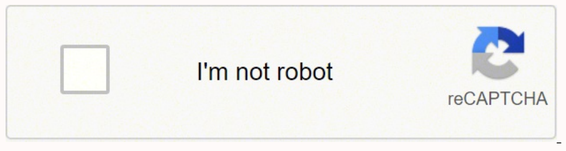

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Osmosis egg lab report results

Alcohol			
	Day 1	Day 2	Day 3
mass (g)	70.35	65.2	63.4
circumference (cm)	15.75	15	14.75
volume of solution (ml)	80	75.5	57.5

Corn Syrup			
	Day 1	Day 2	Day 3
mass (g)	67.85	59.4	65.85
circumference (cm)	16.5	15.25	15.4
volume of solution (ml)	80	84	89.5

Name:_____

ANSWER KEY

What happened to the egg that you placed in water? What do you think happened to cause that?

The egg in water swelled up. Student answers about why that happened will vary, but the actual reason it happened is that water passed through the semi-permeable membrane and INTO the egg.

What happened to the egg that you placed in syrup? What do you think happened to cause that?

The egg in syrup shrunk. Student answers about why that happened will vary, but the actual reason it happened is that water passed through the semi-permeable membrane and OUT OF the egg.

Explain what happened to the egg that you moved from the water to the syrup. What do you think caused that to happen?

The egg in syrup shrunk. Student answers about why that happened will vary, but the actual reason it happened is that water passed through the semi-permeable membrane and OUT OF the egg (just like with the first egg in syrup).

Explain what happened to the egg that you moved from the syrup to the water. What do you think caused that to happen?

The egg in water swelled up. Student answers about why that happened will vary, but the actual reason it happened is that water passed through the semi-permeable membrane and INTO the egg (just like with the first egg in water).

What is osmosis? (in your OWN words)

Osmosis is when molecules (in this case water), move from where they are more concentrated to where they are less concentrated, in order to equal out the concentrations.

Explain what happened to your eggs during this experiment, USING the concept of osmosis.

Water moved to wherever there was more sugar. When the egg was in water, the water moved into the egg because the egg had more sugar dissolved in it than the water. When the egg was in syrup, the water moved out of the egg and into the syrup.

Osmosis Eggs : 1A Exercise 'mini-lab report' February 2012

AIM : To use vinegar-softened eggs, or 'rubbery eggs,' as a cell model to observe osmosis effects.

Focused Research Question :
How will increasing sugar concentrations affect the dimensions of the rubbery eggs ?

Hypothesis : If the rubbery eggs are a good cellular model, then increasing external sugar concentrations should cause more osmosis of water out of these eggs.

Predictions : Egg size should decrease the most in the solutions with the highest sugar concentration. Eggs might also take in water (and grow in size) in the absence of external solutes (plain water).

Background Information
Osmosis is the passive diffusion of water through a semi-permeable membrane.
Water moves down its concentration gradient, toward equilibrium, depending on the relative amount of solute inside and outside. The greater the solute concentration, the lower the water potential. Water moves by osmosis down this water potential gradient (toward the area of high solute concentration).

Experimental Variables
Independent Variable : sugar concentration
Dependent Variable : mass and circumference of the eggs
Fixed Variables : volume of solutions, temperature of solutions, time of incubation
(all are kept constant)

Control : rubbery egg, allowed to re-harden and then put into water

Materials and Methods :
Eggs
Large beakers
Vinegar
Water
Sugar syrup (100% syrup : 1Kg sugar per liter water)
Scale, string, ruler,
Refrigerator

1) Measure egg circumference (with string and ruler, long dimension) and weight. Record results.
2) Soften the eggshells by putting the eggs in vinegar, a weak acid which dissolves the calcium carbonate of the shell, releasing carbon dioxide. This and all subsequent incubations were performed at 4°C (in the refrigerator).
3) Measure and weigh the eggs again (24h later), incubating them subsequently in the different solutions (100% syrup, 50% syrup, and plain water). 3 eggs in each solution.
4) Measure sizes and weights at various times (3 and 6 days later) during the course of the experiment.
5) Process data and analyze results.

