

Identifying a Limiting Nutrient

Limiting nutrients control the growth of organisms in many ecosystems. Excess nutrients can promote the growth of weeds, disease-causing bacteria, and other undesirable organisms. In this investigation, you will determine whether phosphate is a limiting nutrient for the growth of algae.

Problem

Does the supply of phosphate limit the growth of algae?

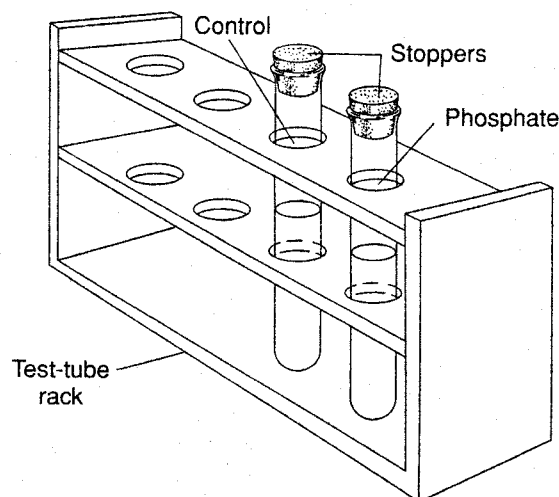
Materials

- dropper pipette
- algae culture
- 2 test tubes with stoppers
- test-tube rack
- 50-mL graduated cylinder
- pond water
- glass-marking pencil
- 10% trisodium phosphate solution

Skills Formulating Hypotheses, Predicting

Procedure

1. Put on your safety goggles, apron, and plastic gloves. Use a dropper pipette to place 20 drops of algae culture in each of two test tubes.
2. Use a 50-mL graduated cylinder to add 19 mL of pond water to each test tube.
3. Use the glass-marking pencil to label one test tube "control" and the other test tube "phosphate." Use a dropper pipette to add 2 drops of trisodium phosphate to the "phosphate" test tube. **CAUTION:** *Trisodium phosphate can injure your skin. Do not get it on your skin or touch your face after handling it.*
4. Stopper both test tubes and place them in a sunny place. Wash your hands.



5. Formulating Hypotheses Record your hypothesis of how phosphate will affect the growth of the algae if it is a limiting nutrient. Also, record your prediction of how the two test tubes will appear after 7 days.

Hypothesis: _____

Prediction: _____

6. Observe the two test tubes each day for the next week. Record your observations each day in the data table below, including a labeled sketch of each test tube.

Data Table			
Day	Tube	Observations	Sketches

Analyze and Conclude

1. **Observing** How did the added phosphate affect the growth of the algae?

2. **Drawing Conclusions** Do your results indicate that phosphate is a limiting nutrient for algae?

3. **Evaluating and Revising** Do your results support your hypothesis? If not, how would you revise your hypothesis?

4. **Predicting** Some detergents are labeled as environmentally safe because they contain little or no phosphate. What differences might you expect to find between a lake that contains high levels of phosphate detergents and one that contains low levels of phosphate detergents?
