CLARK COLLEGE
COMMUNITY AND CONTINUING EDUCATION

Community Education Spring 2023

Fermentation Science 101

Wednesdays, 1:30-3:30PM
4/19-5/17, 5 weeks
CTC Campus Room 338
18700 SE Mill Plain Blvd

Instructor: **Kevin McCabe, PhD**
E-Mail: **Clark Email once issued**

Course Description: Learn about the underlying science behind fermentation, how the microbes involved transform ingredients, how, over millions of years, humans have coevolved with the microbes responsible for fermentation, and the similarities and differences in the fermentation of kombucha, beer, wine, cider, sake, spirits, bread, vegetables, chocolate, coffee, cheeses, soy, and meats. Includes two hands on experiences making sourdough starts and sauerkraut.

Learning Outcomes: ***As a result of taking this course, students will:***

Outcome #1*: Understand underlying science behind fermentation and how the microbes involved transform ingredients.*

Outcome #2: *Examine how humans have coevolved with the microbes responsible for fermentation.*

Outcome #3: *Compare and contrast the fermentation of various beverages and food products.*

Course Schedule:

Week 1: April 19, 2023 - Introduction and the Impact of Fermentation on Human Evolution, Societies, and History This week will introduce some of the basics of fermentation, and, generally, which microbes are involved, their roles, and how they transform the ingredients of the ferment. We will discuss how fermentation can serve to preserve food and provide additional benefits to us, and how this has shaped human history, societies, and even our genetics.

Week 2: April 26, 2023 - Bread, Beer, and Sake This week will introduce grain-based ferments. Building upon last weeks' history of early human fermentation, we will discuss the interrelationships of bread and beer early on, and then how they diverged as production left the individual home. The process of beer production will be contrasted with the production of sake from rice. Demonstration: Dr. McCabe will demonstrate how to make a sourdough starter covering basic principles and microbiology and how to care for it over time. Optional home exercise: Make your own sourdough starter and experiment with baking breads. (See supply list.)

Week 3: May 1, 2023 - Kombucha, Cider, and Wine This week will introduce ferments made from the sugars of fruits and vegetables. These ferments will be compared with fermented beverage production discussed last week. We will also discuss how some of these beverages can be transformed by distillation, and some of the unusual tricks to make distilled beverages taste the way they do.

Week 4: May 8, 2023 - Plant Based Ferments This week will cover a variety of plant-based ferments including sauerkraut, kimchee, rice bran and soy ferments, and how fermentation plays a role in chocolate and coffee production. Demonstration: Dr. McCabe will demonstrate how to prepare and start fermentation of a basic sauerkraut. Optional home exercise: Make your own sauerkraut or kimchee. (See supply list.)

Week 5: May 15, 2023 - Animal Based Ferments This week will cover a variety of animal based ferments including dairy, meat, and marine based ferments. We will discuss how fermentation can increase stability of perishable animal products and some of the basic food safety hurdles involved.

Selected Bibliography/Resources:

Below you will find recommended references and online links to give you more information about the topics of this course. If you have a special interest on a topic we discuss, please ask me for further references.

Rogers, A. (2014). Proof: The Science of Booze. United States: Houghton Mifflin Harcourt.

Palmer, J. J. (2017). How to Brew: Everything You Need to Know to Brew Great Beer Every Time. United States: Brewers Publications.

Katz, S. E. (2012). The Art of Fermentation: An In-Depth Exploration of Essential Concepts and Processes from Around the World. United States: Chelsea Green Pub.

Lukas, K., Peterson, S. (2019). The Farmhouse Culture Guide to Fermenting: Crafting Live-Cultured Foods and Drinks with 100 Recipes from Kimchi to Kombucha [A Cookbook]. United States: Clarkson Potter/Ten Speed.

Zilber, D., Redzepi, R. (2018). The Noma Guide to Fermentation: Including Koji, Kombuchas, Shoyus, Misos, Vinegars, Garums, Lacto-ferments, and Black Fruits and Vegetables. United States: Artisan.

Handbook of Animal-Based Fermented Food and Beverage Technology, Second Edition. (2012). United Kingdom: Taylor & Francis.

Class Evaluation: Class evaluations are sent by email. Sometimes the email will be delivered to your "junk mail," but we can assure you it's from Clark College only. Your responses are completely anonymous. If you do not see your evaluation immediately after class, look in your junk mail and send it to your email address. If you do not receive an evaluation, please email Continuingeducation@clark.edu or call 360.992.2939.

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As you will learn in the class, one key aspect of preserving fermented products, long term, is the ability to keep oxygen out once the fermentation is in progress and especially once it is finished. For the optional at home exercises, it will be helpful to have 2 or more wide mouth pint mason jars for your sourdough starts, 2 or more wide mouth quart mason jars for sauerkraut (or ½ gallon for kimchee), and 2 or more lids with airlocks or one-way valves for these wide mouth jars. Mason jars can usually be sourced from a grocery store, hardware store, farm supply store or online. Airlock or valved lids can usually be sourced from homebrew shops or online.