### **Real World BioApplications**

# Chapter 8

## Osmosis and the Case of the Sad Salad

magine opening up the refrigerator to take out carrots, lettuce, cucumbers, tomatoes, and other vegetables in order to prepare a delicious, crisp salad for your family's dinner. You rinse off the vegetables, slice them up, place them in a big bowl, and lightly season them with salt, pepper, and salad dressing. Finally, you place the bowl of salad in the refrigerator, finish some homework, and listen to a few CDs until it is time to eat. At dinner, as you prepare to enjoy your crunchy creation, you suddenly realize that your once

delicious-looking salad isn't so desirable anymore—the carrots feel like rubber coins, the cucumbers are dry and limp, and the lettuce is wilted. What has happened to your salad?

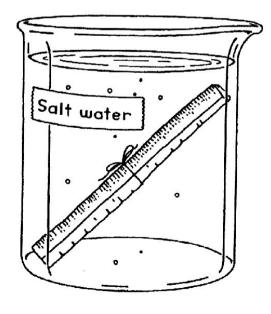
Wilting houseplants, rubbery carrots, and limp lettuce all illustrate the same important biological principle—osmosis, the diffusion of water. In this activity, you'll investigate how the process of osmosis affects plant cells, and learn some ways to prevent a sad salad.

#### PROCEDURE

- 1. Fill two 250-mL beakers three-fourths full with distilled water.
- 2. Add five teaspoons of table salt to one beaker, stir thoroughly, and label it "salt water."

  Label the other beaker "distilled water."
- **3.** Obtain two similar carrot sticks. Tie thread or string tightly around each carrot, as shown in Figure 1. Be sure the thread is tight around each piece.
- 4. Submerge one carrot stick in the beaker of

- salt water and the other carrot stick in the beaker of distilled water.
- **5.** Allow the beakers to stand undisturbed for 24 hours.
- **6.** Remove the carrot sticks. Observe the tightness of the threads. Squeeze and bend each carrot stick to determine its texture.
- **7.** Complete the table based on your results and observations from the experiment.



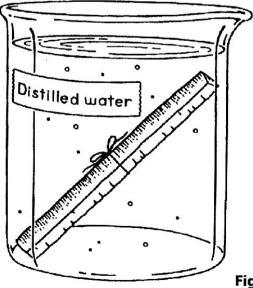


Figure 1

## Osmosis and the Case of the Sad Salad

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Table 1

Condition of Carrot Stick	Type of Water
Loose thread	
Cells gained water	
Soft texture	
Tight thread	
Firm texture	
Cells lost water	

ANALYZE AND CONCLUDE

- 1. What was the purpose of tying thread around each carrot stick?
- 2. Using your knowledge of osmosis, draw a diagram to explain what happened to the cells of the carrot sticks in this experiment.

- **3.** A good way to prevent a sad salad is to always keep vegetables covered with plastic wrap, rather than exposing them to the air. Use your knowledge of osmosis to explain why this method works.
  - **4.** Supermarket workers spray fruits and vegetables with water to make them more desirable to consumers. Why does spraying vegetables with water prevent them from drying out?