

# Soybean oil & ethanol have most tractor fuel promise

TROY, Mich. — Ford Motor Company is actively working to develop agricultural tractor engines powered by energy sources other than diesel fuel.

Company engineers, working alone and in conjunction with governments and university research departments throughout the world, have investigated a variety of fuels and engine adaptations.

Among the fuels studied so far are vegetable oils, liquid propane gas, various gaseous fuels and hydrogen, plus alcohols including methanol and ethanol.

According to W. J. Howard, executive engineer for advanced engineering for Ford Tractor Operations (FTO), some of these fuels have already been dropped from consideration as potential power sources.

### Few Viable Alternatives

"The gaseous fuels, such as liquid natural gas, compressed

natural gas and hydrogen, were ruled out for agricultural tractors because of limited fuel-storage capacity," explains Mr. Howard. "A farmer would need a trailer tied behind his tractor just to carry enough fuel to operate it."

"At this time, liquid propane gas does not appear to be practical either because of unpredictable price fluctuations."

Howard says that most vegetable oils need additional refining to restructure them to meet requirements as a fuel, and at this time do not appear to offer short-term promise. Some interesting results have been discovered using a mixture of soybean oil and diesel fuel, however, and Ford currently is studying soybean-oil mixtures in cooperation with several universities.

### Soybean Oil Shows Promise

Last April, FTO supplied a research grant and a three-

cylinder diesel tractor engine to the agricultural engineering department of the University of Missouri. Researchers there modified the engine to run successfully on a blend of soybean oil and diesel fuel.

A more ambitious research program is currently taking place at the University of Alabama in Huntsville where researchers at the Johnson Environmental and Energy Center have had excellent results using degummed soybean oil as a diesel-fuel extender.

According to senior research assistant, Joseph F. Peters, in preliminary tests a turbocharged diesel engine achieved maximum and continuous horsepower using a mixture of one-third degummed soybean oil and two-thirds #2 diesel fuel with about the same fuel consumption as with 100 percent diesel fuel.

Currently, the Alabama researchers are using a Ford four-cylinder 256-cubic-inch-displacement turbocharged diesel engine which has been modified for direct injection. Various blends of soybean oil and diesel fuel are being examined and final results should be available by the end of 1983.

### Good Supply of Soy Available

Peters says that degummed soybean oil, which is a by-product of soybean meal, can be used as a fuel without further refining, even though it is a little more expensive than plain diesel at today's prices. The soy oil may prove extremely valuable to farmers in the event of a future fuel shortage, particularly during planting and harvest time, when the farmer must be in the field.

There is currently an oversupply of soybean oil in North America, and producers are searching for other uses. Dr. Peters estimates that one season of soybean-oil use as an emergency fuel could eliminate the present glut. However, U.S. farmers alone have an additional billion-gallon potential, since only about one half of the soybeans now grown are used for oil extraction. The widespread use of soybean oil as a fuel also could bring the cost of soybean fuel down.

### Alcohol Fuel Promising

The most promising alternate fuel to date is 100 percent ethyl alcohol. Alcohol shows such strong potential that Ford has developed actual prototype tractors fueled

(Turn to Page D21)



W.J. Howard, executive engineer for advanced engineering at Ford Tractor Operations, inspects a prototype alcohol-powered Ford Series 10 tractor. The company has conducted extensive field tests of alcohol-powered farm tractors in Brazil.

**Award Winning  
CIMARRON ALFALFA**

Available for Spring  
also

**WL 311, WL 313, WL 318,  
Saranac AR, Clover, Orchard  
Grasses, Oats**

**TOBACCO NEEDS**

- Nylon Bed Covers • Bed Fertilizer
- Cotton Hulls • Seed

**BALER & BINDER TWINE**

---

**FARMERS  
SUPPLY**

Box 1537                      215 East Fulton St.  
Lancaster, PA  
(717) 394-7127

**SPECIAL SALE**

**LOW-COST,  
Trouble free  
Nipple Drinkers!**

Easy to clean, Easy to change



1/2" For Pigs & Sows

**\$275** ea



3/8" For Baby Pigs

**\$225** ea

**ONE-PIECE BODY**  
Solid Stainless Steel construction, no tubes, sleeves or inserts. Smooth Finish

- Easily Removable Screen Holder
- Brass Orifice
- Heavier Springs - No More Breaking of Springs

**WE WILL SHIP UPS ANYWHERE**

SWINE & POULTRY SYSTEMS SPECIALISTS


**FARMER BOY AG.**

410 E. LINCOLN AVE. MYERTOWN PA 17067 PH 717 866 7565

BEST IN DESIGN PRICE AND EXPERIENCE


**GREAT NEWS FOR  
SMALL-SCALE  
GARDENERS**

Get "Big Tiller" power from a  
**TROY-BILT®  
Pony!**



- 5 H.P.
- Ideal for gardens up to 3000 sq. ft.
- So easy to use, you guide it with JUST ONE HAND - NO struggling, NO footprints left behind!
- Tills under sod, power-composts even standing cornstalks with NO unbearable tangling!
- Fits between rows to cultivate your whole garden in minutes!
- Now available in Electric Start, too!
- All cast-iron construction.
- Full no-time-limit warranty.

Come see this SMALL-GARDEN  
DREAM MACHINE in action at:



**Hollinger's**  
Lawn & Garden Equipment, Inc.

**TWO CONVENIENT LOCATIONS:**  
1755 W. Main St      1515 East Chocolate  
Ephrata, PA 17522      Ave  
Located on Route 322      Hershey, PA 17033  
Phone (717) 738-1131      Phone (717) 533-4060

**SHENANDOAH INCENERATORS - A SANITARY  
ALTERNATIVE FOR ON FARM DISPOSAL**

To Help Prevent the Spread of Disease

The sanitary way to get rid of animal carcasses is with a Shenandoah incinerator. It's pollution controlled and convenient to use. It's also extra efficient because we've lined the burning chambers, and in some models even the afterburning chambers, with one and a quarter inches of refractory cement. That keeps the heat up and the energy costs down.



Choose among eight easy-to-install smoke and odor controlled models. You even have the option of burning gas or oil.

Ask your local Shenandoah dealer about efficient, inexpensive incinerators. You'll find out how our bright ideas in farm equipment can mean a bright spot in your day. And still leave a green spot in your wallet.

**S Shenandoah**  
Bright Ideas in farm equipment.

---

**COMPLETE SYSTEMS, EQUIPMENT, SALES, INSTALLATION,  
SERVICE FOR CATTLE, HOG, POULTRY AND GRAIN**

Authorized Chore-Time Distributor

**AGRI-EQUIPMENT, INC.**

**2754 CREEK HILL RD., LEOLA, PA 17540**  
**PHONE: 717-656-4151**

STORE  
HOURS:  
Mon.-Fri.  
7:30 to 4:30  
Sat.  
7:30 to 11:30  
(Parts Only)