Class Starters & Enders

Making the Most of Instructional Time
Five Minute Lessons

Class Starters and Enders help utilize the last minutes of class when a lesson ends but there is not enough time to start another, or for an interest approach at the beginning of class. Mini-lessons correlate to GPS in the programs areas below.

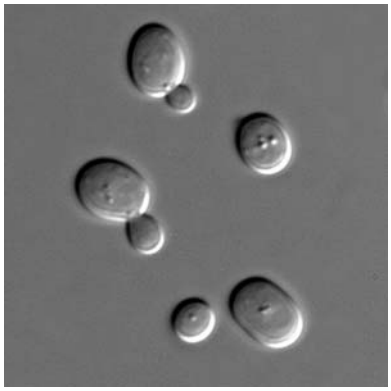
Why Does Yeast Make Bread Rise?

Program Areas: Culinary Arts, Family & Consumer Sciences, and Agriculture

Instructions: Read the material and make notes of important points, answer questions and be ready to discuss this topic.

There are **eukaryotic microorganisms** in your sandwich. Although microorganisms in bread sound a little science fiction, in reality, the **yeast** species *Saccharomyces cerevisiae* (*S. cerevisiae*) has been used in baking for thousands of years. *S. cerevisiae* is a species of **budding** yeast whose round cells are five to 10 micrometers in diameter. Without yeast, all of our bread would be flat and lack that doughy texture that we have grown to crave.

It is not known when yeast was first used to bake bread. The first records that show this use came from Ancient Egypt. Archaeologists digging in Egyptian ruins found early grinding stones and baking chambers for yeasted bread, as well as drawings of 4,000-year-old bakeries and breweries. Researchers speculate that a mixture of flour meal and water was left longer than usual on a warm day and the yeasts that occur in natural contaminants of the flour caused it to ferment before baking. The resulting bread would have been lighter and tastier than the normal flat, hard cake.



Saccharomyces cerevisiae under a microscope

Yeast is used in baking as a **leavening** agent, where it converts the **fermentable** sugars present in dough into carbon dioxide gas. This causes the dough to expand as gas forms pockets or bubbles. The yeast is mixed with flour, salt, and warm water or milk. The dough is **kneaded** until it is smooth, and then left to rise, sometimes until it has doubled in size. The dough is then shaped into loaves, left to rise until it is the correct size, and then baked. A longer rising time gives a better flavor, but the yeast can fail to raise the bread in the final stages if it is left for too long initially.

When the dough is baked, the yeast dies and the air pockets "set" giving the baked product a soft and spongy texture. The use of potatoes, water from potato boiling, eggs, or sugar in a bread dough accelerates the growth of yeasts. Most yeasts used in baking are of the same species common in alcoholic fermentation. Additionally, *Saccharomyces exiguus* (also known as *S. minor*) is a wild yeast found on plants, fruits, and grains that is occasionally used for baking. The presence of sugar and vinegar provide the best conditions for yeast to ferment. In bread making, the yeast initially respires aerobically, producing carbon dioxide and water. When the oxygen is depleted, **anaerobic respiration** begins, producing ethanol as a waste product. Ethanol, however, evaporates during baking.

However, yeast does have other uses besides bread making. *S. cerevisiae* is also extremely important as a model organism in modern cell biology research, and is one of the most thoroughly researched eukaryotic microorganisms. Researchers have used it to gather information about the biology of the eukaryotic cell and human biology.

Review Questions

1. What is the scientific name of the yeast species used in baking?
2. Where do archaeologists believe the use of yeast in bread making originated?
3. About how many years has yeast been used in baking?
4. Name four things that accelerate the growth of yeasts in bread dough.
5. What two things have researchers learned from studying *S. cerevisiae*?

Language Connection

Define the following terms

Anaerobic Respiration
Budding
Eukaryotic
Fermentable
Kneaded
Leavening
Microorganisms
Yeast

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