**Egg Osmosis**

**Problem:** To observe osmosis in a cell

**Background Information:**

 *Osmosis* is the diffusion of water across a selectively permeable membrane. This means that water can go through membranes from areas where there are a lot of water molecules to areas where there are not so many water molecules. To perform their functions, cells must keep an internal steady state even when the environment outside of the cell is changing. This steady state is called *homeostasis*. Homeostasis is maintained in part by controlling the movement of materials into and out of the cell. To achieve this control, cells are surrounded by a membrane that can tell different substances apart, and can slow down or stop the movement of some substances while allowing others to pass through freely. Because not all substances can go through the cell membrane equally well, the membrane is said to be differential, or *selectively permeable.* Selectively permeable membranes are those that have openings called *pores* that let water, oxygen, carbon dioxide and certain other small molecules go through the membrane. Cells in the human body need a constant supply of oxygen and water. They are also making carbon dioxide as a waste, and this needs to be removed from the cell. These substances can move into and out of a selectively permeable membrane around a cell through the process of *osmosis*.

**Materials:**

|  |  |  |
| --- | --- | --- |
| 1 raw egg | Plastic wrap | Corn syrup |
| Graduated cylinder | Rubber band | Water |
| Large plastic cup | Vinegar | Triple beam balance |

**Procedure:**

Day 1:

1. Observe the egg. Record your observations in the data table.
2. Use the triple beam balance to find the mass of your egg. Record.
3. Place the egg in your plastic cup.
4. Using the graduated cylinder, measure out 200 ml of vinegar and pour into cup.
5. Cover the cup with plastic wrap and place a rubber band around the cup to hold the plastic wrap in place. Write your name on the plastic wrap.
6. Place cup in appropriate location.

Day 2:

1. Observe the egg. Record your observations.
2. Using your fingers, carefully remove your egg from the cup. You egg is very fragile now. If you break your egg, you will receive no credit for this lab.
3. Gently rinse the egg and find its mass. Record.
4. Using the graduated cylinder, measure the amount of vinegar left in the beaker. Record.
5. Rinse your cup and place egg back into cup.
6. Measure out 200 ml of corn syrup and pour into cup.
7. Recover your cup with plastic wrap.
8. Place cup in appropriate location.

Day 3:

1. Observe the egg. Record your observations.
2. Using your fingers, carefully remove your egg from the cup. You egg is still very fragile. If you break your egg, you will receive no credit for this lab.
3. Gently rinse the egg and find its mass. Record.
4. Using the graduated cylinder, measure the amount of corn syrup left in the beaker. Record.
5. Rinse your cup and place egg back into cup.
6. Measure out 200 ml of water and pour into cup.
7. Recover your cup with plastic wrap.
8. Place cup in appropriate location.

Day 4:

1. Observe the egg. Record your observations.
2. Using your fingers, carefully remove your egg from the cup. You egg is still very fragile. If you break your egg, you will receive no credit for this lab.
3. Gently rinse the egg and find its mass. Record.
4. Using the graduated cylinder, measure the amount of water left in the beaker. Record.
5. Dispose of your egg according to instructions.
6. Clean all equipment.

**Data Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Day** | **Mass of egg (g)** | **Volume of liquid left in jar (ml)** | **Observations of Egg** |
|  **1** |  | 200 ml |  |
| **2** |  |  |  |
| **3** |  |  |  |
| **4** |  |  |  |

**Data Analysis:**

Make a line graph to compare the change in the egg’s mass as the type of liquid changed. You will have four data points on your graph. Remember to title and label your graph. Use a ruler!

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 Describe the relationship shown in this graph:

Make a line graph to show the change in the volume of the liquid from day to day. You will have four data points on your graph. Remember to title and label your graph. Use a ruler!

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Describe the relationship shown in this graph:

**Questions to be answered using complete sentences:**

1. When the egg was placed in the water, which direction did the water molecules move? Why?
2. After the egg sat in the syrup for 24 hrs, did the volume of syrup increase or decrease? Explain why this happened.
3. Grocery stores spray their fresh produce with water throughout the day. This keeps the produce looking fresh and plump. Explain how this keeps the produce fresh and how osmosis plays a role in this situation.
4. If a shipwrecked crew drank salt water, they could die of dehydration. Explain how osmosis plays a role in this situation.
5. If a bowl of fresh strawberries is sprinkled with sugar, a few minutes later they will be covered with juice due to osmosis. Explain why osmosis occurs.