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Yeast Research

Posted by steven.reynolds | July 23, 2009

Spoilage Yeast May Be Good for Fuel Production

Ever had a glass of wine that tasted the way a barnyard smells? The culprit likely was a yeast, *Dekkera* (*Brettanomyces*) *bruxellensis*, that plagues wine production worldwide. Thomas Henick-Kling is part of a multi-institutional team working to control the yeast and potentially reprogram it to add value in bioethanol production. Henick-Kling is director of WSU's viticulture and enology program.

The team is headed up by North Carolina State University researcher Trevor Phister, assistant professor of food, bioprocessing and nutrition sciences.

Collaborators from five labs won a grant from the U.S. Department of Energy's Joint Genome Institute (JGI) to sequence the *Dekkera* genome. Along with Phister and Henick-Kling, the team is comprised of Scott Baker of the Pacific Northwest National Laboratory, Linda Bisson of the University of California-Davis, Fred Dietrich of Duke University.

"From a microbial spoilage standpoint in wine,



Thomas Henick-Kling, director of V&E at WSU, is part of a new research

this yeast is the big problem we have,” Phister said. “Because the yeast thrives in high-ethanol environments, it also is a contaminant in biofuel fermentations, causing a decrease in the amount of ethanol that those fermentations produce.”

Brettanomyces’ smell has been likened to “barnyard,” “sweaty saddle,” “medicinal,” or “Band-aid.” WSU yeast researcher Charles Edwards said the yeast causes no adverse health effects, but the altered taste and smell of an affected bottle can deter consumers and, consequentially, cause problems for winemakers. Volatile chemicals produced by Brettanomyces are responsible for the off-odors.

Through the grant, Phister’s lab will provide JGI with the DNA of the yeast, and JGI will sequence it. Phister said the final step is for his team to examine the finished genome to make sure it is annotated properly. It’s a big project: The Dekkera genome has about 6,000 genes.

“There are people around the world trying to use the yeast to produce acetic acid and ethanol, but the full genome hasn’t ever been sequenced.” Phister said. “I know from my interaction with the wine community that there are labs in Australia, France and South Africa eager to use this sequence.

“Once we’re finished, we hope that the sequence will help in developing control measures for Dekkera in both wine and biofuel fermentations,” Phister said. “We’re also looking at adapting the yeast and trying to use it for fuel production.”

Phister expects the project to last from one to three years.

“It’s going to be an exciting project,” he said, “and it will shape the direction of future research.”

project that is looking to control a yeast with a reputation for spoiling wine.

For more information on yeast research at WSU, please check out these two articles from previous issues of Voice of the Vine:

<http://wine.wsu.edu/vinevoice/2008/04/17/virus-fighters-wild-yeast-upcoming-classes/> and <http://bit.ly/mjK1b>.

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