Osmosis experiment

DCP & CE

OSMOSIS IN POTATO

DATA COLLECTION AND PROCESSING:

a. Raw Data:

table (1): initial and final weights of potato cubes at soaked in different sucrose solutions

Sucrose solution Molarities (mol/L)	Potatoes (initial weight) (g)(±0.05)	1st trial (final weight) (g)(±0.05)	2nd trial (final weight) (g)(±0.05)	3rd trial (final weight) (g)(±0.05)
0.1	0.6	0.9	0.8	0.7
0.2	1.1	1.3	1.3	1.3
0.3	0.7	0.8	0.7	0.9
0.4	0.9	0.9	0.9	0.9
0.5	1.7	1.5	1.4	1.5
0.6	1.1	1.0	0.9	1.0
0.7	1.0	0.8	0.9	0.8
0.8	0.9	0.7	0.7	0.7
0.9	0.7	0.5	0.5	0.4
1.0	1.1	0.6	0.7	0.7

b. Processed Data:

- The average final weight is obtained using the following rule:

$$\frac{trial\,1\ final\ weight + trial\,2\ final\ weight + trial\,3 final\ weight}{3}$$

- The percentage change is obtained using the following rule:

$$\frac{average\ final weight - initial\ weight}{initial\ weight} \times 100$$

table (2): percentage change of potato cubes weight in different sucrose solutions:

Sucrose solution Molarities (mol/L)	Average final weight (gram) (±0.05) g	Difference between final and initial weights in (g) (±0.1) g	Percentage change in the mass of potato cubes
0.1	0.80	0.20	33.3 %
0.2	1.30	0.20	18.2 %
0.3	0.80	0.10	14.2 %
0.4	0.90	0.00	00.0 %
0.5	1.46	-0.24	-14.1 %
0.6	0.96	-0.14	-12.7 %
0.7	0.83	-0.17	-17.0 %
0.8	0.70	-0.20	-22.2 %
0.9	0.46	-0.24	-34.3 %
1.0	0.66	-0.44	-40.0 %

The previous data in table (2) is represented by the following graph in figure (1).

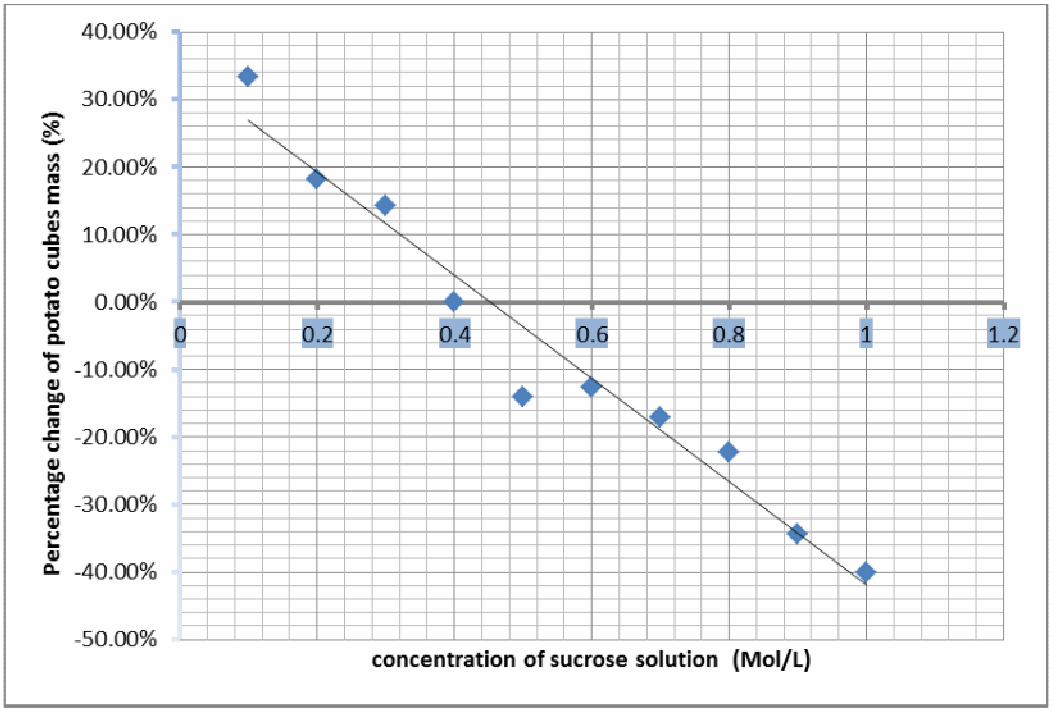

Figure (1): the effect of sucrose solutions on the weight of potato cubes soaked at different sucrose solution molarities.

CONCLUSION AND EVALUATION:

Conclusion:

1. It can be concluded that solutions with molarities (0.1, 0.2, 0.3), are relatively hypotonic to potato pieces, since the potato pieces' sizes increased, when being put into them, which means that those solutions were relatively hypotonic to potatoes, so liquid moved from the solutions to the potato pieces by osmosis.

2. It can be concluded that the solution with molarity (0.4), are relatively isotonic to potato pieces, since the potato pieces' sizes neither increased nor decreased, when being put into them.

3. It can be concluded that solutions with molarities (0.5, 0.6, 0.7, 0.8, 0.9 1.0), are relatively hypertonic to potato pieces, since the potato pieces' sizes decreased, when being put into them.

Evaluation:

1. When working with potato pieces, the only thing concerned was the mass, while the surface area to volume ratio wasn't, although it's a important factor affecting osmosis, as when surface area to volume ratio increases so does osmosis, and vice versa.

2. Potato pieces couldn't be cut into equal pieces, that's why percentage change was used.

3. The potato pieces was left in the solutions a whole day, which made them exposed to temperature changes.

IMPROVMENTS:

1. Repeating the experiment again more than one time, and then takin g the average would decrease the errors.

2. It would be better if precise machinery would be used, so that the potatoes could be cut to equal pieces, with the same mass and probably surface area to volume ratio.

3. the experiment should be isolated from temperature changes.