Simple Additive Turns Raw Soybean Oil Into Fuel

It doesn't take an expensive fuel plant to turn soybean and other vegetable oils into diesel fuel, says Duncan Nesbitt, Kenansville, N.C.

Nesbitt is a distributor for Insta-Pro extruders, which farmers use to make raw oil. He saw that his customers were having trouble competing with large oil producers in selling raw oil to refiners. So, he went looking for something that would make it possible to market oil directly or burn it themselves.

What he found is an additive that, when mixed with raw vegetable oil, allows it to be burned in diesel engines without the residue buildup problems normally associated with burning raw oil as fuel.

The additive is DFX, produced by Oxypro, Inc., a small family-owned California company with a long history of producing engine lubrication additives.

Nesbitt signed on with Oxypro to distribute DFX east of the Rocky Mountains and then began working with several Insta-Pro extruder owners to blend DFX-treated oil into diesel fuel to test in their own engines.

"The appeal for the small oil processor is they can produce a biodiesel-type fuel without the high cost of adding extra processing equipment," Nesbitt says. "There is no glycerin by-product to try to market or dispose of when DFX is used, either. To smaller processors, that's a positive."

Chris Hallberg, owner of Oelwein Custom Commodities, Oelwein, Iowa, is one of the processors who opted to test DFX with Nesbitt. "We process soybean meal and oil for livestock feed, and there are times when we end up with more oil than we can sell for feed," he says.

In the past when that happened, Hallberg would load up a truck and deliver the raw oil to a soy-oil refiner. Trouble was, refiners weren't always that interested in buying smaller quantities and usually discounted the price accordingly.

"This product goes against the grain with respect to bio fuels, in that it makes the crude oil into fuel without first transforming it into methyl ester," Hallberg says.

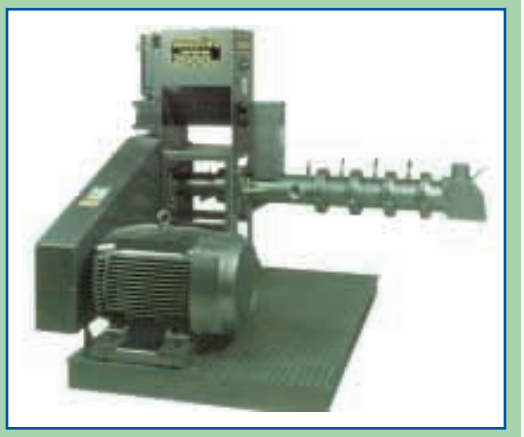
Soyoline is what Hallberg calls the blended fuel he makes from diesel DFX treated soybean oil. "I tested it for seven months in my Ford LT9000 feed truck. It has a 300-hp Caterpillar engine in it. During the test, we used 20 percent soybean oil, but we've tried several different ratios, all the way up to 85 percent treated oil and we have yet to see any problems with it."

Hallberg kept performance records before and during the test period, so he could compare engine performance between regular diesel fuel and his Soyoline. While using 20 percent treated soybean oil, miles per gallon increased by 7.4 percent and fuel consumption decreased by 9 percent.

Hallberg says the blended fuel is slightly more viscous than regular diesel, but that has not caused problems, even in the winter.

Nesbitt says all test results he's seen are similar to those Hallberg reports. Ag Commodities, New Oxford, Pennsylvania, a DFX user, is currently working with Pennsylvania State University engineers to conduct testing that is expected to show the DFX treated soybean oil will meet national fuel quality standards.

Blending DFX into raw soybean oil is simple. Solids must be settled or filtered out of the oil. Then 2 oz. of DFX is added to for every 5 gal. of oil. To make a 20 percent blend, that 5 gal. of treated oil is added to 20 gal. of diesel fuel.



To produce your own oil, you need a farm-sized extruder like this one from Insta-Pro. It will process up to 800 lbs. of beans per hour. Sells for $25,000. Two larger sizes are available. The extruder gives you meal. To pull out the oil, you need a comparably-sized press, which sells for right at $24,000 and produces about 93 lbs. of oil per hour.

"The additive is not that expensive. Price of the blended fuel, though dependent on the value assigned to the oil, is similar to that being charged for diesel with 2% methyl ester added," Nesbitt says.

