



one

Stinky Kitchen

I knew the smell from the front sidewalk. It wasn't the mimosa trees. Their fragrant blooms had ended. It wasn't Ruby's gardenia beside the front porch. It had lost its flowers long ago. What I smelled as I approached the house was rancid fryer oil.

Tami had just renovated the kitchen in our dilapidated farmhouse. She and a cast of contractors had moved it from something you would find in a shack to something you would see in an upscale magazine. She was in the afterglow of a summer's work, which is why the smell of rancid grease emanating from the new kitchen caused both my pace and my heart to quicken.

When I opened the front door, I was engulfed in the putrid, wafting, solid smell of spoiled vegetable oil. Someone had used our new kitchen as a laboratory.

Someone was having a hard time making fuel down at Summer Shop and had trudged up to the house to use the stove.

Tami does not make biodiesel. At the time she didn't even drive a diesel vehicle. Her preference was an Isuzu SUV. But she had humored our quest for fuel. She had watched young idealists pass through our place. She had left us alone at the kitchen table to speculate long into many nights on how we could make biodiesel out of waste vegetable oil. And we had shown our gratitude by boiling veggie in her new kitchen.

I walked into the house and wondered if it was over. Not my marriage to Tami, but our quest for fuel in her domain.

My journey into biodiesel had begun almost two years earlier at the 23rd Annual Festival for the Eno. I boarded the exhibitors' bus and listened to the tour guide give her pitch. The bus was powered by biodiesel, which was made from soybeans, which were grown in America. That was cool. I thought about the 1962 Romanian-made tractor my father-in-law had lent me 12 years earlier. "What do I have to do to my engine to run on biodiesel?"

"Nothing," she said. "If you have half a tank of petroleum diesel and you add half a tank of biodiesel, the two instantly blend and your engine is none the wiser."

I was intrigued. "Will it gum up my fuel lines?" I asked.

"Nope," she replied cheerily. "It has a cleansing effect on the motor."

Another fellow asked what sort of mileage he would get running on biodiesel and was told the miles per gallon were the same as for normal diesel. She set a hook in my imagination. "Where can I get some?" I asked.

At this point her countenance changed. "You can't," she said. "It's available only on state contract."

I was confident she was wrong about that and I skipped off the bus, filled with the idea of running my nasty old diesel tractor on this amazing new substance. I stopped by the American Tobacco Trail booth. The fellow there thought biodiesel sounded like a great idea and he agreed that someone needed to be selling the stuff in Chatham County. He even wanted to buy some for his tractor. I stopped by the North Carolina Sustainable Energy Association booth and they too were easily excited about the fuel. They figured there surely were some tax credits available for investments in biodiesel.

After three scorching days at the Festival for the Eno, I was convinced that I should open a biodiesel gas station at my metal sculpture studio in Moncure. After all, it is an abandoned gas station on a somewhat busy road. I had visions of filling up happy customers with a renewable fuel made from vegetable oil from crops grown by happy farmers in America.

I was astonished to learn that the tour guide was correct. Three summers ago you could not buy biodiesel in North Carolina. I was disheartened by the news, and after fruitless Internet searches I realized that if I wanted

to put biodiesel in my tractor I would have to make it myself.

Like so many others in this country, my entry into the world of biodiesel was through Joshua Tickell's self-published book, *From the Fryer to the Fuel Tank*. I ordered a copy off the net and read it from cover to cover.

Chemistry is not my strong suit. I spent most of my time in high school chemistry figuring out ways to get Martha Peterson to notice me. I had more luck with Martha than I did with chemical reactions, but after two brief semesters I ended up without a thorough understanding of either one.

And I have grown hesitant about new ideas. My daughter Jessalyn keeps an imaginary ledger of my "flops." When she comes to visit she is quick to say things like, "Dad, do you realize that every time I come we remove a couple of truckloads of your bad ideas from the farm?"

She is right about that. There was the failed attempt at vermiculture composting in abandoned refrigerators. She also helped me tote away the cold frame made from orphaned windows. It had rotted away before I mastered winter vegetable production. And she helped me remove piles of recycled bricks that I had accumulated in the woods.

"The snail ranch, Dad. Remember that one? You were going to raise them on garlic and cilantro so they would be pre-flavored. That's going in the "flop" column, Dad."

I knew that if I told Jess I was planning to make fuel out of waste vegetable oil she would not be moved, so instead I tried out the idea on my friend Gary.

Gary has a huge brain and he is patient with me. It is not unusual to find us, on any given Saturday or Sunday in the summer, floating on inner tubes down at my pond, surrounded by splashing children and discussing the next big idea.

He rejected the crawdad farm. He showed little interest in pawpaws. As a great conserver of personal energy, he found no merit in my establishment of a popcorn operation that would be staffed by us and our children. But Gary liked biodiesel. And he figured that, if we had a recipe, we could make some ourselves. My guess is that he paid attention in chemistry class.

People seldom dwell on my good ideas, but I have had a few along the way. I once heard a chef from Louisiana describe on the radio the taste of a deep-fried turkey and I was convinced of the absolute need to prepare one myself.

Deep-frying a turkey is a somewhat harrowing affair that involves lowering a whole bird into four or five gallons of hot oil in a pot atop a propane burner. It requires considerable attentiveness, but in the end it is not that hard. The secret is to not let the oil temperature creep past 400 degrees Fahrenheit or the oil will start to smoke and add a nasty flavor to the meat.

I can't say I have perfected the technique, but I have deep-fried a number of birds and some of them have

been exquisite. Prior to my fixation with biodiesel, I would pour the waste vegetable oil out in the woods. On those occasions I noticed that the oil killed any vegetation it blanketed. I also observed it was rapidly consumed by dogs, possums, raccoons, foxes, bees, gnats and other residents of our surrounding forest. So before boarding that fateful bus to the Eno I already had a vague sense that there was good energy left in used vegetable oil.

Gary and his family came over for a deep-fried turkey feast, and for the first time I was less interested in the outcome of the meat than in our first attempt to make fuel from the leftover oil.

We retreated to a spool table at Summer Shop, leaving the children and wives behind. Gary had found a blender at the thrift shop. I had lined up some rubbing alcohol and some glassware. We had a plastic bottle of lye from the drain cleaning section of the grocery store. I had scored a gallon of methanol from a local chemistry lab. We followed Tickell's instructions carefully, although our scale did not measure accurately enough, and we made a batch of biodiesel.

It turns out that making biodiesel out of waste vegetable oil is not that tough. The process is called "transesterification," which entails taking one ester, vegetable oil, and transforming it into another ester, biodiesel. An ester is an alcohol molecule that is attached to a few carbon chains and looks sort of like a jellyfish. In vegetable oil the alcohol molecule is glycerin. When we make biodiesel we swap the glycerin for a different alcohol — usually

methanol or ethanol — which means we put methanol in and get glycerin out.

The simple test for a successful biodiesel reaction is a nice clear line of separation between the biodiesel layer and the glycerin layer. The glycerin byproduct is a fascinating sidestream that is nontoxic and can be composted.

Despite our crude measuring technique and some glaring errors in our process, Gary and I made biodiesel on the first try. Because our fryer oil had been used only once, and because cooking a turkey requires that the oil stay at a relatively low temperature, we had bright yellow biodiesel with dark brown glycerin at the bottom of our mason jar.

Success was ours.