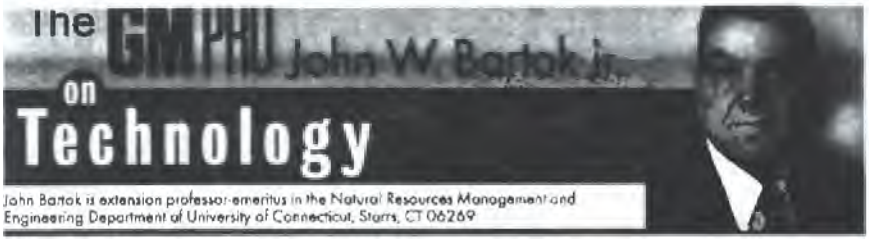

Bioheat waste oil may cut costs

Increasing interest in alternate fuels has Led to development of heating equipment that use fuels other than conventional oil and gas. Biodiesel can be produced in large enough quantities that it has an impact on total consumption in the United States. Waste oils from vehicles, machinery and cooking are others that have high heat value and can fit into many greenhouse operations.

Biodiesel and bioheat?

Bio diesel is produced from vegetable oils and animal fats. Soybean oil is the most common feedstock, but other sources are rape seed (canola), mustard seed, corn oil, coconut oil, sunflower seed, recycled cooking oil and rendered animal fats.

Biodiesel is made by reacting a wood or grain alcohol, such as methanol or ethanol, with the feedstock and with the help of a sodium hydroxide catalyst the reaction produces bio diesel and glycerin.

To ensure consistency, American Society of Testing Materials has established quality standards. Pure biodiesel is designated B100. It has a heat value of 118,170 Btu per gallon, about 8 percent less than No. 2 diesel. This is due to about 10 percent less carbon.

For the transportation industry, a blend of 20 percent biodiesel to 80 percent petro diesel (B20) is standard. For use as a heating fuel, a blend of 2 to 20 percent biodiesel with No. 2 fuel oil is acceptable in most heating systems without any modification. This is referred to as bioheat.

Limitations of bioheat

Many U.S. fuel oil dealers can supply a bioheat blend of up to 20 percent. There are several reasons for not going above 20 percent. Biodiesel has a higher viscosity than fuel oil. This means that its pour point (the temperature below which the fuel will not flow) is higher. The pour point for No. 2 fuel oil is minus 11°F and for B20 it's 0°F In cold climates, bioheat fuel needs to be stored inside a building.

Biodiesel is also a solvent. This can present some problems in an existing heating system until all the sludge is removed from the tank and supply lines. The filter may have to be changed several times until everything is cleaned. Once clean, the burner will probably be more efficient. When greater than 30 percent ratios of biodiesel are used, the rubber seals in the fuel pump can break down. Manufacturers are now using better seals to overcome this.

Environmentally friendly

Although bioheat fuel is generally 5 to 10 percent more expensive than No. 2 fuel oil depending on the blend ratio, it is cleaner burning, biodegradable and reduces emissions. Research at testing agencies have shown that nitrogen oxide emissions are frequently reduced up to 20 percent and sulfur oxide up to 89 percent. Smoke levels are reduced with bioheat resulting in less maintenance.

Biodiesel provides a much better energy balance than petroleum fuels. Typically it takes more energy to extract, process and transport fuel oil to your greenhouse than the heat that is generated. With biodiesel made from soybeans, 3.2 units of biodiesel are produced for every unit consumed in production. The most recent power plants put online are now achieving a ratio of 7 to 1.

Further information on biodiesel and bioheat including handling and burning, storage, suppliers and distributors is available at www.biodiesel.org.

Waste/used oil

Another fuel category that is becoming popular is oil that is a byproduct of other processes. This includes crankcase oil, transmission fluid, hydraulic fluid, cooking oil and certain solvents. They are inexpensive as compared to No. 2 fuel oil and are readily available in some areas. Burning is an approved method of disposal.

Some growers set up collection routes that include garages and oil change service centers. Other growers have developed a relationship with fast food restaurants that have a considerable supply of used cooking oil. Some growers purchase waste oil collected by a recycling firm.

Avoid waste oil problems

Handling waste oils can present some obstacles. Drums or tanks are needed to collect the oil. In large quantities, it has to be pumped. Once the oil is stored at the greenhouse, it needs to be filtered and stored. In most cases, the tanks should be placed in a containment area as a precaution against a spill.

The oils can contain many impurities including metal chips and filings, lead from bearings, sludge, gasoline, potato chips and water. Usually a 40 or 50 mesh strainer removes most of the solids. The material may be considered a hazardous waste and have to be disposed of according to U.S. EPA regulations. This can be expensive if it has to be burned at an incinerator designed to handle hazardous waste.

Burning oil requires a furnace or boiler designed to handle it. Several companies have developed burners that use compressed air to atomize the fuel. Some also use a preheater since some fuels have a higher viscosity than fuel oil.

Burner size is limited by U.S. EPA to no more than 500,000 Btu per hour input. Some growers have installed multiple units to obtain a higher heat output. All of these heaters will bum No. 2 fuel oil or kerosene if the waste oil supply is depleted.

To avoid sludge pickup, the intake pipe and strainer to the burner should be set 3-6 inches above the bottom of the supply tank. An oil filter should be installed just before the burner.

A 2- to 4-cubic feet per minute compressed air supply at 15 to 40 pounds per square inch is usually required depending on the output of the burner. This can be from an integral compressor or from a separate air supply. **PIN**