Hallberg adds, "I've had several companies say they'd like to buy it, but they can't until it's been tested and shown to meet fuel quality standards."

Nesbitt says being able to use excess oil as fuel without first having to transform it into methyl ester gives smaller oil processors and even farmers who own extruders the opportunity to produce fuel for their own use.

If you do produce your own fuel, he recommends checking with the proper authorities regarding fuel taxes and keeping production and use records, too. "You should pay any state and federal taxes associated with the fuel used in over-the-road trucks and pickups. You can file for a refund on the soybean oil portion of it, but you do need to be in compliance with fuel tax laws," he notes.

Anyone east of the Rocky Mountains can purchase DFX from Nesbitt. Those in the Far West should contact the company directly.

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Diesel Repower Turns Old Deere Into "Super" 4020

When Terry Knipper, Dyersville, Iowa, needed a small tractor to farm a few acres of rented land, he paid $1,500 for a well-used 1966 Deere 4020.

Although it was a good price, he (and a lot of other people, too) wondered if the old tractor was really worth it. "It was in poor shape and hadn't been started in two years. It had been stored inside, but was covered with rust and bird droppings," he says. The tires were bad and the seller wasn't even sure the gas engine would turn over.

With help from his brother Chris, Knipper got the engine started but the clutch slipped badly after it warmed up.

He managed to drive the tractor home, and once he'd power washed off the bird droppings, it began to look like a better investment. Replacing the clutch and bearings in the front wheels and all four tires actually made it useable. Unfortunately, the old engine had only about a year left in it.

"I was headed out one day to cultivate corn and it dropped a valve," he says. After calculating the cost of rebuilding the engine at about $3,000, Knipper went looking through salvage yards for a diesel to replace it. He couldn't find a 4020 diesel engine that didn't need work, but did turn up a turbocharged 30 Series Deere diesel out of a '70's vintage 6600 Deere combine. "It's the same engine used in the 4430 tractor," he explains.

He traded his old gas engine and $2,000 for the diesel, which had only 3,200 original hours on it. That included the air cleaner and a diesel flywheel for a 4020, which is weighted differently than a 4020 gas flywheel.

When he got it home, the diesel engine was the right width for the 4020 frame and the engine mounts matched nicely with the holes in the frame. However, it was about 2 in. too long. "I could have fit it in there by shaving the fan blades, but that would have made the cooling system less efficient," he says. Concerned that might lead to problems, especially on a turbocharged diesel, he decided to cut the frame and add 2 in. of steel to it. He had to travel 200 miles to find a length of matching channel iron for the frame.

Extending the frame meant the hood didn't fit right, so he had that extended and painted at a local body shop.

As the project progressed, Knipper discovered the stock Deere turbocharger wouldn't fit under the 4020's hood. He located an M&W after-market turbocharger that fit the engine and the space under the hood.

Besides extending the hood and frame, the only other modification was to the flywheel, which he had to alter slightly in order to use with the original transmission. "I needed the 4020 flywheel because it matched up with the transmission. The center hole in the flywheel was .005 in. smaller than the shaft in the diesel engine, so we had someone machine that to fit the shaft. Also, the 4020 flywheel bolted on with 4 bolts, but the engine needed a flywheel with 6 bolts, so I had the machine shop make that change, too."

Terry Knipper repowered this 1966 Deere 4020 tractor with a used turbocharged Deere diesel engine, which came out of a 6600 Deere combine.

Rebuilding the tractor was a winter project, done while working for his father, Don, on the family dairy farm and farming on his own as well.

While he had the tractor torn down, he replaced the water pump on the diesel engine and all the electrical wiring. He also replaced all the gauges. After seeing how it looked with the repainted hood, he decided the entire tractor needed a paint job. After painting it in the farm shop, he finished it off with new decals all around, including ones that proclaim his tractor is now a 4020 Diesel.

Knipper says the diesel engine may be putting out close to 140 or 150 hp. That compares with 90 to 95 hp from the 4020's original gas engine.

He figures he spent more than 100 hours reworking the 4020. With his original $1,500 purchase price, the new clutch and tires, the engine, wiring, paint and a recently added wide front end, he has about $9,000 invested in it. He figures that's still quite a bit less than a similarly powered used tractor in such good condition.

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