

Biology 2201 Lab  
Osmosis in Plant Tissues

**Purpose:** To determine which concentration of salt solution provides an isotonic environment for potato cells.

**Method:** Pieces of potato are weighed and placed in beakers containing different concentrations of salt solutions (0%, 1%, 2% and 5%). After a period of time the potato pieces are removed, dried and weighed again. The change in mass can be used to determine the direction and relative rate of osmosis.

**Hypothesis:** Make a statement about which of the solutions will be isotonic with potato cells.

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**Prediction:** What do you think will happen to the mass of potato pieces in each solution?

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**Materials:**

* 4 - 50mL or 100 mL beakers	* 4 - 2cm x 2cm cubes of potato
* 25 ml of each salt solution (0%, 1%, 2% and 5%)	(cut from the same potato)
* electronic balance	* petri dish

**Procedure:**

1. Cut four cubes measuring 2cm x 2 cm from the potato provided.
2. Obtain four 50 or 100 mL beakers and place 25-40 mL of the various salt solutions in different beakers. Label the beakers carefully.
3. Place a clean dry petri dish on the balance, and zero the balance.
4. Determine the mass one of the four potato cubes by patting it dry with paper towel first and then placing it in the petri dish on the balance.
5. Wipe the petri dish dry and repeat steps 3 and 4 for the other three cubes.
6. After all cubes have been massed, place one cube in each salt solution, being careful to note which cube is placed in which beaker. Leave the solutions for 20-30 minutes.
7. Remove all four cubes from the beakers, being careful to note which cube came from which beaker.
8. Find the mass of each cube as in steps 3-5 above.
9. Pour out the salt solutions, discard the potato cubes and clean up your work area.

**Variables:** What is the manipulated (independent) variable in this experiment?

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What is the responding (measured or dependent) variable in this experiment?

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What conditions are kept constant in this experiment?

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**Results:** Record your data below:

Beaker Number	Salt Solution Concentration	Initial Mass of potato cube (g)	Mass of potato cube after 20-30 min (g)	Percent Difference	Percent Difference (Class Average)
1	0%				
2	1%				
3	2%				
4	5%				

**Analysis:** 1. Calculate the percent difference in mass for each potato cube as follows:

$$\% \text{ difference} = [( \text{Final Mass} - \text{Initial Mass} ) \div \text{Initial Mass}] \times 100\%$$

2. Discuss the changes in mass you observed in each beaker, using the terms isotonic, hypertonic and hypotonic.

3. Compare your percent differences with the class averages. Why would class averages provide more useful information than your data alone?

4. Write a suitable conclusion for this experiment in terms of your hypothesis and the purpose of the experiment.