

Beer waste brewing fish food

Entrepreneurs bet water can become useful high protein

By Roger Fillion

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The popular Fat Tire Amber Ale has been heralded for its "toasty malty" flavor.

But the New Belgium Brewing Co. beer has another characteristic: It's a key ingredient in an environmentally friendly form of fish food.

Three Colorado entrepreneurs are wagering hundreds of thousands of dollars to convert the wastewater from New Belgium's brewing operations into a high-protein ingredient to feed farm-raised fish.

The trio and their Idaho Springs startup hope to usher in change to the booming business of fish farming, or aquaculture. Fish farming has taken off as the world's catch of wild fish has hit a plateau. Global fish consumption, meanwhile, is climbing.

Farm-raised species such as salmon and tilapia rely on other fish such as anchovies and menhaden, which are ground into fish meal.

"We can't support the growth of the aquaculture business using fish to feed fish," said Randy Swenson, CEO of Oberon FMR Inc. "The business we're in is fish meal replacement."

Global fish meal production has been relatively flat at around 6 million to 7 million metric tons a year in recent years. Aquaculture output, by contrast, has been climbing at an annual clip of 5-plus percent, to more than 48 million metric tons in 2005.

Oberon is teamed with the Colorado School of Mines and New Belgium to brew up its "fish meal replacement" at a pilot production plant at New Belgium in Fort Collins.

The pilot facility will feed and convert the protein-laden bacteria already swarming in New Belgium's brewing wastewater. The goal: to change that bacteria into a protein-rich biomass.

The resulting Jell-O-like goop will be dried into granules and added to fish feed, reducing the need for fish meal in the feed.

"You're taking what was previously a waste and turning it into fish food," said John Spear, assistant professor of environmental science and engineering at the Colorado School of Mines.

Spear noted the process could be duplicated with wastewater flowing from other food-related plants such as those making soy milk or jam.

Mines and Oberon landed a \$1.1 million grant from the National Science Foundation in 2006 to help bankroll the effort and to try out the protein ingredient in Bangladesh, a key aquaculture country.

The NSF said the project aims to cut the "environmental impacts of a major and growing global economic activity" - aquaculture. The process, it added, "could be implemented in many countries around the world."

And while environmental alarm bells have been sounded over fish farming, Renee Sharp, senior analyst at the nonprofit Environmental Working Group, likes the idea of Oberon's product.

"It sounds potentially very interesting and potentially very helpful," Sharp said.

Forty-three percent of fish that people eat worldwide come from aquaculture, according to a 2006 report from the Food and Agriculture Organization of the United Nations. That's up from 9 percent in 1980.

The level of fish caught in the wild, by contrast, has been flat. The FAO said that leveling-off, combined with a growing world population and increasing per-capita demand for fish, "spells trouble."

The organization raised questions about whether aquaculture can fill the gap, in part because of doubts about future fish meal supplies.

Enter Oberon. Founded in 2001, Oberon was the pet project of two Mines graduate students: Seth Terry and Andy Logan. Swenson, the CEO, joined in 2005.

A \$900,000 round of venture capital financing last summer from two funds - including one backed by Colorado Internet millionaire Jared Polis - helped Oberon in its bid to commercialize its technology.

"We thought they had a great package as a startup company," said David Tze, managing director of New York-based Aquacopia Venture Partners, which invested \$566,000.

Tze said Oberon's product is different from those being developed by other companies, such as Norway's Aker BioMarine and Florida's Neptune Industries Inc.

"None of the other products are based on material that is ultimately thrown away," Tze said.

At New Belgium on a recent sunny morning, workers cut pipe and scaled a ladder to prepare a 9,200-gallon plastic tank for use as Oberon's production plant.

"We're going to be retrofitting what was a water tank into a biological reactor," said Oberon cofounder Seth Terry, vice president of operations.

New Belgium's wastewater lines will feed the tank.

"We'll house the population of bacteria in this tank," Terry added. "The key is controlling the conditions under which the bacteria are growing."

Using a proprietary process, the bacteria will be nurtured to promote the growth of more protein-laden bacteria. The protein-rich biomass that results will be separated out in a nearby 2,500-gallon tank and dried into granules in a dryer.

Oberon plans to start producing up to 100 pounds of the granules a day by February. The company wants to ramp up that output to 500 pounds a day by the third quarter 2008 and eventually build a much bigger facility.

In addition to the planned feeding trial in Bangladesh, Oberon expects to ship the product to fish-feed producers that will add the protein ingredient to their feed.

"This is test material," Terry said. "It will not go into any finished product at this point."

Company executives want to begin commercial sales as early as next summer.

For New Belgium, the Oberon facility represents an environmentally friendly way to process its wastewater. The brewer is known for its green initiatives.

"We were pretty much interested from the first conversations we had with Seth and his crew," said Brandon Weaver, in charge of New Belgium's water treatment.

Oberon FMR Inc.

* **Headquarters:** Idaho Springs

* **Product:** High-protein ingredient to feed farm-raised fish in an environmentally sustainable way

* **Key input:** Wastewater from New Belgium Brewing Co.'s brewery facilities

* **Production:**

Up to 100 pounds of protein granules a day by February. Oberon wants to ramp up to 500 pounds a day by third quarter 2008.

* **Key partner:** Colorado School of Mines

* **Funding sources:** National Science Foundation and venture capital financing