



How environmentally friendly are biofuels?

The idea of using biofuels from renewable sources is attractive as biofuels could help reduce greenhouse gas emissions and our dependency on fossil fuels. However, a new study which looked at the full life-cycle of biofuels shows that, depending on the type and source of biofuel, the benefits and environmental impacts can vary considerably. The results highlight differences that could help inform policymakers considering tax-breaks for renewable fuels.

Biofuels are currently the most important form of renewable energy in road transportation, but the debate over their environmental impact is ongoing. Some argue that when cultivation, including deforestation and soil acidification, is taken into account, biofuels consume more energy than they produce.

The researchers from the Swiss Federal Institute for Materials Science and Technology have provided, for the first time, a complete picture of the environmental costs and benefits of 26 different biofuels, which could help resolve this debate.

The study analysed the full life-cycle of each of the 26 fuels, from crop cultivation, to waste substance and consumption as fuel. It provides a detailed comparison of the environmental impacts of petrol, diesel and natural gas with different biofuels from a wide variety of crops.

The damaging effects of each biofuel were calculated using two different criteria: greenhouse-gas emissions relative to gasoline, and overall environmental impact (including natural resource depletion, damage to human health and ecosystems). The authors found that most (21 out of 26) biofuels reduce greenhouse emissions by 30 per cent compared with than fossil fuels. However, nearly half of the biofuels have greater environmental costs than petrol.

The fuels which showed the greatest reductions in greenhouse gases (over 50 per cent) when compared with fossil fuels were biodiesel made from waste cooking oil and methanol and methane derived from wood. These fuels, plus bioethanol made from whey, also performed very well when taking into account their full environmental impact.

The least environmentally friendly biofuels were biodiesel made from Brazilian soy, and bioethanol made from potatoes, rye and soy. These all had low reductions in greenhouse gas emissions and high negative environmental impact.

The authors write that Governments must be selective about which biofuel crops they choose to support through subsidies, and tax breaks must promote the best production paths.

Additional information: Biodiesel made from specially selected waste vegetable oil fuelled a quarter of buses in Valencia, Spain, under the project ECOBUS. ECOBUS is co-financed by the European Union under its LIFE programme. For more information see the [project summary](#), [layman's report](#) and [project website](#).

Source: R Zah, H Boni, M Gauch *et al* (2007). Empa report. Life cycle assessment of energy products: environmental assessment of biofuels. Executive summary available from: http://www.bfe.admin.ch/themen/00490/00496/index.html?lang=de&dossier_id=01273.

Additional sources: Ökobilanz von Energieprodukten: Ökologische Bewertung von Biotreibstoffen (in German) can be downloaded from <http://www.news-service.admin.ch/NSBSubscriber/message/attachments/8514.pdf>.

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