### Biodiesel Basics

- Biodiesel is an alternative diesel fuel made from renewable resources, which:
  - can be produced from crops grown by American farmers.
  - is a clean burning fuel that reduces harmful emissions.
  - helps reduce dependence on foreign oil.
  - is nontoxic and biodegradable.

- The price is competitive with #2 diesel fuel with little change in fuel economy.

- Blends up to 20% biodiesel (B20) can be used in any diesel engine.

### Become Involved

The Pilot Plant team is always looking for multi-disciplinary interaction with students and fuel testing partners at the university.

To work with, partner or sponsor the Pilot Plant please visit the website or contact us by email at:

utbiodiesel@utk.edu

http://apcsi.utk.edu/SAE/biodiesel.htm

e-mail: utbiodiesel@utk.edu

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The University of Tennessee Biodiesel Production Pilot Plant is a model for campus sustainability. Waste vegetable oil collected on campus is turned into biodiesel fuel by students and used in UT vehicles.

Biodiesel will be used in campus diesel trucks and diesel engines associated with Challenge X and other automotive engineering programs.

The Pilot Plant was made possible by a grant from the UT Environmental Semester program. The Pilot Plant, coordinated by the UT student section of the Society of Automotive Engineers (SAE) under the guidance of Dr. David K. Irick, is operated mainly by undergraduate students in Mechanical Engineering.

**Biodiesel Chemistry**

Biodiesel is produced by a reaction between vegetable oil, methanol and lye, which is similar to that of making soap. The reaction causes the oil to separate into glycerin and methyl esters (biodiesel). Glycerin is drained off and the biodiesel is then washed.

Excess methanol and lye must be washed out of the methyl esters using water. The water will absorb and separate them from the mix.

The product must be thoroughly tested before it can be called biodiesel.

The biodiesel Production Pilot Plant processor is based on the open-sourced “Appleseed” processor plans commonly used by biodiesel home brewers and is the basis for small-scale, commercially available biodiesel processors.

The biodiesel Production Pilot Plant is designed to process waste vegetable oil collected from UT Dining Services. The waste oil is donated by Valley Proteins, the company contracted to collect the oil. The oil is collected and tested for water content and free fatty acids. Oil meeting quality standards is then filtered and processed into biodiesel.

A secondary project is to rebuild an former Future Truck Chevy Suburban to dubbed the “biodiesel hauler” to pick up the waste cooking oil. It will be used for outreach and to increase visibility regarding the pilot plant project. The biodiesel hauler is powered by a diesel engine running on fuel from the Pilot Plant.

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