Environmental Benefits

Emissions

Biodiesel is the only alternative fuel to voluntarily perform EPA Tier I and Tier II testing to quantify emission characteristics and health effects. That study found that B20 (20% biodiesel blended with 80% conventional diesel fuel) reduced total hydrocarbons by up to 30%, Carbon Monoxide up to 20%, and total particulate matter up to 15%. Typically, emissions of nitrogen oxides are slightly increased with B100 depending on the duty cycle of the engine and testing methods used however biodiesel blends of 20 percent and lower have no measurable NOx increase compared to US EPA approved diesel fuel. Research also documents the fact that the ozone forming potential of the hydrocarbon emissions of pure biodiesel is nearly 50% less than that of petroleum fuel. Pure biodiesel does not contain sulfur and therefore reduces sulfur dioxide exhaust from diesel engines to virtually zero.

Biodiesel can also help meet national goals for the net reduction of atmospheric carbon. As a renewable fuel derived from organic materials, biodiesel and blends of biodiesel reduce the net amount of carbon dioxide in the biosphere. Lifecycle CO2 emissions are 76-86 percent lower compared to 2005 baseline petroleum in a well-to-wheels lifecycle analysis. This methodology was used by the US EPA to set thresholds in the Renewable Fuel Standard and includes penalties for indirect land use change. More recently, the University of Idaho and USDA used the same methodology and updated the numbers to reflect more recent data. Carbon dioxide is “taken up” by the annual production of crops such as soybeans and then released when vegetable oil based biodiesel is combusted. This makes biodiesel the best technology currently available for heavy-duty diesel applications to reduce atmospheric carbon.

Health Effects

Biodiesel is safer for people to breathe. Research conducted in the US shows biodiesel emissions have decreased levels of all target polycyclic aromatic hydrocarbons (PAH) and nitrited PAH compounds, as compared to petroleum diesel exhaust. PAH and nPAH compounds have been identified as potential cancer causing compounds. Targeted PAH compounds were reduced by 75 to 85 percent, with the exception of benzo(a)anthracene, which was reduced by roughly 50 percent. Target nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene reduced by 90 percent, and the rest of the nPAH compounds reduced to only trace levels. All of these reductions are due to the fact the biodiesel fuel contains no aromatic compounds.

Energy Balance

Biodiesel helps preserve and protect natural resources. For every one unit of energy needed to produce biodiesel, 5.5 units of energy are gained. Because of this high energy balance and since it is domestically produced, biodiesel use can greatly contribute to domestic energy security.

Biodegradability and Toxicity

Biodiesel is nontoxic and biodegradable. Tests sponsored by the United States Department of Agriculture confirm that biodiesel is ten times less toxic than table salt and biodegrades as fast as dextrose (a test sugar).