

# A blooming solution to gas crisis?

An Anoka company turns algae into biodiesel fuel.

By PAUL LEVY Star Tribune

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A solution to \$4-a-gallon gas could be floating in your neighborhood pond.

Algae -- that green, oil-saturated substance that can double in size overnight and is ever-present in this land of 10,000 lakes -- is being touted in an Anoka lab as a potential answer to the fuel crisis.

Scientist Clayton McNeff says algae-based biodiesel fuel can be sold for \$2 a gallon. Mark Rasmussen, a microbiologist who works for McNeff's SarTec Corp. in Anoka, says algae's potential is vast. Using just 3 percent of our current crop land, algae could be used to produce 63 billion gallons of the diesel fuel currently used annually in the United States, he said.

More than 35 countries have contacted SarTec, asking how they, too, can capitalize on this algae-based formula that was developed, in part, by an Augsburg College student, who explained the process to Congress in the spring. SarTec's owners are so dedicated to this algae formula that they will open a two-towered fuel producing plant, to be called Ever Cat Fuels, in Isanti in October.

But the algae formula also has provided fuel for skeptics.

"Algae will grow faster than a forest or a cornfield, but how much of it is actually available?" asked Lanny Schmidt, University of Minnesota Regents professor in chemical engineering and materials science.

"I know about algae and I think it's great stuff, but there's a lot of chemical engineering that goes on before algae can be converted to fuel. And if you can't produce it for less than \$3 a gallon, will people be interested?"

Schmidt has been a critic, yet admits he is "captivated" by algae's possibilities and says "our nation needs to support stuff like this." The attraction of this green plant goes beyond going green to collecting green.

Because it isn't a food-producing crop, algae generally wins high praise, particularly from critics of corn- and soy-based fuels. And while an acre of soybeans will produce only 70 gallons of biodiesel fuel, an acre of algae can produce up to 1,200 gallons, said McNeff. Other reports say as many as 9,000 gallons can be produced.

## The genesis of the idea

The genesis for this potentially revolutionary fuel formula began with an Augsburg College research project two years ago. Student Brian Krohn asked his adviser, Arlin Gyberg, if he could research making biodiesel from waste cooking oil.

Krohn found that using solid acids as catalysts could convert plant oil to biodiesel, said Gyberg, now in his 42nd year at Augsburg. When Krohn's initial experiments failed, he realized that much of the technology used to convert plant oil to fuels was developed before World War II.

Enter McNeff, who grew up in Wayzata and whose dad, Larry McNeff, was a longtime Cargill employee. Twenty-five years ago, Larry and Marie McNeff decided to start their own plant, which develops yucca plant-based natural products. Young Clayton, an only child, was 14 when he began working for the family company.

"I loved the work ethic I saw in my parents," Clayton McNeff said at the plant, where his parents are found most days with 40 other employees. "You couldn't help but being absorbed by what was being done here. I fell in love with science."

So much so that he became a world-renowned expert on zirconia, the metal oxide of zirconium. Krohn recalled how six years ago, McNeff had given a seminar on zirconium, which McNeff says is a "catalyst that can speed up chemical processes by thousands of times."

Krohn, who is currently vacationing in Greece, and Gyberg visited McNeff at SarTec, where they and SarTec scientist Bingwen Yan developed what they call the Mcgyan Biodiesel Process (named after McNeff, Gyberg and Yan).

Here, in simplest form, is how it works:

Start with an oil or fat -- from pine trees, hamburger grease, French fries, algae, almost anything. The oil or fat is combined with an alcohol. The mixture is then pumped through a tube filled with a catalyst -- in this case, zirconia. The end result is a liquid that's about 60 percent alcohol and 40 percent fuel.

"We're using zirconia to separate the compounds," McNeff said. "But in separation science, you don't want to change the molecule you are trying to analyze. You do not want things to react in separation science."

The companies and countries that have contacted SarTec love the process because, McNeff says, it can be cost-effective and environmentally friendly -- and it's portable.

On the parking lot outside SarTec's Anoka office are four trailers. In each are homemade contraptions that take algae through the process of becoming fuel. When prospective clients see the trailers, they realize how quickly and efficiently a makeshift plant could be set up.

To scientists and academics such as Schmidt, it all makes sense.

"Algae's a hot topic right now," he said from his University of Minnesota office. "We need a next generation of biofuels.

"Nobody knows if these things are going to work, but that's the way it should be. We need radically new fuels. So we've got to keep on hunting."

'An innovative process'

In the SarTec plant, Rasmussen stood over two vats of homegrown algae. Converting the green stuff into fuel is a lot like growing bushels of tomatoes and converting them into sauce. Just as it takes a ridiculous amount of tomatoes to make a jar of sauce, it takes a lot of algae to produce the hardened algae flakes from which oil is extracted.

It's worth the effort, said Douglas Root, a senior scientist of biomass and renewable products technologies with the Agricultural Utilization Research Institute in Marshall, Minn.

"All biodiesel fuel fans should be watching with high hopes," he said of the new Ever Cats Fuels in Isanti. "I think Dr. McNeff and the SarTec team have discovered an innovative process for producing biodiesel."

McNeff is confident that the Ever Cats Fuel plant will produce 30 million gallons of biodiesel fuel within three to five years.

For his family, the past two years -- since the advent of the Mcgyan Process -- have been a whirlwind.

"But think about the 1970s, when there was a gas shortage and people panicked at the pumps," said Larry McNeff. "Then, once the lines at the gas pumps went away, people forgot about the crisis. But that was the time that something should have been done.

"This is the time for this."

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