

Growth of Fungi on Plates

Introduction: Yeast are single-cell fungi. They are microscopic organisms, about the size of large bacteria, but they are eucaryotic whereas bacteria are procaryotic. Yeast have been used for thousands of years to make bread, as well as beer, wine, and other alcoholic products.

As yeast cells reproduce themselves, they make daughter cells that are identical to the parent cell. If a single yeast cell is placed on a semi-solid surface such as an agar petri dish that single cell will grow and divide to produce thousands of daughter cells. All the daughter cells will remain very close to the parent cell. Together all these cells will form a small, round, white visible clump of cells called a colony.

Many wild fungi are called molds and mildew. Most of these fungi produce long filaments called hyphae rather than single cells as yeast do. Wild fungi typically give a fuzzy, spreading growth rather than discrete colonies. These filaments (hyphae) form networks called mycelia. It is the mycelia that you see when you observe fungi growing on foods.

Objective: To observe the production of a colony of yeast cells on a semi-solid medium. To observe the growth of fungi that form hyphae and mycelia on a semi-solid medium.

Safety note: There are no specific safety concerns with this lab; however, students should always keep their work areas clear and clean and wash their hands after a lab activity.

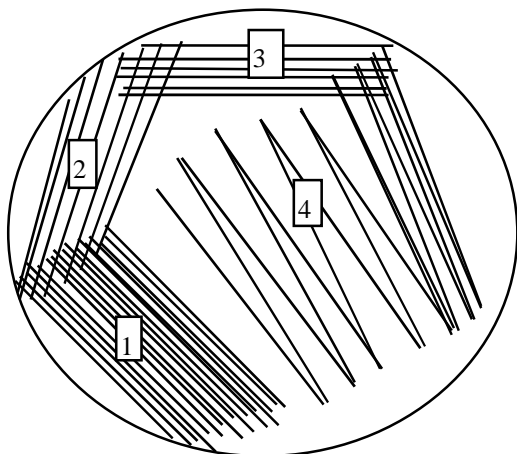
Materials (per student or group)

- agar or gelatin plates
- yeast solution
- toothpicks
- cotton swab (such as Q-tips)
- vegetables (such as carrots, green pepper, squash, potato, etc.)
- blue cheese
- marking pens

Procedure

A. Streaking the yeast solution on an agar or gelatin plate

1. Label the bottom of the plate with your initials and the date.
2. Look at the instructions in the picture below.
3. Dip the tip of a toothpick into the yeast solution. Then gently touch the toothpick to the surface of the agar or gelatin plate.
4. Using the same toothpick, gently streak the tiny droplet of yeast solution over the surface of the gelatin or agar. Do not dig the toothpick into the surface, and do not touch the surface with your finger as you streak. The pattern of streaking is shown below.
5. Incubate the plate at room temperature.
6. Observe the plate after 4-7 days.



Inoculation of a streak plate

1. Area of initial inoculation and first streaks yields heavy growth.
2. Area of second streaks from area 1 yields less dense growth
3. Area of third streaks from area 2 yields weak growth
4. Area of fourth streaks from area 3 yields single colonies.

B. Streaking wild fungi on an agar or gelatin plate

1. Label the bottom of the plate with your initials and the date.
2. Look at the instructions in the picture above.
3. Moisten a swab (Q-tip) in water and gently rub it over the surface of a fresh vegetable. If you are using the blue cheese, gently press the swab against a vein of blue mold in the cheese.
4. Place the moist swab on the surface of an agar or gelatin plate and gently rub it over the surface in the pattern shown in the picture above.
5. Incubate the plate at room temperature.
6. Observe the plate after 4-7 days.

Results

Most fungi will grow well on commercial agar plates such as Sabaroud Dextrose agar plates and many will grow on the homemade gelatin medium. Observe and record how quickly different fungi grow, their color and smell, and whether they form colonies (like yeast) or mycelia (which are made up of the threadlike filaments called hyphae).

Teacher Instructions

In advance

Purchase baker's yeast, fresh vegetables and blue cheese.

Purchase or prepare Sabaroud Dextrose agar plates. These are best for the growth of yeast and fungi.

If a commercial medium is too expensive, you can prepare homemade gelatin plates that will allow many fungi to grow. This homemade medium can be poured into sterile disposable petri dishes or, if those are too expensive, can be poured into foil muffin cup liners and stored in plastic sandwich bags.

For homemade medium you will need

- plain gelatin
- water
- sugar
- beef bouillon granules
- foil muffin (cupcake) cups
- muffin pans
- measuring spoons

In a saucepan, mix 4 envelopes of plain gelatin with 4 cups cold water, 8 tsp. sugar and 4 tsp. bouillon granules (or 4 bouillon cubes). Bring slowly to a boil, stirring constantly. Cool slightly and fill either (1) sterile disposable petri dishes or (2) foil muffin cup liners (cupcake cups) in muffin pans for support, about 1/3-1/2 full with the hot gelatin solution. Cool until the gelatin is solid. Remove foil muffin cup liners from muffin pan and store in plastic zip-lock bags in the refrigerator. Do not touch the surface of the gelatin. Makes 25-30.

Day of lab

Dissolve a package of yeast in about 2 cups of warm water. Place a small amount in several small beakers or jars for the students.

Optional activities

1. Streak the yeast on the agar or gelatin medium. Heat the yeast solution to about 180° F. Streak a sample of yeast after heating to determine the effect of heat on yeast.
2. Streak fungi on 2 agar or gelatin medium plates. Sprinkle salt or sugar liberally (but not in a visible layer) on the surface of one. Observe the effect of salt or sugar on fungal growth.

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