

Biofuels and What You Should Know

First, Second and Third Generation Fuels



What are Biofuels?

Biofuels are transportation liquids made from renewable biomass material (living or recently dead plants)- includes alcohols, and biodiesel.

What are they made from?

First Generation (Fuel from food crops): Corn, soybeans, canola oil, fryer grease, and coconut oil.

Second Generation (Fuel from non-food products): Corn cobs, corn stover (stocks and leaves of the plant), and grass straw.

Third Generation (Advanced Technology): Algae and other microorganisms (this technology is still being developed).



How are they Used?

First Generation: Fuels from food crops

(ie. Biodiesel from canola oil, ethanol from corn)

Second Generation: Fuels from non-food sources

(ie. Cellulosic bioethanol [alcohol from plant waste materials])

Third Generation: Fuels from genetically modified microorganisms

(ie. Algae)

FAQs

Q: Can I use biofuels in my engine?

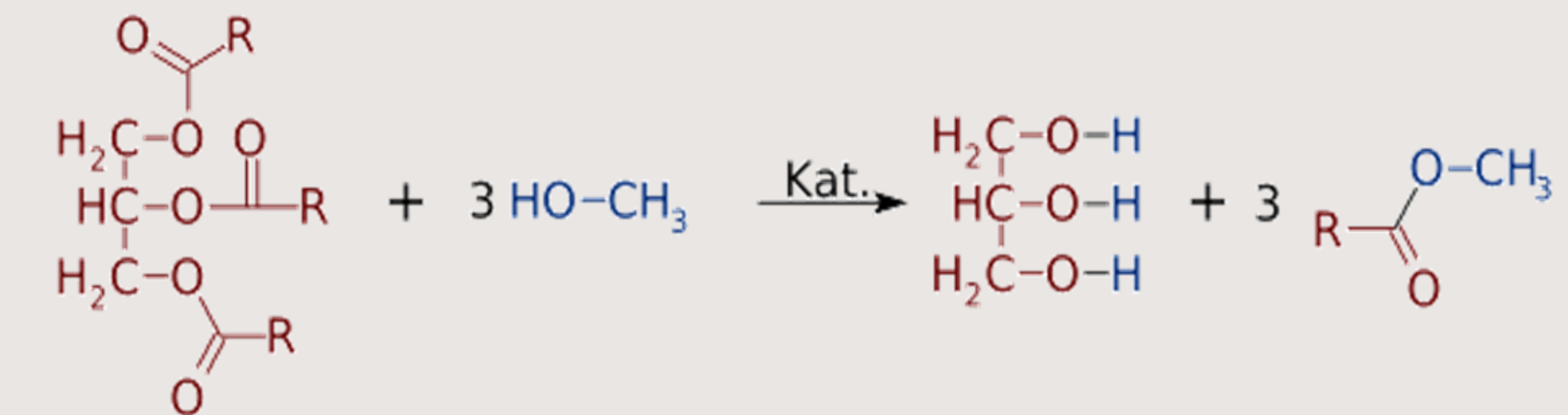
A: Biodiesel will run fine in a diesel engine. It burns cleaner and combusts more quickly than normal diesel fuel. Ethanol/Gas blends require a conversion kit that generally sells for about \$200-\$400 and can be installed in several hours.

Q: Where can I buy biofuels?

A: Oregon currently has 12 gas stations that offer up to 85% ethanol blends. The Midwest and Breadbasket regions have a high density of stations.

Biodiesel Chemistry

Fatty Acid + CH₃OH + NaOH → Glycerol + Methyl esters



Biodiesel is made from the combination of vegetable oil with a solution of alcohol (ethanol or methanol) and a catalyst (usually NaOH or KOH)

The reaction, known as transesterification, cleaves the vegetable oil molecule causing glycerol, a heavier molecule, to precipitate. The remaining part of the molecule is biodiesel, or fatty acid methyl esters.

Ethanol Fuels

Ethanol fuels are made by fermenting and distilling food crops or their waste products. This fuel can be either mixed with conventional gasoline or used by itself, though an engine conversion is necessary if the percent ethanol gets much above 10%.

