Biodiesel: how much pollution does it really produce?

Biodiesel, made from partially renewable sources of oil such as soy, rapeseed or waste cooking oil, has been heralded as an environmentally-friendly alternative to petroleum-derived diesel. It can be used in diesel engines without any engine modification and past studies have shown biodiesel to be less polluting than petroleum-derived diesel. However, new research has shown that the quality of the biodiesel used as fuel has a significant impact on emissions. The researchers call for more stringent testing of biofuels and stress the importance of using good quality fuel.

Petroleum diesel engines are heavily polluting. They emit nitrogen oxides and particulate matter that are harmful to human health. There are serious concerns especially over children exposed to exhaust pollutants. Previous studies of engines fuelled by biodiesel, on the other hand, have suggested that biodiesel produces less carbon monoxide, hydrocarbons and particulate matter.

Studies that show an advantage for biofuels, however, do not simulate real driving conditions. The tests are generally performed in the controlled environments of laboratories, run on single engines with high quality fuel and in unrealistic conditions. Researchers from the Desert Research Institute, Nevada, USA performed an on-the-road study showing that it is not possible to predict levels of pollution solely from laboratory studies.

The researchers monitored 200 school buses in the winter of 2004. They measured both gas and particulate matter emissions close to where the school bus depot was located. During the first phase of the experiment conducted in January, the buses ran on petroleum diesel. The emissions were measured again in March when the vehicles switched to a 20 per cent biodiesel blend.

The real-world conditions yielded unexpected results. After the switch from petroleum to biodiesel, bus exhaust particulate emissions jumped by a factor of 1.8. Carbon monoxide and hydrocarbon emissions from the vehicles were also higher.

However, the authors point out that the buses were running on poor quality biofuel which did not comply with official US standards. They found high concentrations of free glycerine in the fuel, a sign of poor quality arising from improper production procedures.

These findings stress the importance of stringent quality testing in biofuel production. Additionally, the introduction of new biofuels will not necessarily translate into air quality benefits while fuel standards remain poor and compliance to fuel quality standards is not strictly enforced.


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