

1. Study of osmosis by potato osmoscope.

Aim : - To study the process of osmosis using potato osmoscope. Date- / /

Requirements A fresh Potato, peeler or scalpel, Petri dishes/ bowls/ trough/ shallow glass beakers, pins, concentrated sugar solution, coloured water, etc.

Principle

When two solutions of different concentrations are separated by a semipermeable membrane, the flow of solvent is from the region of weaker solution (having low solute concentration) to the region of stronger solution (having high solute concentration) till the equilibrium is reached so that the osmotic pressures are balanced.

Osmosis is of two types viz. endosmosis and exosmosis.

Figure

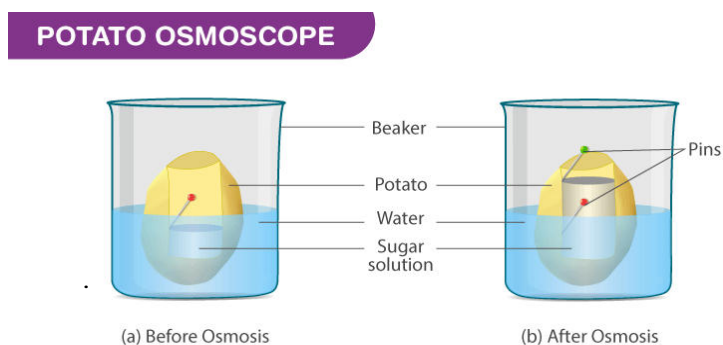


Fig. Potato osmoscope experiment to demonstrate osmosis

Procedure:-

1. Take a fresh potato tuber and peel off the skin with the help of scalpel.
2. Cut the potato from one side in such a way that it will make a flat base.
3. Scoop the peeled tuber properly so as to make a hollow block (well) in potato with thin intact base bottom and care should be taken that it will not rupture at base.
4. Now add concentrated sugar solution in that cavity and mark its level by inserting a pin in the cavity wall.
5. Place this potato osmoscope in a petri dish/ bowl or glass beaker, filled with coloured water.
6. Mark the initial level with pin. After some time mark the level of sugar solution in the potato osmoscope.

Observations

After few hours the level of sugar solution in the potato osmoscope rises and the solution becomes coloured.

Inferences :-

1. The rise in the sugar solution is due to osmosis
2. The membrane of the living cells of potato tuber functions as a semipermeable membrane.
3. Water from outside (hypotonic) enters the cavity filled with concentrated sugar solution(hypertonic) thus, demonstrating osmosis.

Questions

1. Potato is used to prepare an osmoscope- justify.

Peeled potato represents a living system to demonstrate the process of osmosis. The cell membranes of potato act as the semipermeable membranes and allow the passage of water from hypotonic solution to hypertonic solution.

2. Define permeability.

Permeability is defined as the property of membranes to allow passive diffusion of molecules.

3. Define osmotic pressure.

Osmotic pressure is equivalent to the pressure which must be exerted upon the solution to prevent the flow of solvent across a semi-permeable membrane.

4. Do you find any role of osmosis in water purification?

In water purification, reverse osmosis is used. It is the reverse movement of water through a semipermeable membrane from a more concentrated solution to a more dilute solution by applying external pressure on the more concentrated solution. It is used for removing salts from saline water.

5. Osmosis plays important role in stomatal movement. Explain.

Stomatal movement depends on the turgidity of guard cells.

Guard cells become turgid due to endosmosis and the stoma gets open.

Guard cells become flaccid due to exosmosis and the stoma closes.

Multiple Choice Questions

- In living cells, an osmosis specifically refers to the movement
 - diffusion of solvent
 - diffusion of solute
 - diffusion of water**
 - diffusion of solute and solvent both
- The direction and rate of osmosis is controlled by
 - nature of property of membrane
 - nature of solvent
 - pressure gradient and concentration gradient**
 - cell structure and composition of cytoplasm
- The structure that contributes to the solute potential of a cell is
 - vacuolar sap
 - cell sap
 - water
 - solute particles**
- Osmotic potential refers to
 - movement of water molecules from hypotonic solution to hypertonic solution**
 - movement of water molecules from hypertonic solution to hypotonic solution
 - pressure potential
 - movement of water molecules from hypotonic to isotonic solution
- Which of the following is not semipermeable?
 - Parchment paper
 - Ligament membrane
 - Bladder membrane**
 - Cell wall
- Which acid is used to extract egg membrane?
 - Acetic acid**
 - Dilute HCL
 - Concentrated HCL
 - Dilute H_2SO_4

Remark and Signature of Teacher