

Biology experiment
on osmosis for gcse
very good got
assignment



**ASSIGN
BUSTER**

The effects of osmosis on potatoes placed in different salt concentration

Introduction: Osmosis is a movement of water across a semi-permeable membrane. This may only happen when there is a difference in concentration between the two sides of the membrane. The water moves from low concentrations to high concentrations. That is because the low concentrated area tries to dilute the opposite via osmosis. The effects osmosis has on a cell are either that it becomes turgid and hard as water enters the cell or it becomes dehydrated (this is called plasmolysis in plant cells) as water leaves the cell and the solution enters.

There is a change of mass, volume, texture and length. Aim: The aim is to investigate the effects of varying concentrations of a salt solution on the amount of osmotic activity between the solution and a potato of a given size.

Osmosis: Process of Osmosis Osmosis is the process of the flow of one constituent of a solution (in this case salt) through a membrane while the other constituents are blocked and unable to pass through the membrane. Experimentation is necessary to determine which membranes permit selective flow, or osmosis, because not all membranes act in this way.

Many membranes allow all or none of the constituents of a solution to pass through; only a few allow a selective flow. That is why I have chosen potatoes as my semi-permeable membrane. In osmosis, a solvent (often water) moves from a region of low concentration to a region of high concentration through a semi-permeable membrane. Here, water molecules diffuse into the concentrated salt solution because the water molecules are small enough to move through the semi permeable membrane. The larger

salt molecules are unable to move through the membrane into the water solution cause the membrane acts as a net.

Osmosis will stop when the two solutions reach equal concentrations on either side of the membrane. Hypothesis: The hypothesis is that as the solvent, the water enters the potato cell to dilute the concentrated salt solution inside the cells. As the salt solution gets weaker more water will enter the cell. This is because more water is needed to dilute the stronger salt solution concentration in the potato cells. The water will try to flow in and out of the potato continuously until it will reach an isotonic equilibrium. The potato cells become turgid and hydrated.

However the potato is a plant therefore it has a cell wall that means that at some point the cell wall will stop letting in water or slow its flow down. If the plant cells did not have a rigid cell wall they would burst, like in animal cells which have soft cell walls. In this particular investigation I intend to prove that the lower the concentration of the salt solution in the Petri dish, the greater the mass of the potato will be. This is because the water molecules pass from a high concentration, I. E. In the water itself, to a low concentration, I. E. In the potato chip. Therefore, the 4 CM core bored potato ? Pips? In higher water concentrations will have a larger mass than in higher salt concentrations. If the concentrated salt solution is stronger than the isotonic solution then the cell will lose water. Water will leave the cell and dilute the strong salt solution outside the cell. It will make the concentration gradient equalize. As the strength of the concentrated solution increases the more water will leave the cell. The potatoes cell wall will only shrink because it is only the cell wall that will dehydrate or polymerase, but <https://assignbuster.com/biology-experiment-on-osmosis-for-gcse-very-good-got-assignment/>

only up to a certain extent because it is only the vacuole that will seriously shrink.

The polymerase plant cell can be seen under a microscope. My prediction for this particular investigation is at about 0.4 / 0.6 [molar] concentration the salt solution there will be an increase in both mass and length of the potato. The weaker the salt solution the further the solution the quicker will cause decrease in mass and length in the potato. To examine and create an appropriate range of results. For this experiment six Petri dishes were used each with five 4 CM core-bored pieces of potato.

As evidence of osmosis occurring I used the difference of weight before (after being blotted for six minutes) and after being in the salt solution. The control is five core-bored potatoes in a distilled water solution. Here nothing anomalous should occur. To make the results valuable the experiment is replicated five times in each Petri dish. Any anomalous results in the potatoes it will be noticed and recorded To ensure reliability of results, the whole experiment will be replicated to increase the accuracy of the results. Further information on potato plant cells: Plant cells always have a strong cell wall surrounding them.

When they take up water by osmosis they start to swell, but the cell wall prevents them from bursting, unlike animal cells. E. Weick cells, which explode if they take up too much water. Plant cells become "turgid" when they are put in dilute solutions. Turgid means swollen, Stilt and hard. The pressure inside the cell rises and eventually the internal pressure of the cell is so high that no more water can enter the cell. This liquid or hydrostatic

pressure works against osmosis. Turgidity is very important to plants because this is what makes the green parts of the plant “ stand up” into the sunlight.

Weigh each piece individually and record the weight on the table. 5. Put these cores into a beaker of water so they do not dry before the others. 6. Do this five times for each Petri dish 7. Keep adding each piece in too a beaker of water . Blot the potato with paper towel to remove excess water only when they have all been cut 9. Weigh each piece individually and take note (add the results to the table) 10. Pour distilled water into Petri dish 11 . Set stop watches in front of each Petri dish 12. With a permanent marker write the concentration of [molar] in each Petri dish 13.

Note the time and put the five potato cylinders into each Petri dish 14. Put each five cores in the Petri dish at five minutes interval 15 Wait 25 minuets (while waiting you may prepare the apparatus tort 16. Each Petri dish with his contents will be in for 25 minutes he next tact 17. Weigh each potato individually and take note (add the results to the table) 18. Record the new mass next to the old one Risk assessment: 1 . Lab coat must be worn at all times to avoid stains and cuts on clothes. Also getting clothes tangled or attached to the set apparatus, which may cause it to fall or break. . While using the scalpel always put white tile underneath, never use the scalpel on the top of bench or while holding sharp object it in hand because it may cause an injury or damage the furniture. 3. Whenever using the core bore make sure that no item of clothing, furniture or errors is directly under the core bore when the perforation of the potato is about to occur. 4. If any beaker or glass item falls on the floor and breaks make sure that no one

<https://assignbuster.com/biology-experiment-on-osmosis-for-gcse-very-good-got-assignment/>

goes near or try? s to touch it and that the glass is brushed away into a non plastic bin liner.