

Do-it-yourself DIESEL ALTERNATIVE

By Rev. J. D. Hooker

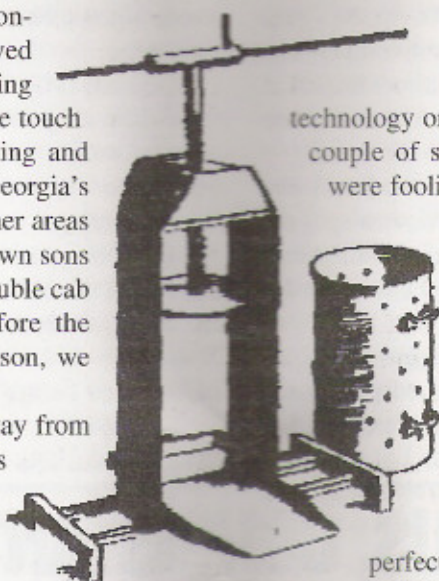
Upon meeting and marrying a wonderful Georgia farm girl, Steve moved south to join her family's huge farming operation. We've kept in pretty close touch over the years, though, taking hunting and fishing trips here in Indiana, along Georgia's extensive rivers and lakes, and to other areas as well. So when he and his two grown sons pulled into the yard with their big, double cab diesel 4x4 pickup the morning before the opening day of our early goose season, we were expecting them.

Northeastern Indiana is a long way from any of the major waterfowl flyways used annually by migrating ducks and geese, yet we've got tremendous numbers of so called "resident" flocks of large, tasty Canadian geese. So it wasn't unusual to find the four of us limited out, and busy cleaning our morning's take out behind my kitchen before noon.

It was while we were busy with this game cleaning business that I mentioned that there appeared to be a little more money in farming down in Georgia than in this area. That is, if their fancy pick-up was any indication of income, rather than of the buying power of credit. We'd been friends for so long, that I felt easy enough to say this as a joke, certain that Steve and his sons knew I had no real interest in how much money they were (or weren't) making.

His reply wasn't in quite so light a vein, however. It seems their entire operation had been about to go belly up before they switched to running the whole thing on peanut oil. They'd even driven his shiny pick-up all the way up here on their homemade "peanut oil diesel." I was interested.

For them (as with so much of the rest of the country), it was the steadily increasing fuel and utility costs that had driven their farming operation to the brink of insolvency. It had only been by pure chance that Steve Jr. had read about the very simple process (known of course by a ten-dollar name) of transesterification. This had helped



them gradually climb back solidly into the black.

This is mighty far from being a new technology or process. In fact, as far back as 1853, a couple of scientists named J. Patuck and E. Duffy were fooling around with the idea. Once proven as a viable and valuable fuel source, transesterified vegetable oil really caught on in certain regions of the world, most notably in South Africa, where it powered nearly all of that nation's heavy trucks, farming tractors, and heavy construction equipment in the years before WWII.

Truthfully, this whole process of turning ordinary vegetable oil into a perfect diesel fuel alternative is an exceedingly simple matter. The process involves adding small amounts of both alcohol and caustic soda (lye) to any type of fresh or used vegetable oil. After mixing everything thoroughly together, the mixture is allowed to just sit there and settle into two distinctly separate layers, after which the finished diesel fuel replacement is simply siphoned off from the vicious layer of glycerin that will have settled to the bottom.

Coming up with all of the ingredients in usable quantities might be the hardest part for some folks. In Steve's case, they'd started out with nothing more than a home-built screw-type press like the one illustrated. Ground peanuts (which they were growing commercially anyway; though sunflower seeds, mustard seeds, flaxseed, and most types of nuts will work just as well), are heated and dumped into the perforated cylinder. The screw is turned slowly until oil starts seeping from the tiny holes in the cylinder walls. Once this oil begins seeping out, don't apply any more pressure until the flow stops, then tighten the screw just enough to get the flow started again. Keep repeating this, increasing pressure and then waiting, until no more oil can be pressed out from the batch.

The tightly packed (almost like some pressed wood product) "oil cake" is then forced out of the cylinder and

broken into small bits. This "oil seed cake" makes a terrific (and marketable in many areas) livestock feed in its own right.

Steve's original human-powered screw press has been replaced by one they've built which operates off a tractor's hydraulics, but the principle is still the same; it just requires a lot less muscle power.

