

Soil Microbes Lab

Objective

To understand that millions of microorganisms live in a handful of soil and these microorganisms, some too small to see with the naked eye, eat organic matter such as grass clippings, fallen plant leaves, and algae. In doing so, they reduce dead organic matter on Earth's surface and release nutrients from the decomposing organic matter for living plants to use.

Time

15-30 minutes to perform initial activity steps. Then 30 minutes, once each week for four weeks, to observe changes, make comparisons, and write down observations.

Materials and Tools

- 2 Handfuls of grass clippings
- 1 cup of potting soil
- 2 zip-closing plastic bags
- A sharp pencil
- A teaspoon

Preparation

Conduct a discussion about microbes, their composition, what they do, and where they are found in the natural environment. Discuss the decomposition of dead organic matter, toxins and pesticides. Discuss their relationship with plants, the importance of microorganisms, and what would occur if they were not present in the food chain.

Background

The existence of soil is a primary component in the decomposition of dead organic matter. Soil needs to be at a minimum temperature and moisture level for active decomposition to occur. Air must be available for microorganisms to respire and decompose the dead organic matter. Over time, dead organic matter is reduced in size and volume, continually keeping Earth's surface clear of dead debris.

Composting is the process through which microbes in soil transform dead organic material, such as dead plants and animals, into humus. Humus is an important source of soil nutrients. Gardeners make compost piles by placing layers of kitchen scraps and dead plants in between layers of garden soil. The soil provides a place for soil microbes to live and to decompose dead organic matter. Earthworms contribute by helping to digest the dead organic matter and excreting it as casts which are also rich in nutrients.

Procedure

1. Place one handful of grass clippings in each of two plastic bags.
2. In one bag, add a cup of fresh potting soil and mix well. In the other, leave the clippings as they are. Seal both bags.
3. With a pencil, carefully poke 5-10 air holes in each side of each plastic bag. Be careful not to poke yourself.
4. Place the bags in a dark place. Once each week, open the bags and add a teaspoon of water.
5. After one week open the bags and look inside. Look closely at the grass. Aside from being dirty in the soil bag, does the grass in either bag look like it has changed from when you placed it in the bag initially? Write down your observations. Close the bags and put them back into a dark place.
6. After one more week, open the bags and look closely again at the grass in each bag. Compare what you see. Write down your observations. Close the bags and put them back into a dark place.
7. Continue to observe the bags for the next few weeks. Write down your observations and explain what you think is happening to the grass, and what is going on in the soil.

Conclusion

1. What has happened to the grass that was initially placed in the soil? What happened to the grass without soil?
2. Over time, what is occurring to the grass in the soil? What is occurring to grass that has no soil?
3. What role do air, water, and temperature play in the decomposition process? If the air, water, and temperature levels are low what do you think will happen or won't happen to the grass, soil, and microorganisms living in the soil?