

How does the relationship between salt concentration

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How does the relationship between salt concentration effect osmosis in the aquatic plant Elodea? Quantitative data From observing the cells under a microscope, we see that they are continuously moving and therefore are alive. We have observed that when the cells are in the 10% sodium chloride, the chloroplasts are positioned to the sides of the cell wall and the cytoplasm is more expanded. Cells in the distilled water are slightly smaller than the cells in the sodium chloride solution and the chloroplasts have begun moving to the same.

Finally, cells in the isotonic water are very small and equally spread out through out the cells. Conclusion From observing the Elodea in different concentration of water, we can see that the more concentrated the solution is, the more osmosis occurs. This can be seen from the change from observing the plant in isotonic water, distilled water and a 10% sodium chloride solution. As the concentration of the solution increases, the cytoplasm and chloroplast was pushed to the edges of the cell membrane instead of being spread out like in the isotonic water.

This observation is especially visible for the 10% sodium chloride solution; where all of its chloroplast was on the boundary and pressure of the cytoplasm is more. This occurs because of osmosis where water molecules move in the sodium chloride solution as osmosis works from a region of lower solute concentration to a region of higher solute concentration across a partially permeable membrane. The sodium chloride molecules moves across the membrane so the net is in equilibrium, due to this the elodea contain more water and therefore becomes larger.

At some cells, we can see that they look very weak and dull, these are the cells which are reaching the maximum capacity of water they can obtain. If we were to leave the elodea in higher concentration solution they may burst due to too much water flowing and pressure inside the cells. There was only a gradual change between the cell in the isotonic water and distilled water since the salt concentration to the distilled water was not very strong. Also, because the solution is less solute is due to less molecules held up so they move more freely across the membrane. Thus, a smaller net movement of water is evident.

However, we can still see some small changes such as the some of the chloroplasts have been moved the side, as while as the cell has expanded slightly, especially the cytoplasm. When placed in isotonic solution, the cell does not experience any changes since there is an equal exchange of water. The reason for this is the solution and cell has the same concentration, therefore water moves in the same direction so osmosis does not occur. There is no pressure inside the cell so the cytoplasm is not pressed against happens better in concentrated solutions where the cytoplasm and chloroplast are mainly affected.

Although I only did the experiment once, my results may not be completely accurate; however, because of our knowledge of osmosis, we can infer that the results are to a large extent reliable and can be used to justify our conclusion. Evaluation Limitation How it affected the results How to improve it The slide where the cell was put on to be observed under the microscope may have contained traces of previous concentration of solutions. Because

the solutions were mixed (for instance, some traces of isotonic water on slide when the cell was put in distilled water) it could weaken the concentration of the solution.

The weaker solution may create a barrier to how much of the stronger solution could enter the cell. Therefore, the cell could contain more of the weaker solution than the stronger. Due to more of the weaker solution, osmosis may not occur as effectively as it would with a pure solution. After observing the elodea, cleanse it thoroughly so excess water comes off. When wanting to observe the next elodea in a different concentration take a new slide each time so there is the cell is on a completely clean surface. The harsh light of the microscope created heat, which was aimed towards the cell.

The heat would have made the cell drier by drying the water that the cell contained. This would have made the cell flaccid as the cell loses water and has lack of firmness. Therefore the cells' structure would be altered, giving false results. Decrease the amount of light shined on the cell. Also, only switch off the microscope when not using to observe to ensure that extra light will not shine. The time the leaf is left in the solution is not consistent. - Sometimes the leaf was left for 5 minutes sometimes longer. The time needs to be consistent since the effects of osmosis may be more visible if there is longer time.

The cell in a particular concentration may be less "developed" compared to the cell in another concentration, which was in the solution for a longer

period of time. Have a fix time for the elodea cell to be in each of the solutions. (10 minutes would be a good time) The experiment was only done once This may not have given very accurate results as the one trial we did may have been flawed. Therefore it is not very reliable to assume that our results will always give the ame conclusions that concentration effect osmosis.

Do the experiment at least fives times to compare the results to make sure they are all similar. This way you can ensure that your results are more accurate and have no anomalies. Different leaves were used for each of the three solutions. and how everything is placed. Because of this, we do not know if the changes we see are due to osmosis or if the leaves are different from each other. It makes comparison between the concentration of solutions harder as we need to be more cautious in what we assume are the effects of osmosis.

Use the same leaf whenever changing into a different solution. However make sure to fully cleanse the leaf after putting in each concentration to ensure there is no traces of old concentration. Limitation by use of sketching to collecting information There might be human error when sketching since we cannot locate the same part of the plant and also there is different amount of cells within each part. Humans may also produce error when drawing the shapes, so when comparing, it is difficult to know whether the shapes produce are caused by human error or osmosis.