The effects of temperature on beetroot cell membranes argumentative

Tube was removed and the water in the test tube was tipped out. 10ml of tap water was then added to it and then left to stand in the test tube rack. The beaker was then heated to 35c. The burner was then turned off and the water's temperature was left to rise to 40c. 5 beetroot slices where then added to the test tube labelled 40c, then water was added to the slices Just to cover them. The 40c test tube was then placed into the beaker with the water's temperature at 40c for 90 seconds. After 90 seconds the test The beaker was then heated to 45c.

The burner was then turned off and the water's temperature was left to rise to 50c. beetroot slices where then added to the test tube labelled 50c, then water was added to the slices Just to cover them. The 50c test tube was then placed into the beaker with the water's temperature at 50c for 90 seconds. After 90 seconds the test tube was removed and the water in the test tube was tipped out. 10ml of tap water was then added to it and then left to stand in the test tube rack. The beaker was then heated to 55c. The burner was then turned off and the water's temperature was left to rise to 60c. beetroot slices where then added to the test tube labelled 60c, then water was added to the slices Just to cover hem. The 60c test tube was then placed into the beaker with the water's temperature at 60c for 90 seconds. After 90 seconds the test tube was removed and the water in the test tube was tipped out. 10ml of tap water was then added to it and then left to stand in the test tube rack. The beaker was then heated to 65c. The burner was then turned off and the water's temperature was left to rise to 70c. 5 beetroot slices where then added to the test tube labelled 70c, then water was added to the slices Just to cover them.

The 70c test tube was then placed into the beaker with the water's temperature at 70c for 90 test tube rack. The beaker was then heated to 75c. The burner was then turned off and the water's temperature was left to rise to 80c. 5 beetroot slices where then added to the test tube labelled 80c, then water was added to the slices Just to cover them. The 80c test tube was then placed into the beaker with the water's temperature at 80c for 90 After 30 minutes the test tubes were shook and then held against a white background in a well lit room. The colour of each solution was recorded.

Results: Colour Intensity Scale 2 Graph of Results 3 4 5 6 7 8 9 10 Temperature Colour Intensity -54 30 4 40 3 50 3 60 5 70 3 80 6 Discussion: The results show that as the temperature rises and decreases, (below and above the cell membranes temperature tolerance) the cell membrane becomes damaged and then breaks allowing the red pigment to leak from the vacuole. The method used could be improved with the size of the beetroot slices and also the recording method. A set colour intensity scale to compare a group's results against would make for a more accurate reporting of the results.

The beetroot slices were totally different in size, this allowed for some of the thinner slices to have a better surface area to volume ratio allowing for more pigment to escape from the beetroot lices. This could be improved by using a cork borer for example, to make the difference in sizes closer and more accurate to each other. Conclusion: The hypothesis stated was correct in one way as it said that as the temperature rose the membrane would leak more pigment but the significance of the cell membrane being exposed to colder temperatures was not looked at.

The results show that higher temperatures (70c, 80c) and lower temperatures (-5c, 5c) effect the cell membrane severely. Effects on Membranes of Other Environmental Stresses Background Information: A cell membranes is a thin structure that surrounds the hole cell. It contains the cytoplasm of a cell. The cell membrane is made up of hydrophilic region and a hydrophobic region. The hydrophilic region likes water, it is on the outside of the cell, the hydrophobic region is the inside of the cell where its protected from H20. The cell membrane’s outer surface lets larger molecules into the cell.

The inner surface deals with proteins that are important for development and cellular function. The cell membrane contains specific proteins and lipid components that enable it to perform its roles for the cell or organelle. A cell membrane can erform many different roles, these include protecting the cell, allowing cell recognition, allow transport in and out of the cell and also allowing cell or organelle motility. A beetroot cell has a large vacuole which contains a red pigment called anthocyanin, The cell membrane stops this pigment from leaking out of the vacuole.

When the cell membrane becomes damaged or stressed the membrane breaks causing the vacuole to release the anthocyanin. Aim: To investigate the effect these substances have on the beetroots cell membrane : Solutions of pH 2, 4, 6, 8, 10 Ethanol solutions: 1%, 25%, 50% Detergent solution: 1%, 25% Boiled distilled water Aerated distilled water Hypothesis: Solutions of pH 2, 4, 6, 8, IO- These solutions will have an effect on the cell membrane, the higher the concentration the more the membrane will be effected.

