

Food Explorations Lab III: Multiplying Organisms

STUDENT LAB INVESTIGATIONS

Name: _____

Lab Overview

In this investigation, three types of food will each be placed in two different environments to determine which food and environment is best for the growth of mold.

Lab Objectives

In this lab, you will learn how to...

1. Identify factors that increase the growth of mold.
2. Identify ways to reduce the growth of mold on food.

Lab Safety: Before beginning ANY investigation you should put on your safety goggles and apron. It is important to avoid getting chemicals on your hands. Always wash your hands following completion of an investigation. When handling food, you should also wash your hands prior to beginning an investigation.

Lab Questions

1. Which of the following food items will produce the MOST mold growth? (Circle your answer.)

Apple Slices

Cheese

Bread

Prediction: I predict _____ will produce the most mold because...

2. Which environment will produce the most mold growth? (Circle your answer.)

Aerobic (air present)

Anaerobic (air not present)

Prediction: I predict the _____ environment will produce the most mold because...

Observation of Mold Growth

MATERIALS

Safety goggles	1 plastic sandwich bag
Aprons (optional)	1 plastic knife
1 slice of white bread	1 black permanent marker
2 slices of apple	1 microscope (optional)
2 pieces of cheese	2-3 microscope slides (optional)
1 paper plate	

PROCEDURE

1. Obtain your food samples. Draw your *visual* observations of each food in the Food Sample Drawings table under Day 1.
2. Prepare your food samples. Place one piece of each food type (half a slice of bread, 1 slice of apple, and 1 piece of cheese) in the plastic sandwich bag. The foods in the plastic bag should be considered an anaerobic environment (no air). Be sure to squeeze out any air from the plastic bag prior to closing it to ensure you are creating an anaerobic environment. Be sure to label your plastic bags with your group name.
3. Using the black marker, divide the paper plate into thirds. Place the remaining food samples (half a slice of bread, 1 slice of apple, and 1 piece of cheese) on the divided paper plate (aerobic environment, which has air). Be sure to label your paper plate with your group name.
4. Place all six food items to the side for later observation.
5. One to two times a week for up to 3 weeks, observe the food samples for visible mold growth. When mold is visible on at least 2 samples of the available food types, use a plastic knife to remove a small sample from each and proceed with the remainder of the lab investigation.
6. Record your *visual* observations after 3 weeks in the Food Sample Drawings table under Final Day. Be sure to identify if your sample was stored in an anaerobic or aerobic environment.

NOTE: Not all foods will produce mold.

7. (Optional) Observe each mold type under a microscope.

Table A. Food Sample Drawings

Apple		Cheese		Bread	
Day 1					
Final Day					
AEROBIC	ANAEROBIC	AEROBIC	ANAEROBIC	AEROBIC	ANAEROBIC
Brown and mushy; edges of skin are curled and brown	Brown and mushy	Some gray and black mold, dry, cracked	Lots of gray and black mold	Hard like toast; may have green mold on one side	A little moist, blue-gray mold all over

TEACHER'S NOTE: Mock observations may differ slightly in appearance

Conclusion:

1. Which food type had the most mold growth? Why?

Cheese grew the most mold because it provides the most nutrients (e.g. protein, water) mold needs for growth.

2. Describe how the mold types differ for each food sample? Consider appearance, color, and odor.

Each food and environment produced a different color mold. Each color represents a different type of mold.

3. For each type of food, which environment produced the most mold? Is oxygen necessary for the mold to grow?

Anaerobic produced the most mold because this environment retains more moisture. Oxygen is not necessary for mold to grow.

4. Brainstorm or research a few examples in which mold growth (fermentation) is used to produce food products. Describe your findings below.

Beer, Bread, Sourdough, Kimchi, Sauerkraut, Wine, Vinegar, Cider, Cheese, Yogurt, Chorizo, Salami, Pepperoni

5. Based on the reading and your observations, what conditions are ideal for microbial growth? Describe how food can be kept safe from molds.

The conditions ideal for microbial growth are food, low acidity, moderate temperatures (40-140°F), oxygen, and high moisture.