MSU researcher finds renewed interest in turning algae into fuel

The same brown algae that cover rocks and cause anglers to slip while fly fishing contain oil that can be turned into diesel fuel, says a Montana State University microbiologist.

Drivers can't pump algal fuel into their gas tanks yet, but Keith Cooksey said the idea holds promise. He felt that way 20 years ago. He feels that way today.

"We would be there now if people then hadn't been so short-sighted," Cooksey said.

Cooksey is one of many U.S. scientists who studied the feasibility of turning algal oil into biodiesel in the 1980s. The U.S. Department of Energy, through its Aquatics Species program, funded their research. Cooksey's lab made a number of discoveries. Scientific journals published his findings.

Funding dried up, however, and the scientists went on to other things.

"Rumor had it that big oil got in the way," Cooksey said. "They didn't want competition so the project was dropped."

Cooksey "sort of" retired as a research professor in 2003. He now directs the Department of Defense's EPSCoR program for Montana. A few months ago, however, Cooksey started getting phone calls and e-mails from researchers and others who read about his algal work on the Internet or had seen it referenced in scientific journals. Companies tried to hire him as a consultant. He was invited to attend conferences. He ran into several scientists who had been his friendly competitors in the old days. They all said, "If only."

"It's a very strange feeling," said Cooksey, now 72. "You don't usually have people bending your ear on what you did 20 years ago. Science doesn't work that way, but in this case, it did."

The revived interest in microalgae stems from the conflict in the Middle East and the resulting focus on alternative fuels, Cooksey said.

"Our lab was one of three or four in the world doing research that nobody was really interested in," Cooksey said. "Now, suddenly lots of people are interested in it."

Cooksey doesn't plan to resume his research, but said his lab in the 1980s figured out how to increase oil production from algae. It developed a system that screened algae for their oil content and greatly reduced the sample size needed for their research. It developed a stain for algae, called Nile Red. When treated with the stain, the algae became fluorescent under certain conditions, making it easier to measure their oil content.

Algae grows naturally along rivers, the seashore, and in the mangrove swamps of southern Florida, Cooksey said. They also grow in wastewater treatment ponds and can be grown commercially in manmade ponds. One design that was tested in the 1980s is a shallow pond that looks like a raceway. Another is a system of deeper ponds. Algae can be grown especially well in desert states that have plenty of sunshine and access to water unusable for traditional agriculture or drinking. Because of its salt content, salt water is more economical than fresh water for growing algae, so southwestern states with saline aquifers might find it easy to grow them.

"In principle, lipids from microalgae are suitable for refining into conventional liquid fuels," said a 1983 annual report from the Solar Energy Research Institute that provided Cooksey's funding and some algal

cultures. "Indeed, in the past, biological oils have been refined to fuels during shortages in petroleum supply."

Joseph LaStella, president of Green Star Products, Inc. in San Diego, Calif., raved about the potential of algae in a recent phone call. His company built a demonstration pond in Hamilton, Mont., last spring.

Soybeans produce about 50 gallons of oil per acre per year, and canola produces about 130, he said. Algae, however, produces about 4,000 gallons per acre a year, and he predicted it will go far beyond that. He said algae requires only sunshine and non-drinkable water to grow. The demonstration pond showed that algae will grow even when temperatures fall below zero.

"This is the only answer to our fuel crisis," LaStella said.

David Tooke, director of operations at Sustainable Systems in Missoula, said, "With new interest in biofuels, it's another opportunity to supply those fuels.

"As far as surface area needed, it's more reasonable to assume we could attain those levels of production from algae versus agricultural crops," he continued.

Twenty years ago, algae looked promising, too, but interest died down as oil prices dropped, Tooke said. Can algal biofuel make it this time around?

"Most certainly," he predicted. "It's beginning to make sense to pursue this."

Source: Montana State University