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| **Session 5:**  | **Osmosis** |

##

**Skills developed in this session:**

* Preparation of solutions
* Use of instruments to measure volume, measuring cylinders, pippettes etc.
* Use of volumetric flask
* Use of Excel to design Tables and graphs
* Use of Excel for basic statistics
* Calculating percentajes

## Assessed criteria

Criterion C: Processing and Evaluating

Criterion E: AIE

**Research Question**

“How does sucrose concentration of a solution affect the mass of potato cells?”

**Background Information**

Osmosis is the movement of water from a solution with high solute concentration to a low solute concentration.

 

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* A solution that has the same solute concentration as a cell is called **ISOTONIC**, there will be no net movement of water molecules because there is no concentration gradient.
* A solution with a lower solute concentration than inside the cell is called **HYPOTONIC**. This means there is a high water potential outside the cell and there will be net movement of water into the cell.
* A solution with a higher solute concentration is called **HYPERTONIC**. This means there is a low water potential and there will be a net movement of water out of the cell.

**Objective**

To determine the internal concentration of sucrose in potato cells.

**Hypothesis** (*Complete this section)*

As the concentration of salt in the solution increases, the potato will **lose/gain** weight because……………………………………………………………………………………………………………………………………

**Materials**

|  |  |  |
| --- | --- | --- |
| 1 M sucrose solution | 100 mL volumetric flask | Metric ruler |
| Potato | 25, 50 and 100 mL measuring cylinder | Electronic scale |
| Knife | 3 glass jars | Distilled water |
| Potato chopper | Dropper | Tissue paper |

**Method**

*Working in groups of three prepare 100mL sucrose solutions of the following concentrations*: *(Remember M1 x V1 = M2 x V2)*

1. Group 1🡪0 M, Group 2 🡪0.2 M, Group3🡪0.4 M, Group 4🡪0.6 M and Group 5🡪0.8 M.
2. In order to make the solutions you will dilute a 1 M sucrose solution (already prepared) using distilled water.
3. Pour your solution into the 3 glass jars, giving each jar more or less the same amount.
4. Take a potato slice with a thickness of 1 cm, and cut it with the potato chopper until you have 15 pieces with a similar mass and surface area.
5. Dry off the pieces and measure their mass in groups of 5 pieces of potato using a scale. Write down their initial mass.
6. Place 5 pieces of potatoes in each glass jar with the sucrose solution you have prepared for 45 minutes.
7. Remove, dry and weigh again. Write down their final mass.
8. Share your data with the rest of your classmates. Record the initial and final mass for each sucrose solution on a table.
9. Calculate the mass percent variation for each sucrose solution.
10. Mass percent variation= (final mass – initial mass / initial mass) x 100

**Results** (*Complete this section*)

* Record all the values on a table.
* Draw a graph which represents the mass variation percent against the sucrose solution concentration.
* Determine the internal concentration of potato cells.

**Conclusion** (*Complete this section*)

Draw conclusions from your graph and link to scientific reasons (see background information).

**Evaluation** (*Complete this section*)

How accurate are your results? What stages of the method might have changed the accuracy of your measurements?

**References** (*Complete this section*)