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Georgia Pines May Play Role in Fuel of the Future

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Dr. Art Ragauskas from the Georgia Institute of Technology has been working with transforming pine needles and wood chips into fuel for your car. He is a participant in the bio-energy conference in Atlanta this week.

Just what are biofuels anyway?

The first generation of biofuels are made from sugars, starch, vegetable oil or animal fats using conventional

Pine needles, wood shavings and municipal waste are just three of the ingredients that may power your car in the future.

"What's exciting is that materials that we currently think of as causing disposal problems could become fuel," said Prof. Art J. Ragauskas of the Georgia Institute of Technology. "Trash becomes cash."

Ragauskas will be one of the participants in a conference being held in Atlanta this week co-sponsored by the AtlanTICC Alliance, a partnership for research in the next generation of biofuels. That partnership includes three leaders in the field in the United Kingdom and the United States - Georgia Tech, the U.S. Department of Energy's Oakridge National Laboratory in Tennessee and Imperial College in London. The University of Georgia is also doing research into biofuels and is participating in the conference.

The conference is called "Bioenergy - Trends in Global Innovation and Finance" and is being held at the Ritz Carlton Hotel Buckhead.

It may sound like Middleville alchemy, but fuel from pinewood has been created in the laboratory, according to Ragauskas. There are challenges, however, to some of the processes used and in finding a model for commercial applications of the new technology. Ragauskas estimates that commercial use of the new technology is five to 10 years away.

Biofuels offer several advantages, according to the Georgia Environmental Facilities Authority. Biofuels are domestically produced, reducing the United States' reliance on imported oil; the supply is renewable; and their use helps to reduce harmful emissions.

technology. They are already on the market and are mixed with petroleum-based fuel. Examples of this are biodiesel and ethanol.

Biodiesel is made from some type of vegetable oil, the most common being soybean oil, mixed with petroleum-based gasoline to prevent the oil from clotting. The technology used is not new; in fact, when Rudolph Diesel first demonstrated his engine at the Paris World Exhibition in 1898, he used peanut oil as fuel.

Georgia already has several facilities that are producing biodiesel, including US Biofuels in Rome, Middle Georgia Biofuels in Dublin and Sunshine Biofuels in Camilla. More are on the way. Bulldog Biodiesel in Ellenwood is being designed to produce 10 million gallons of biodiesel per year.

Ethanol is produced using sugars found in corn, sugar cane, sugar beets and sweet potatoes and is also usually blended with gasoline. Any vehicle that uses a gasoline engine can run on something called E10 - a mix of 10 percent ethanol and 90 percent petroleum-based fuel. Some vehicles can run on E85, or 85 percent ethanol; these are called flexible fuel vehicles and are made by major car manufacturers.

Ethanol is also produced in Georgia at several locations. Windgap Farms in Baconton produces roughly 500,000 gallons of ethanol from waste per year.

The next generation of fuel draws on a greater diversity of materials. For instance, something called "cellulosic ethanol" can use a wide variety of biomass, or biological material - wood, switchgrass, hay, plants or even garbage.

Here is where scientists like Ragauskas are making contributions. Ragauskas is a specialist in wood science and is making fuel out of pine.

"It really all depends on what's available," Ragauskas said. "The materials should not be more than 60 to 100 miles from the location (that you produce the fuel) or transportation costs make it too expensive. In Georgia we have a lot of pine, in the Midwest it might be switchgrass."

There is also a benefit to developing these fuels that Ragauskas said was personal for him.

"This is something that can create jobs and economic development in rural areas," he said. "That is personal for me."

Georgia is just gearing up to use this technology. Range Fuels is planning to build a facility in Soperton that will produce 20 to 100 million gallons of cellulosic ethanol per year.

Ragauskas said that the science is so complicated that forming partnerships to find commercial applications is necessary.

Glen Whitley, who works with the British government on trade and investment, agrees. Whitley is enthusiastic about the AtlanTICC Alliance and sees great opportunities for companies in the United Kingdom and Georgia to form partnerships. The conference in Atlanta this week is also being co-sponsored by the Georgia Department of Economic Development and the U.K. Trade and Investment department, a branch of the British government.

Whitley said there are benefits in cellulosic ethanol because it can be made from so many types of biomass.

"There is no one fuel to replace gasoline," he said. "But cellulosic ethanol can use whatever is available - like pine trimming in Georgia - to make fuel and this doesn't dip into the food supply."

Whitley attributes the difference between approaches to the new technology in the U.K. and the U.S. to the fact that England is a more "compact" country.

"In the U.S., each state may have a different set of policies but in the U.K. things are more uniform," he said. The feds are involved, however, through the Oakridge and the Department of Energy.

There has been increased interest in these new technologies in recent years, according to Ragauskas.

"In the last couple of years, there is been an incredible increase in funding from government, academics and industry," he said. "There are national labs involved in this now."

Ragauskas said that he realizes some people are cynical. They have seen an interest in renewable energy come and go with the energy crisis of the day.

"What's different is that the technology is much better," he said. "This is allowing us to stand on the shoulders of giants and really allows us to achieve."