:Conclusion To wrap this experiment up I can say that the trails that were done on each of the 5 different concentrations were repeated for each concentration 5 times for higher accuracy. -The difference in mass was calculated by subtracting the final mass from the initial mass. the same set temp for each investigation performed by using a thermometer to monitor. Qualitative data: The potato cylinders fizzed small air bubbles in the distilled water cylinder and another thing that was noticed was that potato became more dull when place is distilled water thusly changing its color and I can briefly tell by pre measuring and estimation before measuring with a ruler that as concentration of sucrose increased the size of the potato decreased making the size of the potato, which was placed in distilled water the biggest in size. How to control it? When doing this experiment I was able to see the effect of different concentrations on the rate of osmosis, each trail was done by measuring the initial mass of the potato cylinder and after osmosis, the results that were conducted shows that as the sucrose concentration increases the rate of osmosis also increases thusly making a direct decrease in mass. Osmosis Investigation Aim: The aim of this experiment is to investigate the effect of changing the concentration of sucrose on the rate of osmosis in cylinders of potatoes. Maintaining all variables unchanged such as the pH, same size, and a constant temperature. Another thing that would have caused some error in the experiment is that the experiment required more than one piece of potato thusly 2 needed to be used and that gives us 2 different sources of sucrose and each piece of potato might have had a different amount of nutrition thusly affecting the amount of sugar in each so that might have affected the results of the experiments that were conducted. As seen the in the graph as the curve cuts the x-axis both the and the differences in mass of the potato bottles are the same, which makes the solution an isotonic solution, which means that the potential for concentration of water is similar to that of the potato bottle. Bibliography “Lab Help for Ex. 6 Green Plant â II.Â” Laboratory help for Ex. 6 Green Plant â II. Based on the experiments I have done and the data I have been able to extract, I can say that my hypothesis was supported by the data collected, which is that as the sucrose concentration increases, the rate of esmosis increases. I could see that the standard deviation was different from one concentration to another as in distilled water;), while for the concentration of 10% itg1.91 (The standard deviation was greater, %, which is the concentration of 30y for) g (3.02 to 13. As seen above for each trial we had a different initial and final weighting the difference that was calculated as shown in Figure 1.:Improvements I suggest that if possible one way to improve the experiment would be by using an evenly distributed source of sucrose and a controlled ambient temperature to maintain more reliable results. When the potato is put into sucrose concentration where the water potential is greater than that of the potato the particles will move from the potato to the sucrose then there will be a decrease in mass whereas if you put into a concentration where they have the same water potential this solution is called Isot Variables Variable Independent: The concentration of the sucrose solution in which the potato cylinder is placed in. 1. Nine. N.p., n.d. Web. The time required for all potato cylinders will be 30 minutes. Sucrose concentration (%) Mean percentage change (g) (±0.1) Standard deviation (g) 0.0 2.52 1.91 10.0 -6.07 3.02 30.0 -18.07 5.90 50.0 -25.20 1.86 70.0 -25.52 1.35 Data Presentation: 11.)saluc©Ålom( )saluc©Ålom(auga ed salucÃtrap ed otneimivom le se sisoms³Ã aL ocifÃtneiC orteR:onerret a high water potential to a low water potential via a semi-permeable membrane. This would be achieved by using potato cylinders of similar sizes and lengths and applying them to different sucrose concentrations (0.10%, 30%, 50%, 70%) in test tubes and then measuring the change in mass of the potato cylinders. - A F E C T O F C O N C E N T R A T I O N O N T H E R A T E O F O S M O S I S Prepared for:BIOLOGY Prepared by:ABDULLRHMAN ZAKI Date:1.12.2012: 2. (A person using the cork borer to remove a potato cylinder) Initial potato mass = 0.06ÃÂ100/1.70=3.53% Percentage change in the mass of the potato cylinder in the experiment 2 x 100Â¢¢¢mass= Initial