

Effect of sucrose solution on potatoes and apples



All the method is referred to the sheet given. In order to dilute 1.0 mol dm⁻³ of sucrose solution given to produce 0.2 mol dm⁻³ of sucrose solution, 0.3 mol dm⁻³ of sucrose solution, 0.4 mol dm⁻³ of sucrose solution and 0.5 mol dm⁻³ of sucrose solution, the formula below is used ;

$$M_1V_1 = M_2V_2$$

For example:

To produce 0.2 mol dm⁻³ of sucrose solution with volume of 20cm³

$$M_1 \text{ (initial concentration of sucrose solution)} = 1.0 \text{ mol dm}^{-3}$$

$$V_1 \text{ (initial volume of sucrose solution)} = ?$$

$$M_2 \text{ (final concentration of sucrose solution)} = 0.2 \text{ mol dm}^{-3}$$

$$V_2 \text{ (initial volume of sucrose solution)} = 20 \text{ cm}^3$$

$$M_1V_1 = M_2V_2$$

$$\text{mol dm}^{-3}V_1 = (0.2 \text{ mol dm}^{-3})(20 \text{ cm}^3)$$

$$V_1 = (0.2 \text{ mol dm}^{-3})(20 \text{ cm}^3)$$

$$(1.0 \text{ mol dm}^{-3})$$

$$V_1 = 4 \text{ cm}^3$$

RESEARCH QUESTIONS

Does verifying the concentration of sucrose solution would affect the length of potato strips and apple strips after 125 minutes?

<https://assignbuster.com/effect-of-sucrose-solution-on-potatoes-and-apples/>

Does the volume of the sucrose solution affected?

HYPOTHESIS

If the concentration of the sucrose solution is high, which is a hypertonic concentration, the length of potato strips and apple strips will decrease because the water molecules moved out from the potato and apple tissue to the sucrose solution. This causes a decrease in the length of potato and apple strips. Thus, the potato and the apple strips become flaccid. The volume of the sucrose solution will increase simultaneous due to the decreased of potato and apple lengths.

If the concentration of the sucrose solution is low, which is a hypotonic concentration, the length of potato and apple strips size will increase and becomes turgid because the water moved out of the potato and the apple cells. The volume of the sucrose solution will decrease simultaneously with the decreased of potato and apple lengths.

If the concentration of the sucrose solution is same as the concentration of potato and apple tissues, there will be no change on the length of potato and apple strips because the movement of water molecules into and out of the potato and apple cells is the same. The volume of the sucrose solution also will not changed. This called isotonic.

VARIABLES :

Independent variable :

Independent variable

Concentration of sucrose

Dependent variable

Final length of potato and apple strips after 125 minutes

Constant variable

Initial length of apple and potato strips

Initial volume of sucrose solution

Five strips of apple and potato are put in each test tube

DATA PROCESSING

CONCLUSION

If the concentration of the sucrose solution is high, which is a hypertonic concentration, the length of potato strips and apple strips will decrease because the water molecules moved out from the potato and apple tissue to the sucrose solution. This causes a decrease in the length of potato and apple strips. Thus, the potato and the apple strips become flaccid. The volume of the sucrose solution will increase simultaneously with the decreased of potato and apple lengths. The hypertonic solution for apple strips is at 0.2M and 0.3M, whereas for the potato strips is at 0.2M and 0.3M also.

If the concentration of the sucrose solution is low, which is a hypotonic concentration, the length of potato and apple strips size will increase and becomes turgid because the water moved out of the potato and the apple

cells. The volume of the sucrose solution will decrease simultaneously with the decreased of potato and apple lengths. The hypotonic solution for apple strips is at 0.5M and 1.0M, whereas for the potato strips is at 1.0M.

If the concentration of the sucrose solution is same as the concentration of potato and apple tissues, there will be no change on the length of potato and apple strips because the movement of water molecules into and out of the potato and apple cells is the same. The volume of the sucrose solution also will not be changed. This is called isotonic. The isotonic solution for the apple strips is at 0.4M, whereas for the potato strips is 0.4M and 1.0M.

The hypothesis is accepted.

LIMITATIONS

SUGGESTIONS

Error may occur during the measurement to determine the length of potato strips.

The measurement should be repeated for at least 3 times to minimize the error in the experiment.

Error may occur while marking the level of sucrose solution due to the poor method of measuring that is by visual observation.

A more precise tool should be used to get the most precise data.

The surface of potato strips may not be flat. So even though we controlled the initial length, actually the initial lengths are not the same for each potato strip.

the mass of potato strips in order to observe the changes of elongation of the potato strips in each solution to get more accurate reading as the electronic mass balance has a small uncertainty compared than using a ruler to measured the elongation. LIMITATIONS AND SUGGESTIONS