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Farmers can use some of their crops for own fuel

By TOM C. DORAN
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DODGEVILLE, Wis. — Farmers a century ago used a different kind of “horsepower” in their fields, allotting a certain amount of their crop for fuel in the form of feed.

Fast-forward to modern agriculture where another version of horsepower runs on fuel that perhaps was extracted from underground on the other side of the world.

Dieter Harle and Eric Hamilton of Circle Energy are hoping producers can return to basics with an all-inclusive biofuel production process.

Under the plan, the farmer grows a crop such as soybeans, canola or sunflowers and uses a portion of that crop to produce biodiesel on their own farm for their own use.

Harle refers to the idea as the “oats model,” a concept that was developed by a university professor in Germany.

“When the energy had to come from the farms to feed horses, it required 5 to 10 acres of hay per 100 acres to for feed,” Harle said of the “oats model.”

“That is no different than it is today for tractors used by growers. It would take the same percentage of canola — 5 to 10 acres per 100 acres farmed — to produce (straight vegetable oil) or biofuel with the option to be driven directly or made into biodiesel for tractors.

“There are variations, but, in principal, that’s how they figured it.”

Grain pressing and filtering technology to produce vegetable oil on the farm for tractors is a common practice in Germany for the past 10 to 15 years, and now done by up to 90 percent of the farmers in some regions of that country.

Circle Energy is promoting this process in the United States and selling the equipment to do so.

“Growing, processing and using their own product is the key to increasing the farmer’s profitability if he can do it reasonable versus buying his fuel,” Harle said.

As part of the process, tractors are converted to burn vegetable oil. They feature a small tank for regular diesel fuel and a larger tank for vegetable oil.

The engines start with regular diesel and switch to vegetable oil once the engine reaches optimal operation temperature. The switch can be automated or done manually.

“So when the engine idles, you go back to diesel. When the engine is cold, when you do light work, you don’t use vegetable oil,” Harle said.

“Vegetable oil has almost as much, if not more, power. There is more energy that you burn in the



AgriNews photo/ Tom C. Doran

Dieter Harle of Circle Energy says grain pressing and filtering technology to produce vegetable oil on the farm for tractors has been a common practice in Germany for the past 10 to 15 years and now is done by up to 90 percent of the farmers in some regions of that country.

same gallon versus biodiesel without glycerin. That’s why you end up getting a little more energy from the same gallon.

“German farmers have told me that when they have the tractor converted to vegetable oil, they can drive a gear faster and there is less smoke coming out of the top.

“I’m amazed how many custom operators in Germany have converted to using vegetable oil straight in two-tank systems. Their biggest problem is they can’t always get good enough oil. But they also can deal with the farmer where the farmer provides the fuel and thus, they have trade-offs.”

A cold pressing process is used on the farm to produce the vegetable oil from crops like canola, sunflowers and soybeans. However, soybeans are not readily available in Germany.

“There is a distinct difference between cold-pressing and the standard process typically used to make biodiesel,” Harle said.

“When it is cold-pressed the oil in

the pressing operation from soybeans, from canola, from sunflowers, etcetera, does not get warmer than about 100 to 110 degrees Fahrenheit.

“In this process, the phosphorus, the minerals are not volatilized and they go out with a cake (byproduct).”

In the standard extrusion process, temperatures reach 180 to over 200 degrees resulting in higher phosphorous levels in the oil, according to Harle.

The cake byproduct is “easy to use for livestock such as mature dairy and beef cattle,” he said.

“However, single stomach animals like poultry and pork will have to use a slight heating process for soybean cake to safely release the trypsin inhibitor. Canola and sunflower cake does not encounter this critical issue,” Harle said.

“The Germans have a lot of good data on how effective the feed cakes are for pork, beef, and dairy. It is just a matter of rates,” he said.

The cold press process is slow, producing only about two to three

gallons per hour with canola and sunflower seed, while only about one to 1.5 gallons with soybeans. The system is totally automated and can run continuously.

“The ideal running time is not to run it for two hours every day. The ideal optimum use is 24 hours a day for 365 days. That’s how it pays,” Harle said.

“When you’re talking production of a ton a day, it’s not big by American standards, but a ton of day will easily produce 8,000 TO 10,000 gallons a year from soybeans and up to 25,000 gallons plus with canola and sunflower seed.

“A 400- or 500-acre farm, depending on livestock and so forth, would seldom need more than 10,000 gallons of fuel a year.”

As part of implementing the process, growers develop a plan of how many acres should be set aside to produce the fuel crops and what crop would be best utilized.”