Ethanol solutions of 1%, 25%, 50%- These solutions will have an effect on the cell membrane, the higher the concentration the more the membrane will be effected. Detergent Solution of 1%, 25%- 1% will have a small effect on membrane and 25% will have a fair amount of impact on the membrane. Boiled and Aerated Distilled Water- These will have no effect on the cell membrane. Procedure: 60 beetroot slices were collected with forceps and placed in a 100ml beaker. The beetroot slices were washed with tap water and then gently dried with paper towel. pH solutions of 10 5 test tubes were labelled with pH solution of 2, 4, 6, 8 and 10. slices of beetroot were placed into each test tube. 5 more test tubes were labelled with the pH solutions as well. Using a measuring cylinder 10ml of pH 2 solution was poured into the corresponding test tube with the slices and then left to stand for 90 seconds. After 90 seconds the solution was poured out and the beetroot slices were ransferred to the correctly labelled second test tube. 10ml of tap water was then added to it and then left to stand for 30 minutes. This was repeated for each of the other pH solutions. After 30 minutes the colour intensity of the solutions was recorded.

Ethanol solutions of 1%, 25%, 50% 3 test tubes were labelled with Ethanol solution of 1%, 25% and 50%. 5 slices of beetroot were placed into each test tube. 3 more test tubes were labelled with the Ethanol solutions as well. Using a measuring cylinder 10ml of Ethanol solution of 1% was poured into the corresponding test tube with the slices and then left to stand for 0 seconds. After 90 seconds the solution was poured out and the beetroot slices were transferred to the correctly labelled second test tube. 10ml of tap water was then added to it and then left to stand for 30 minutes.

This was repeated for each of the other Ethanol solutions. After 30 minutes the colour intensity of the solutions was recorded. Detergent solutions of 1%, 25% 2 test tubes were labelled with Detergent solution of 1% and 25%. 5 slices of beetroot were placed into each test tube. 2 more test tubes were labelled with the Detergent solutions as well. Using a measuring cylinder 10ml of Detergent solution of 1% was oured into the corresponding test tube with the slices and then left to stand for 90 seconds. After 90 seconds the solution was poured out and the beetroot slices were added to it and then left to stand for 30 minutes.

This was repeated for the 25% Detergent solution. After 30 minutes the colour intensity of the solutions was Boiled Distilled Water 1 test tube was labelled with Boiled Distilled Water. 5 slices of beetroot was placed into the test tube. Another test tube was labelled with the Boiled Distilled Water as well. Using a measuring cylinder 10ml of Boiled Distilled Water was poured into the orresponding test tube with the slices and then left to stand for 90 seconds. After 90 seconds the solution was poured out and the beetroot slices were transferred to the correctly labelled second test tube. 0ml of tap water was then added to it and then left to stand for 30 minutes. After 30 minutes the colour intensity of the solutions was recorded. Aerated Distilled Water 1 test tube was labelled with Aerated Distilled Water. 5 slices of beetroot was placed into the test tube. Another test tube was labelled with Aerated Distilled Water as well. Using a measuring cylinder 10ml of Distilled Water was poured into the orresponding test tube with the slices and then a straw was used to blow air into the water for 90 seconds.

After 90 seconds the solution was poured out and the beetroot slices were transferred to the correctly labelled second test tube. 10ml of tap water was then added to it and then left to stand for 30 minutes. After 30 minutes the colour intensity of the solutions was recorded. Solution Colour Intensity pH2 Medium / Dark Pink pH4 Medium Pink pH6 Medium Pink pH8 Barely Light Pink pH 10Very Dark pink/ red/ maroon Ethanol 1% Light pink Ethanol 25% Medium pink Ethanol 50% Dark Pink Detergent 1% Pink Detergent 25%Dark Pink/ Red

Aerated Distilled Water No change Boiled Distilled Water No change My prediction was supported by the results except when considering the results for the pH solutions of 6 and 8. In the prediction it was stated it would get darker as the concentration got larger but those results disprove it. This is because 6 and 8 are around 7, 7 is totally neutral and is the best ph for organism’s growth not them being harmed. This being said pH 6 and 8 are weak acidity and alkaline concentrations. The Membrane structure surrounds the cytoplasm and also surrounds the whole cell. The cell membrane is made up of hydrophilic region and a hydrophobic region.