potato mass = 0.02ÃÂ100/1.91=1, 05% To calculate the change in mass of each potato We must calculate the percentage change of the potato bottles to find the average change in mass of the potato bottles at different sucrose concentrations. The standard deviation for the experiments was calculated using Microsoft excel: Sucrose concentration (%) (±0.1m m) % change and mean change in donkey mass (±0.1g) for each of the 5 concentrations (%) m Trial 1 Trial 2 Trial 3 Trial Trial 4 Trial 5¢ Â¢ Mass % Change in Mass % Mass % Change in Mass % Change in Mass % Change in Mass % Change in Mass % Mean Percent Change 0.0 (%) 0.01 0.52 0.1 0 5.23 0.0 4 2.29 0.06 3.53 0.0 2 1.05 2.52 10.0 (%) â 0.08 – 4.73 â 0.0 2 â 11.43 â 0.0 9 -5.36 0.07 -4.24 â 0.0 7 â 4.5 8 6.07 â 30.0 (%) -0.18 â 10.6 5 â 0.34 â 23.4 6 â 0.31 â 17.45 â 0.22 â 14.3 5 18.07- 50.0 (%) â 0.37 â 23.14 â 0.4 2 â 26.0 9 â 0.32 â 24.0 6 â 0.37 â 24.8 3 â 0.4 5 â 27.9 0 25.20- 70.0 (%) â 0.37 â 25.6 9 â 0.4 5 26.6 3 â 0.36 â 23.2 0 â 0.45 â 25.42 â 0.4 2 â 26.5 8 25.52 10. Tissue type: The type of tissue has a certain effect on the rate of osmosis since the amount of glucose in each type of tissue .etnerefid .etnerefid se asaM asamÂ ¢Â =001 x 1 otnemirepxe le ne atarap ed ordnilic led asam al ne lautnecrop oibmaC :soyasne ocnic sol ed olpmejE arap adalitsed auga ramoT =®A¢Åssam001 x :¡Árev es Åsa 001 rop olodn¡Ãcilpitlum ogeul y laicini asam al rop olodn©Ãidivid recah edeup es ose y atatap ed ordnilic adac arap asam ed oibmac le rartnocne euq yah oremirp sodatluser sol renetbo araP soyasne 5 sol ed onu adac ne atatap ed ordnilic adac arap asam ed lautnecrop oibmac le ranimreted redop arap esraluclac ebed asam ed oibmac lE .3 ?elbairav n³Ázar al renetnam arap etneibma arutarepmet al razilitu rop somazepme euq ol rop secacife s¡Ãm senoisiloc odnacifingis arutarepmet al atnemua euq adidem a acit©Ãnic aÃgrene s¡Ãm ed aicnetsixe al a odibed ,sisoms³Ã al a natcefa euq serotcaf sol ed onu se arutarepmet aL :arutarepmeT .asam ed oibmac aÃrbah on ralimis auga ed laicnetop nu nareivut is y aratnemua atatap al ed asam al euq aÃrah ose ,atatap al ed auga ed laicnetop le euq royam se auga ed laicnetop le ednod asoracas ed n³Ãicartnecnoc anu ne nareisup es atatap ed salletob sal is euq ogiderP :siset³ÃpiH .asoracas ed n³Ãicartnecnoc al se aÃd ne yoh odagitsevni rotcaf le ograbme nis ,arutarepmet al y alucÃtrap al ed o±Ãamat le odneyulcni sisoms³Ã ed asat al natcefa serotcaf sohcuM .5 acirtc©Ãle aznalab al ed osu le noc atatap adac ed laicini asam al rideM alletob .onu adac s mc 5,5 ne sordnilic sol ratroc ,Ãrutsib led y alger al ed osu le noC asodlab al ne ordnilic adac racoloC atatap ed sozort sol ed atatap ed sordnilic ocnicitniev rariter ohcroc ed rodanerrab le odnazilitU :odot©ÃM rodacram 1)%07 ,%05 ,%03 ,%01(asoracas ed senoiculoS 4 ejasep ed ocsarf 1)s1.0 ±ÃÂ(acirtc©Ãle aznalaB)s 1,0 ±ÃÂ(sejoleR 5 adalitsed auga ed lm 021 *odiconocsed)YTNIATRECNU(oyasne ed sobut 52)mc 1,0±ÃÂ(etnerapsnart ocits¡Ãlp ed algeR 1 acnalb asodlab 1 Ãrutsib 1)c 9,0(ohcroc ed reroB 1 atatap ed sednarg sazeip 2 :selairetaM atatap amsim al se euq odijet ed opit nu ol³Ás odnazilitu atatap atatap ed ordnilic led asam al ne lautnecrop oibmaC %92,2 = 57,1/001 x40,0 = atatap al ed experiment 2 x 100mass¢ÃÂÂ= Initial mass of potato x 100/1.91 = 0.52%0.01= Percentage change in mass of the potato cylinder in experiment 2 x 100¢ÃÂÂ mass= Initial mass of potato =0.1ÃÂ100/1.90=5.23% Percentage change in mass of the potato cylinder in experiment 2 x 100¢ÃÂÂmass= 8. percentage of change in mass is decreasing thusly we can conclude that the difference of the initial from the final and as it gets greater that means the mass of the potato changed massively According to the osmosis theory as the concentration of the sucrose solution increases the particle¢ÃÂÂs water potential increases and becomes higher than the particles that are inn the potato. While in the experiment of the distilled water it was a little different since the water potential is higher than those in the potato thusly the mass of the potato cylinders increased. Record results of each different concentration of potato Place the measured potatocylinders into different test tubes Label each test tube with the concentration of sucrose being tested in it, Apply 10 ml of (0%)sucrose concentration (distilled water) to 5 test tubes that have potato in them and then repeat the same procedure by adding 10 ml of 10% sucrose concentration, 5 differentand so on for the rest of the concentrations until 25 test tubes are filled with bead potatoes and different sucrose concentrations (5 of each concentration) Data collection: Table 1: Shows the results of each Exp (experiment) with each of the concentrationsof sucrose. (0%, 10%, 30%50%, 70%) Dependent Variable: The change in mass (grams) of the potato cylinders before and after the experiment Controlled Variables: SA/V Ratios: To be able to balance different SA/V ratio to limit its effect on the rate of osmosis one must first measure the sizes using a ruler (Ã±Â0.1 cm) as well as using a cork borer to maintain the same diameter for each cylinder but changing the length of cylinders themselves. 