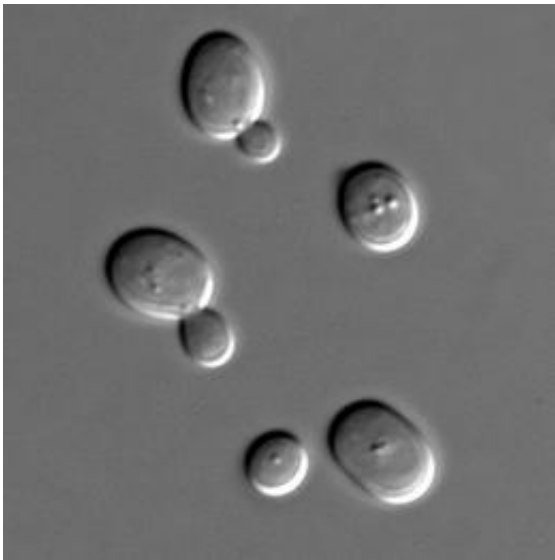


Baking sourdough? Biologist discusses yeast and fermentation

April 13 2020, by Brian McNeill



Sacharomyces cerevisiae cells in DIC microscopy. Credit: Wikipedia.

As most people are cooped up at home amid the COVID-19 pandemic, many are occupying their time by baking and experimenting in the kitchen. So much so in fact that baking ingredients—flour, yeast and eggs to name a few—have been in short supply on grocery store shelves.

Fernando Tenjo, Ph.D., associate professor and associate chair in the Department of Biology in the VCU College of Humanities and Sciences, teaches a course, Yeast and Fermentation, which explores the basic biology of yeast in beer and [wine production](#), as well as yeast properties

such as growth, structure, genetics, biodiversity and natural habitats.

VCU News spoke with Tenjo about the course, as well as why yeast—essentially a domesticated microorganism—is not only our friend, but also can provide clues to understanding human biology and disease.

What is it about yeast and fermentation that you find fascinating?

Fermentation processes have been part of human history and civilizations and it is fascinating to see the number of products that involve this process, such as bread, pickles, yogurt, kefir, salami, sour cream, cheese and some not that obvious, such as chocolate and coffee and indigo fermentation to stain textiles. What is fascinating is that all of these are the work of microbial communities that are the powerhouses that use their own biochemical processes to provide us with these products.

Many of us see microbes as foes but it is a minority that cause disease. Most food and beverage fermentation products are derived from microbial transformations. Fermented products are safer to consume than water in some places, they have an extended shelf life, and can have an increased [nutritional value](#). It is enlightening to see that fermentation provides an opportunity to bridge [traditional knowledge](#) with the scientific aspects behind the process. Furthermore, many fermented products also are tied to cultural values and are a part of regional and country identities.

Yeast is a single-celled eukaryotic organism closely related to us. It is a fungus and is considered a model organism to study processes that can provide clues to understanding many aspects of human biology and

disease. Yeast is tightly linked to fermentation processes and its role in this process involved many famous scientists, such as Louis Pasteur. I found it interesting that humankind has also domesticated this microorganism and we have selected the yeasts that provide us with the best results for our fermented products, such as beer, wine, etc.

In my course, I try to connect these two ideas and my view that learning about these processes can spark the student's curiosity and creativity to explore these areas in their future careers. I also encourage that they value the role of microorganisms and their contributions to us.

As you've been working from home, have you been occupying your time with any projects related to yeast and fermentation?

We have made pizza and will start making bread, and may start experimenting with sourdough since finding baker's yeast at the grocery store is as hard as finding other items (toilet paper!)

What's one thing that surprises your students when they're first learning about [yeast](#) and fermentation? Is there anything about the subject that is commonly misunderstood?

The students learn the role of different microorganisms and reaffirm or confirm that the bacteria and fungi are our friends and provide us with many benefits. Many also found that traditional beverages in the world are part of the culture and that people who make them do a small experiment that involves many concepts they learn in many courses (cell biology, biochemistry).

Yeast as a [model organism](#) is not surprising but after Derek Prosser, Ph.D., and Alaattin Kaya, Ph.D., from Biology and Stephen Fong, Ph.D.,

from the College of Engineering explained their work, the students realized the power of this single-celled organism to model human disease and the use in biotechnology industries.

One of the most surprising aspects is that the class provides them an opportunity to explore a new area where they didn't know their biology knowledge could be applied and maybe pursue a career in this area.

What advice would you give to people who are stuck at home and interested in trying their hand at, say, bread baking, beer brewing or another process that involves yeast and fermentation?

Just to start experimenting. I recommend the book, "The Art of Fermentation" by Sandor E. Katz. It is an inspirational reading and turns on the curiosity in anyone interested in this area.

For brewing, try one of the kits that brewing supply stores offer, maybe buy one of the starter kits and see if this is something that would be a hobby to explore. This is similar to my running experience; I started running in a 5K race, liked it and tried a 10K and from there I have run four marathons and close to 25 half-marathons. You just get into it and love the experimenting and trying new recipes and creating your own.

Anything else you'd like to add?

I just want to share the work of my students, and I will be happy to continue working in my class and find collaborators to involve other VCU departments and schools.

Provided by Virginia Commonwealth University

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