



# FERMENTATION IN PLANTS



## You Will Need:

- 4 teaspoons active dry yeast
- $\frac{3}{4}$  teaspoon amylase\* solution
- $\frac{3}{4}$  teaspoon glucoamylase\* solution
- 4 snack-sized zipper-top bags
- 4 index cards
- Ruler
- Marker
- 4 teaspoons of feedstock (cornstarch or table sugar)
- Water

\* Amylase and glucoamylase for science experiments can be purchased online.

## WHAT IS FERMENTATION?

Fermentation is the process of breaking down carbohydrates like starch and sugar into alcohol or acid. The process creates sources for renewable energy and foods like cheese and yogurt. In this experiment, we'll see how different enzymes affect the fermentation process.

## Steps

### 1. Prepare each zipper-top bag:

- Label each bag, with each having one of these descriptions: "no enzymes," "with amylase," "with glucoamylase" and "with both amylase and glucoamylase."
- Add 1 teaspoon of feedstock and 1 teaspoon of yeast to each bag.

**Tip:** Feedstock are raw materials that can be converted into energy.

- Add  $\frac{1}{4}$  teaspoon of each enzyme solution to the correct bag and add  $\frac{1}{4}$  teaspoon of warm water to the bag labeled "no enzymes."

**Tip:** If you have powdered glucoamylase and amylase, you can make a solution of each by mixing 2 cups of water with 1 teaspoon of the powdered enzyme.

### 2. Start the fermentation process

- Remove any excess air from each bag and close.
- Gently mix each bag and lay flat on a horizontal surface.
- Start your timer.

### 3. Record your data:

- Place an index card on top of each bag.
- After 5 minutes, measure the height of the bag by holding a ruler perpendicular to the table and recording where the index card has reached.
- Repeat every 5 minutes until 20 total minutes have passed.
- Compare your data. Which bags fermented fastest?