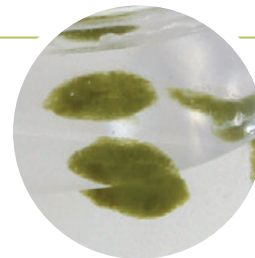


Using Algae Beads as a Model for Photosynthesis

A Carolina Essentials™ Activity

Student Worksheet



Overview

Photosynthesis occurs in all green plants. In this activity, algae beads serve as a model for photosynthesis. Algae beads are made of algae and sodium alginate solution. They allow for indirect observations in the concentration of oxygen produced during photosynthesis. Qualitative and quantitative observations of the algae beads—in culture tubes exposed to light and shielded from light—will be recorded for a period of 4 days. Based on the evidence recorded, you can develop a model of photosynthesis.

Essential Question

How does photosynthesis transform light energy into stored chemical energy?

Activity Objectives

1. Create green algae spheres for use in photosynthesis experiments.
2. Observe algae beads for evidence of photosynthesis.

Safety Procedures and Precautions

Students will need lab safety goggles, aprons, and safety gloves.

Procedure

1. Place 5 mL of green algae culture into a culture tube.
2. Add 2.5 mL of 2% sodium alginate solution to the tube, place the cap on the tube, and mix for 1 to 2 minutes.
3. Collect some of the mixture into your pipet.
4. Hold the pipette over a beaker containing 3% calcium chloride (CaCl_2) solution. The calcium chloride solution should be cold.
5. Gently depress the bulb on your pipet to release the algae mixture drop by drop into the beaker. Do this slowly and uniformly. As the algae mixture drops in the calcium chloride, the algae will be immobilized inside of a bead. Your mixture should allow you to make approximately 100 algae beads.
6. Collect your beads using the plastic spoon provided and rinse them using the distilled water in the wash bottle.
7. Transfer the beads to your clean culture tubes and fill the tubes with distilled water.
8. Tightly wrap one tube with aluminum foil so no light can penetrate.
9. Place the tubes in a well-lit area designated by your teacher.
10. Observe the algae beads daily for 3 to 4 days. Rinse tubes when finished.

Disposal

Wash contents down a lab sink/drain using plenty of water. Dispose of any waste in accordance with local regulations.

Continued on the next page.

SAFETY REQUIREMENTS



MATERIALS

Thick green algae culture (*Chlorella*, *Ankistrodesmus*, or other freshwater species)

2 culture tubes, 15 mL

3 mL 2% (by mass) sodium alginate solution

30 mL 3% (by mass) calcium chloride solution in a 250-mL beaker

1 plastic spoon

1 distilled water in wash bottle

1 pipet

Aluminum foil



Data and Observations

Observations	Not wrapped (color, position in tube)	Wrapped (color, position in tube)
Day 1		
Day 2		
Day 3		
Day 4		

Analysis

1. Explain the differences in results between the covered and uncovered tubes.
2. What causes the algae beads to float to the surface?
3. Use the evidence you gathered to develop a model explaining the relationship between the position of algae beads in the tube and photosynthesis.