To come up with sufficient lye, they'll simply drill a 1/4" hole at the bottom of a plastic 55-gallon drum. Once the drum's been filled with sifted white ashes (wood fire-place ashes, corn cob or peanut hull ash, or any other ashes produced from burning plant products), ten gallons of clean water are slowly poured through the top of the barrel. Once the caustic liquid starts draining out at the bottom, it's caught in plastic buckets. (Wear heavy rubber gloves and eye protection at all times around this stuff.)

Once the liquid has stopped draining out, it's transferred to a clean metal container and heated until it just starts to simmer. Don't increase the heat, but leave the container over the heat until finally nothing remains but a dry, whitish residue. 550 grams of this homemade lye is added to a drum containing 50 gallons of pressed vegetable oil.

Next a quart of alcohol (theirs is homemade, but rubbing alcohol, or even rum, vodka, whiskey or applejack will work as well) is also poured in. For the next 15 minutes or so, a canoe paddle is used to stir the mixture well, after which the stuff is left alone to simply sit there for about 12 hours. The lighter oily fuel is then siphoned off, leaving the thicker layer of glycerin (yep, the same glycerin many folks pay good money for when sold as hand cream and so forth) behind in the bottom of the drum.

This "methyl ester" of vegetable oil has a viscosity roughly double that of regular petroleum based diesel fuel, while its molecular weight is only about a third of that of ordinary vegetable oil. Ever newer and stricter environmental regulations have forced the oil companies to make drastic cuts in the highly lubricating sulfur content of petroleum based diesel fuels. The higher viscosity of this homemade replacement actually increases the life expectancy of the engines it's used in while producing nearly 75 percent less pollution than petroleum based #2 diesel.

Steve assured me that aside from running all of their huge farming operation's tractors, trucks, and other equipment on this home produced fuel, they also heat their homes and shops by utilizing this same fuel in unaltered fuel oil furnaces. They even provide for their own electricity needs with large diesel powered generators,

running on this refined vegetable oil. I simply had to do some experimenting of my own.

Understanding already how readily such oil could be home processed; either by boiling, or using presses as Steve does, I opted to try a somewhat different track. So, during the week Steve and his sons stayed up here, we spent the morning hours out hunting the high flying Canadian honkers. But during the afternoons, we were hitting up restaurant owning acquaintances for the discarded cooking oil from their deep fryers. As we obtained this dark, burnt smelling used cooking oil in five-gallon buckets, it was an easy matter to strain it through several layers of regular bath towels once we got it back to my house.

Once we had two 55-gallon drums nearly filled with this waste cooking oil (which, by the way, the EPA considers a toxic waste), we added 2 1/2 quarts of rubbing alcohol, and 1 1/2 pounds of store purchased lye to each drum. Once all of the stirring and waiting was done, we siphoned our desired product into clean containers.

Filling a regular kerosene heater with our new fuel, we placed it in the middle of my workshop floor and lit it up. Aside from a faint scorched fish odor (which I later found to be eliminated by kerosene deodorizer), the results seemed to exactly mirror those obtained when using its intended fuel.

5 GAL
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1 CUP
ALCOHOL
2 OZ
LYE

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We also filled another friend's older International semi tractor with our homemade diesel alternative, and after 500 miles, he reported almost exactly the same fuel mileage he normally got using expensive petroleum based diesel fuel.

With the experiences Steve had related to me, I was already certain that fresh vegetable oil could readily

be transformed into a high quality alternative fuel. Now our efforts had assured us that even well used vegetable cooking oil can produce an equally useful product. In addition, *all* of the byproducts are entirely safe and even useful: glycerin for soap making, hand cream, etc., the hard oil seed cake as an excellent livestock feed, and the ash remaining

from lye making as a fertilizer.

It will probably take me a while, but I'm certain we'll be switching to diesel powered vehicles, back-up generators, and several other pieces of equipment around our homestead. Try producing your own alternative diesel fuel using these methods, and you may just decide to make similar changes yourself.

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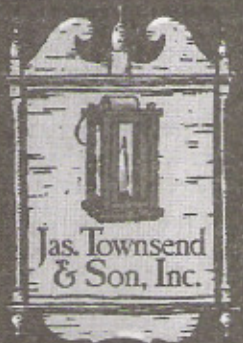
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