“It doesn’t work as well for soybeans. Soybeans have only 10 of the 20 percent of the oil available for

the cold pressing process, while canola has 25 to 35 percent of its 40-plus percent oil available. So there is a much better use per acre,” Harle said.

“I personally feel that in order to manage risk today we need to look at it as if I want grow 10,000 gallons of fuel, I’m not going to grow all soybeans because soybeans don’t always grow very well either, depending on the weather, etcetera.

“So, in this aspect, I feel that you can spread that out and manage risk so if one out of three crops goES sour, you still have two other ones for fuel.”

Circle Energy will be providing a spread sheet on its Web site at www.circle-engine.com to study the economics of growing and producing one’s own fuel.

This includes soybean yield scenarios, as well as sunflowers, and spring and winter canola, and what percent of oil can be removed from the respective crop to produce the vegetable oil fuel. It also includes the press cake byproduct that can be used for livestock feed.

Harle was asked about the storage requirements for the vegetable oil, and operating the processor in the winter.

“Vegetable oil doesn’t flow very well in the winter. The pressing requires a little more energy in the winter to keep it warm,” he said. “It does not have to be preheated, but you can’t use frozen seed because it doesn’t release the oil very well.

“As long as you enclose the place, you can press in the winter, and since it is like a 24/7/365-day operation, and it basically runs by itself, that’s not a problem to handle it in the winter. Simple insulation panels will keep it warm enough in smaller rooms.”

A dark tank is recommended to be used for vegetable oil storage. In-ground storage facilities are a common practice in Germany.

At this point, there are no government restrictions for processing the vegetable oil on the farm.

“You can start pressing tomorrow and use the fuel yourself the next day. (Filtering processors are available from Circle Energy, as well.) But the moment you sell it to your neighbor — the moment it hits the blacktop — the state comes and inspects it and collects an inspection fee. You just have to keep it yourself,” Harle said.

“The other thing is, the moment you use it on the road for fuel, you are subject to fuel tax. As long as you make it, use it yourself, and keep it off the road, it is exempt from taxation fine.”

Education, tours aid transition to self-sustaining fuel system

By TOM C. DORAN
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DODGEVILLE, Wis. — Switching to an all inclusive, self-sustainable fuel system can’t just be done on a whim. It requires education and planning to make it work.

Circle Energy, a firm that sells an on-the-farm seed press system for converting homegrown crops into vegetable oil for fueling tractors, provides tours to farms where the system is being implemented, as well as educational support.

Dieter Harle of Circle Energy has been a tour guide for three groups that have visited Germany this year to see the seed to press to use process.

Another two trips are slated for November.

The tours, which are geared toward farmers, enable the visitors to observe and discuss all aspects of plant oil seed production.

Winter canola production is typically grown in Germany for vegetable oil conversion, as are soybeans, sunflowers, flax, camelina and other crops.

Circle Energy’s objective is to offer first hand experience in on-farm biofuel production and technology information that results in the installation of systems offered by Circle Energy via its supplier in Germany — KernKraft, according to Harle.

Special focus is given to the processing and on-farm filtering of the vegetable oil biofuel, viscosity and standards for safe operation. Among the features is a tractor that has run for 12,000 hours on nothing but vegetable oil.

The November tour will include a day at the EuroTier show in Hanover, Germany.

This is the leading international exhibition for bioenergy and local energy supply.

It offers investors and interested parties from municipalities, industry and agriculture a comprehensive overview of products and services.

The bioenergy show will feature about 280 exhibitors and address-

es producers and users of bioenergy, and users and operators of local energy supply systems of biogas, and liquid and solid biofuels.

“The value that this brings to farmers excites me. That’s why I even put more of my energy into it,” Harle said.

One of the goals of the company is to also offer demonstrations at Circle Energy’s Dodgeville, Wis., headquarters. “We will have presses running there,” Harle said.

There are several factors to consider when growing crops specifically for making fuel to be used on one’s own farm.

“We’ll teach you how to grow your own fuel, all the way through in a day-long seminar,” Harle said.

“There are now soybeans that have 5 percent more oil in it than the regular soybean that they buy, and many farmers do not know what their oil content of their soybean variety is. If I know I want some oil from that crop, why shouldn’t I grow a higher yielding oil?”

Setting aside acres for canola, a higher oil-yielding product, is one option.

“We just got canola seed from North Dakota that originated from German breeding. We help teach the farmer how to grow it,” Harle said.

Further information is available by calling (800) 516-9559 or visiting www.circle-energy.com.