

Aim 8

To find the Water Potential of Potato Tubers by Weight Method

Introduction

Osmosis is the movement of liquid solvent thorough a semi permeable membrane from its higher concentration to its lower concentration. It does not allow the movement of solid solute to pass. In plant, osmosis help in maintaining the water level, balance between water and solutes, absorption of water from soil by root hairs etc.

Requirements

Potato tubers, Cork borer, distilled water, test tubes, blotting paper, glass rod, beakers, weight balance, forceps, sucrose.

Procedure

1. Take potatoes, wash with distilled water and dry with blotting papers.
2. Ten cylindrical pieces are taken out from potatoes with the help of cork borer.
3. Length of cylindrical pieces is equalized by cutting from ends.
4. The initial weight of pieces is taken before putting them in test tubes.
5. Ten test tubes are taken and mark as 1-10.
6. Single potato cylindrical piece is added in each test tube with addition of 10 ml of sucrose solution. Molarity of sucrose solution vary regularly in each test tube and use cotton to plug the test tubes

7. Leave the test tubes undisturbed for 24 hours, cylindrical piece of potato are taken out from extract material with the help of forcep.
8. Note down the final weight. Change in weight of tuber can be measured with the help of initial and final readings.

Formula Used

$$\text{Water potential } (\psi_w) = M \times 22.4 \times (T_x - T_r) / T_r$$

Where:

M = Isotonic Molarity

T = Absolute Temperature

T = Room Temperature

Observation Tables

Preparation of sucrose solution of different Molarities:

S.No.	Molarity	Stock solution	Distilled water
1.			
2.			
3.			
4.			

Change in weight at different Molarities:

S.No.	Molarity	Initial weight of Potato (g)	Final weight of Potato (g)	Change in weight (g)
1.				
2.				
3.				

Precautions

1. Sucrose solution should be of accurate molarity.
2. Use only uniform cylindrical pieces of potato.
3. Cover the test tubes having sucrose solution and potato properly.
4. After taking out potato cylinder from sucrose solution, they shall be placed at blotting paper for absorption of the extra solution.