

The Effect of Salt on Plant Cells

Salting an eggplant to demonstrate the effect of salt on plant cells.

Materials

- A large eggplant
- Salt

Distribute the worksheets or investigation booklets for students to use to draw their predictions of what will happen when the eggplant is salted. (Students will also use the investigation booklet for the salt and ecosystem case studies that follow.)

Demonstration: Salting the eggplant

Key Idea: Salt pulls water out of cells killing them.

In their Investigation Booklet or worksheet, ask students to draw their predictions of what will happen when you place salt on the eggplant.

1. Slice a large eggplant in half longitudinally
2. Cover the eggplant with generous amounts of table salt.
3. Watch how the salt draws the water out of the cells (osmosis). The eggplant will get very wet.

NOTE: It can take 15 minutes for the water to leave the eggplant. You may want to set up this demonstration at the beginning of the period and return to it after completing the next steps in the lesson.

Discussion

Question: Where did all the water come from?

Answer: The water is pulled out of the cells by the process of osmosis (See Teacher Tip for another suggested demonstration about osmosis).

Question: What happens to the eggplant without all of that water?

Answer: If the eggplant was still growing, its cells would not have the necessary water to perform important life functions and would die.

Question: How do you feel when you eat potato chips? Are you thirsty?

What do you think is happening to your cells?

Answer: The water is diffusing via osmosis out of the cells, decreasing the quantity of water in their cells and causing them to be dehydrated. That is why after eating a bag of potato chips, you feel thirsty.

Question: Using what happened to the salted eggplant, develop an explanation for what happens to a person's cells when a person drinks seawater?

Answer: A person's cells would also lose water that they need for normal life functions, which would disrupt homeostasis (a stable internal environment) causing that person's cells and eventually that person to die!

Alternative Demonstration

Another simple way to show the effect of salt water on plants is to place a piece of celery in a glass half full with water and one tablespoon of salt for 24 hours. The celery will wilt and lose its rigidity because the salt water is hypertonic and causes the water from inside of the celery cells to go into the solution.

Background: Where did the water come from? – OSMOSIS!

Osmosis is when water moves across a semi-permeable membrane (i.e. the outside layer of the cell) from an area with low levels of dissolved material (solute) to an area with a high levels of dissolved material (solute) In this case, the salt sprinkled on top of the eggplant dehydrated the plant by drawing the water across the eggplant cell membranes and out of the eggplant!

Teacher Tip:

Osmosis and Diffusion can be defined and introduced at this part of the lesson.

Osmosis: the diffusion of water (across a membrane). Water will move in the direction where there is a high concentration of solute and hence a lower concentration of water.

Diffusion: the process by which molecules spread from areas of high concentration to areas of low concentration.

Ecology Disrupted:

Winter Roads

Teachers guide and all materials for this lesson can be found on the web at
<http://www.amnh.org/explore/curriculum-collections/ecology-disrupted/winter-roads>