction will encourage the use of biodiesel on a larger scale.

NB: the duty was removed completely for small producers (2500 litres or less per year) from 30 June 2007, and also, medium-sized producers now have to send in returns quarterly instead of monthly.

LILI run a course on making biodiesel, and information will be provided on building your own biodiesel processor.

Extreme care must be taken when making biodiesel, as the process requires the use of potentially hazardous materials. Methanol and the other chemicals required to make biodiesel can be obtained from Trinity Research (see below). They also have a free glycerol disposal service.

resources

- LILI run a residential weekend course on how to make biodiesel
- *How to Make Biodiesel* – book from LILI
- Joshua Tickell, 2000, *From the Fryer to the Fuel Tank* – also from LILI
- veggievan.org - a mine of useful biodiesel information
- journeytoforever.org - biofuels library - tons of info on biofuels and other technologies
- Trinity Research - trinity-research.co.uk, 01925 594083, methanol, plus glycerine disposal
- Biodiesel Filling Stations – list of suppliers biodieselfillingstations.co.uk
- LILI provide biodiesel from waste oil in IBCs
- Biofuel Watch - biofuelwatch.org.uk, campaigning against palm oil for biofuels etc.
- see the links page of LILI's website for many more biodiesel websites

Contact us or visit our website to find out more about our message, networks, factsheets, books, courses, products, services, magazines, links, forum, events and volunteering on organic farms. You can also become a Friend of LILI, receive our e-newsletter, and help us change the world.

Low-impact Living Initiative (LILI), Redfield Community, Winslow, Bucks, MK18 3LZ
tel: +44 (0)1296 714184 email: lili@lowimpact.org web: lowimpact.org
Registered in England. Company Ltd. by Guarantee no: 420502