Xylogenics Inc.

Service: develops bioengineered yeasts for the production of the automotive fuel ethanol from corn and biomaterials such as grasses and wood

Principals: Butch Mercer, chairman; Mike Neibler, CEO; Mark Goebl, chief science officer

Employees: eight

History: founded in 2008 as the result of medical-related research by a team led by Mark Goebl, professor of biochemistry and molecular biology at Indiana University School of Medicine

Funding: Last month raised $225,000 from angel investors. Previously raised more than $150,000 from IU School of Medicine faculty group and Lugar Center for Renewable Energy

What's new: patents filed; recently moved to IU Emerging Technologies Center in downtown Indianapolis and planning product release by year-end

Competitive advantage: may be only firm working in fermentation phase with viable product to increase yields for production of both conventional corn-based ethanol and for emerging cellulosic-based production

Sources: Xylogenics Inc., Securities and Exchange Commission filings

Promising ethanol yeast nears market launch

Chris O'Malley
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A firm that may have developed a breakthrough yeast for ethanol production has landed new investment and high-octane board members.

Two-year-old Xylogenics Inc. also says it plans to license its first bioengineered yeast later this year. This version is intended to boost yields and lower costs of making the automotive fuel ethanol at conventional distilleries that use corn.

The yeast for corn-based distilleries is a way to help fund the company before the sale—likely next year—of yeast for cellulosic ethanol plants under development.

Cellulosic is the holy grail of ethanol production because such distilleries could make ethanol on the cheap from abundant, ordinary plant material such as grasses.

“One of the issues for young companies is, how do you finance yourself going forward? We have an immediate application,” Butch Mercer, chairman of Indianapolis-based Xylogenics, said of the corn ethanol product.

Collecting cash

Xylogenics has attracted modest investment in a difficult market. Recently, it raised $225,000 from a half-dozen investors, according to U.S. Securities and Exchange Commission records, and is gunning for an additional round. Xylogenics said backers have included the Irish Angels, a University of Notre Dame-linked investment group.

Early on, the firm generated $150,000 from sources including a faculty group at the Indiana University School of Medicine, where the firm hatched out of medical research conducted by biochemistry professor Mark Goebl. He is chief science officer of the new firm.

Xylogenics last month opened its own bioengineering lab at the IU Emerging Technologies Center, along the Central Canal.

“Several companies are evaluating our technology,” CEO Mike Neibler said of ethanol producers.

One of the goals is to provide a minimum 3-percent to 5-percent increase in alcohol yield in corn-fed ethanol distilleries. Neibler sees capacity increases stemming from the yeast’s ability to reduce the length of the fermentation cycle by a third—to around 35 hours.

At such a rate, a plant could save $6.5 million a year—or $1 billion industrywide—given that there are about 200 corn-based ethanol plants in the nation.

“The results of these evaluations are very promising,” Neibler said. “The evaluation results have come back better than this.”

He declined to elaborate.

Xylogenics has established enough credibility already to attract some big names to its board. They include Joseph Prochaska Jr., a former executive vice president and chief accounting officer for New York-based MetLife. Prochaska also has served as president of Aon Financial Services and controller for Aon Corp., a Chicago-based international insurance brokerage.

Another new board member is William Parry, former senior vice president for Naperville, Ill.-based Nalco Chemical Co. Previously, Parry worked for a Honeywell subsidiary specializing in petroleum refining and gas processing.

Versatility may be plus

Xylogenics will need the outside perspective. A number of bioengineering companies have sprung up in recent years. Many promise they have the breakthrough ingredient for cellulosic ethanol production.

Currently, corn works well in ethanol production because it’s abundant in the Midwest and because it is rich in yeast’s favorite sugar—glucose.

Unfortunately, corn is also a food staple. Grasses, wood chips and even leftover parts of the corn plant are a cheaper way to make ethanol. The cell walls of these ordinary plant materials contain other complex sugars

that yeasts won't easily ferment, however, such as xylose. Even trace amounts of it are a turnoff to most yeast.

Xylogenics said its yeasts are not only breaking down xylose needed for cellulosic ethanol production, but that they've shown promise in increasing yield in conventional corn-based ethanol plants. These plants represent tens of billions of dollars in previous infrastructure investment.

"The beauty of our technology is, most of the yeast technologies are focused on cellulosic. Ours works on both," Neibler said.

Ethanol producers have constructed a number of cellulosic pilot plants likely to come online soon. Xylogenics said its bioengineered yeasts could improve production at those facilities by 30 percent to 50 percent. If so, that could help make ethanol a viable alternative to foreign oil.

Xylogenics has yet to make the radar of industry analysts, so little is known about its prospects for success.

Generally, the quest for making cellulosic ethanol cost-effectively is taking two tracks.

One is the biochemical process using yeast. But Xylogenics isn't alone in this field, Michigan State University ethanol expert Bruce Dale has noted. He points to promising, better-known organisms such as one developed by Purdue University molecular biologist Nancy Ho. She licensed it to a Canadian company for making ethanol from wheat straw.

Research is also under way using thermo-chemical technology. Heat and chemicals are used to convert biomass into synthetic gas, which can then be turned into ethanol.

"Bottom line is, there is no miracle cure," said Wallace Tyner, professor of agricultural economics at Purdue.

"All the processes have potential, but they are all expensive. [There are] no clear winners yet. However, there are lots of exciting discoveries and potentials for the future."

Challenging market

As it is, the effort to make ethanol a viable alternative has been fraught with challenges for producers. Among them is a glut brought on by federal production mandates in the Energy Independence and Security Act of 2007. It requires 13 billion gallons of ethanol this year and 36 billion gallons by 2022. Yet an economic slowdown has resulted in reduced demand for fuel and hitting the targets is unlikely in the next few years, at least.

Ethanol's biggest use today is as a fuel additive for ordinary gasoline, most of which now contains 10 percent ethyl alcohol.

But distilleries ultimately would like to see widespread use of so-called E85, a mix of 85 percent ethyl alcohol and 15 percent gasoline.

Millions of so-called "flex-fuel" cars and trucks on the road can run on E85. It costs little for a car maker to equip these cars to run on E85 other than more robust fuel lines to handle alcohol's corrosive effect, changes to the emission system, and more nimble engine computers.

Even so, use of E85 has been tempered. Mostly, it's because E85 provides lower fuel economy than gasoline. It's cost-effective to use only when the price of gasoline is high relative to E85.

The pump price of E85 could fall dramatically if ethanol distillers could make their product with cheap sources of plant matter—cellulosic production.

Indiana's $3.6 billion corn-growing industry has a big stake in the issue. About 25 percent of Indiana corn is grown for ethanol.

The Indiana Corn Marketing Council has been working with Purdue researchers to identify opportunities to supply cellulosic matter—such as corn stover—in the event that cellulosic production pans out. Among questions is what price farmers need to be able to collect from the material to make it worthwhile, said Megan Kuhn, spokeswoman for ICMC.•