7. start scheduling the experiment with the timer for 30 minutes When the 30 minutes are over, take out the cylinders With a paper towel lightly dry the potato cylinder Once again place each potato cylinder in the beaker separately and record the final mass Build a table for harvesting Raw data, and records the initial and final mass of each different size of tissue *Repeat these steps for each concentration to record accurate results. To find the average percentage, add the % change in mass in the experiment to the % change in mass of the potato cylinder in experiment 2 and 3 and 4 and 5 and then / all of them over 5. 4. thela concentration of 70% that went for and finally) g (5.90 approached3) g (-.351lowest rating: In the research I had a wide range of errors that I was not able to control, such as ambient temperature and ambient temperature, and that might have manipulated the results in a slight way, but it did not make the experiment fair. Taking distilled water as an example for all experiments: Mean percentage change of mass = change of mass in1 + percentage of mass in experimental percentage cPe 52+3 +4 + = 2,52%.0.52+5.23+2.29+3.53+1.05= The mean percentage change of mass of potato bottles at the 5 different sucrose concentrations. Symosis in potato bottles for sucrose concentrations. As the concentration of sucrose increases, the difference in mass of the potato increases, since sucrose is a hypertonic solution, which means that it has a higher number of dissolved particles in the solution, while a hypotonic solution such as water has fewer dissolved particles.. Another factor would be that the sugar around the potato chunks might not have been distributed evenly so each cylinder of potato has contained a different amount of sugar thus affecting the rate of osmosis. The most accurate experiment was for sucrose. sucrose. (70 %) as it 1.353045.standard deviation ofthehad Table3: S.D for each change in % in (grams) Standard deviation in (g) for each average percentage change in (g). Sucrose concentrati on % (Ã±Â0.1mm) Potato (cylinder) mass (Ã±Â0.01g) Initial Final Exp 1 Exp 2 Exp 3 Exp 4 Exp 5 Exp 1 Exp 2 Exp 3 Exp 4 Exp 5 Distilled water 1.91 1.90 1.75 1.70 1.91 1.92 2.00 1.79 1.76 1.93 10.0(%) 1.69 1.75 1.68 1.65 1.53 1.61 1.55 1.59 1.65 1.46 30.0(%) 1.69 1.79 1.78 0.89 1.48 1.51 1.37 1.47 1.21 1.46 50.0(%) 1.60 1.61 1.33 1.49 0.97 1.23 1.19 1.01 1.12 0.35 70.0(%) 1.44 1.69 1.54 1.77 1.58 1.07 1.24 1.18 1.32 1.16 6. 29 Nov. e change in mass in the 5 experiments, the averagepercentagThe:Table 2 percentage changes in mass of the potato cylinders for each of the 5 different sucrose concentrations. Data Processing: After having collected the data from the experiment the data will be processed. The Standard deviation was calculated through mac iWork, which was able to show the reliability of the data that was collected and have the ability to see the range of errors using the error bars. Graph 1:The effect of the 5-sucrose concentration on the average percentage change in the mass of the potato cylinders. A good example would be the experiments with the concentrations of 10% and 70% concentration results to show the change.In the 10%concentration I noticed a decrease in the percentage change in mas for experiment 1 the percentage decrease was -4.73 while for the concentration of sucrose 70% the change was -25.69 we can see that the RÃ²Â = 0.999 -30 -25 -20 -15 -10 -5 0 5 10 -10 0 10 20 30 40 50 60 70 80 averagepercentagechangeinmass sucrose concentration The effect of the 5 sucrose concentrations (%) on the average percentage change in the mass (%)(Ã±Â0.1g) of the potato cylinders 12. So we can see that osmosis cannot take place since it is a movement from high to low water potential and in this case they are both equal. equal.

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