

Fermentation and Food

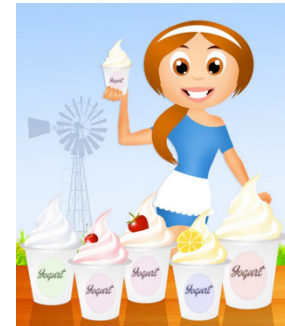
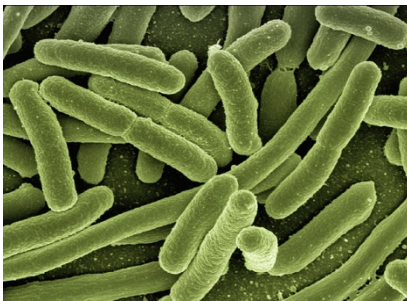


What is fermentation?

Fermentation is a metabolic process done by microorganisms as well as human cells. It can be used to create many things including wine, bread, yogurt, and beer. In the process, microorganisms break down carbohydrates such as starch and glucose and change them into carbon dioxide, alcohol, and energy. One of the key points of fermentation is that it is an anaerobic process. That means that the entire process does not use oxygen. This is the case for each example below. If the bacteria or yeast being used is exposed to oxygen, the process will not work.

Interesting Fact!

There are 1,500 different species of yeast currently identified.



What are the different types of fermentation?

There are two main types of fermentation:

1. Lactic acid fermentation: This type of fermentation is carried out by bacteria to make yogurt and by your own muscles when you are exercising.
2. Alcoholic fermentation: This type of fermentation is used by bacteria and yeast to create wine, bread, beer and biofuels.

Fermentation: A chemical process where sugars are changed into energy, acids, alcohol and gasses without oxygen being available. It is done in bacteria and yeast cells as well as in our own muscle cells.

How is bread made?

Bread is made with flour (a carbohydrate) and water along with baking powder (or baking soda) and yeast. Yeast is a eukaryotic, single-celled organism that feeds on the sugars found in the flour. At first, the yeast uses oxygen to convert the sugar into water and the gas carbon dioxide, which causes the bread to rise. Once it runs out of oxygen, the yeast continues to break down the carbohydrates anaerobically (without oxygen) and produces a small amount of alcohol. Any alcohol produced, however, boils away during baking.



How is yogurt made?

Ecobottle Sample



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How is wine made?

Wine is made with grapes and yeast. Grapes are picked and then squeezed so that all their juices can be collected. The yeast creates alcohol and carbon dioxide by breaking down the sugars found in the grape juice. The carbon dioxide is removed and the wine is bottled. The type of wine created depends on the grape that was used. For example:

- Chardonnay is a white wine made from the chardonnay grape.
- Merlot is a red wine from the merlot grape

Did you know that traditionally, winemakers used grape stomping to mash up the grapes in order to get their juices? Grape stomping involved barefoot participants repeatedly stomping on grapes to release their juices!



Lactic Bacteria: Bacteria that eat lactose, a sugar found in milk.

Beer fermentation:

Ecobottle Sample

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Field of barley



Airtight, fermentation tanks

Wort: Wort is what brewers call the sweet, amber liquid extracted from the barley used to make beer.

Reading Comprehension Questions:

1. What is fermentation?
2. What
3. What
4. How is bread made?
5. Which example
6. Fill in the blank. The type of wine created depends on the _____ that was used.
7. What is
8. What three things do you need to make beer?

Extension Questions:

Use your search engine to answer questions 9 and 10:

9. How is
10. What is the difference between still wine (regular white or red wine) and sparkling wine (a.k.a. Champagne)?
11. Make a

Ecobottle Sample



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References

Bread facts, information, pictures | Encyclopedia.com articles about bread. (n.d.). Retrieved from

<http://www.encyclopedia.com/sports-and-everyday-life/food-and-drink/food-and-cooking/bread>

Fermentation (Read) | Biology | CK-12 Foundation. (n.d.). Retrieved from

<http://www.ck12.org/biology/Fermentation/lesson/Fermentation-BIO/>

Fermentation | chemical reaction | Britannica.com. (n.d.). Retrieved from

<https://www.britannica.com/science/fermentation>

How Yogurt is Made - Yogurt | Dairy Goodness. (n.d.). Retrieved from

<https://www.dairygoodness.ca/yogurt/how-yogurt-is-made>

Science of Bread: Bread Science 101 | Exploratorium. (n.d.). Retrieved from

https://www.exploratorium.edu/cooking/bread/bread_science.html

Science of Pickles: Fermentation and Food | Exploratorium. (n.d.). Retrieved from

<https://www.exploratorium.edu/cooking/pickles/fermentation.html>