

2. Study of plasmolysis in epidermal peels.

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Exosmosis in a living cell when placed in hypertonic solution, is called plasmolysis.

Aim To study plasmolysis in epidermal cells of *Tradescantia* leaf.

Requirements Fresh leaf of *Tradescantia*, concentrated sugar solution, distilled water, slides, cover slips, watch glass, blades, etc.

Principle

Osmotic concentration of cell sap decides the movement of solvent molecules across the different types of membranes.

Figure

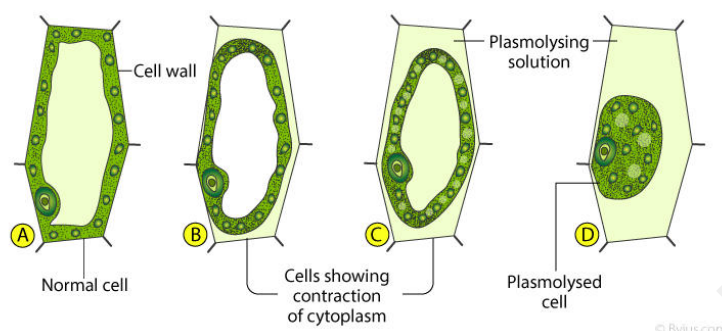


Fig. Phenomenon of plasmolysis

Procedure

1. Take a fresh *Tradescantia* leaf and peel off its lower coloured surface in such a way that epidermal cells can be observed.
2. Take a small piece of epidermal peel and place it in concentrated sugar solution for few minutes (hypertonic solution). Mount it on slide and put a cover slip.
3. Observe the slide under microscope and focus over few cells.
4. Take another small piece of peel from lower epidermis and place it in water (hypotonic solution) for few minutes, Mount it on a slide and put a cover slip.
5. Carefully observe this slide also under microscope.

Observation

1. The slide prepared using hypertonic solution shows shrinkage of cytoplasm (protoplast) cytoplasm moves (recedes) away from the cell wall and becomes concentrated to corner of the cell. This is known as plasmolysis.
2. The slide prepared using hypotonic solution or water shows that cell cytoplasm bulges or swells i.e. increases in size. This is due to endosmosis.

Inferences-

Plasmolysis is observed when the plant cells are immersed in the concentrated salt solution or sodium chloride 5% solution. During this process, 4 to 5 per cent of water passes through the cell membrane into the encircling medium. This occurs as the concentration of water inside the cell is higher than the outside of the cell hence the protoplasm induces shrinkage and takes a spherical shape.

When the plant cells are immersed in a dilute salt solution or sodium chloride 0.1% solution, the water in the plant cells moves from the outside to the inside of the cell as the water concentration is higher outside the cell as compared to the inside of the cell which causes the turgidity of the cell.

Questions

1. What does occupy the space between the cell wall and protoplast of a plasmolysed cell?

The hypertonic solution (i.e. a solution with high salt concentration) occupies the space between the cell wall and shrunken protoplast in a plasmolysed cell.

2. Define incipient plasmolysis.

It is the initial phase of plasmolysis where in the protoplasm is just about to leave the cell wall.

3. Where do we use plasmolysis at home?

Salting and sweetening create hypertonic condition in which the fungi and bacteria get killed by plasmolysis.

Pickles, meat and fish are preserved by salting.

Similarly, jams and jellies are preserved by sweetening with sugars.

4. Is it possible to use plasmolysis in fish drying?

Fish drying is the example of osmosis and not of plasmolysis.

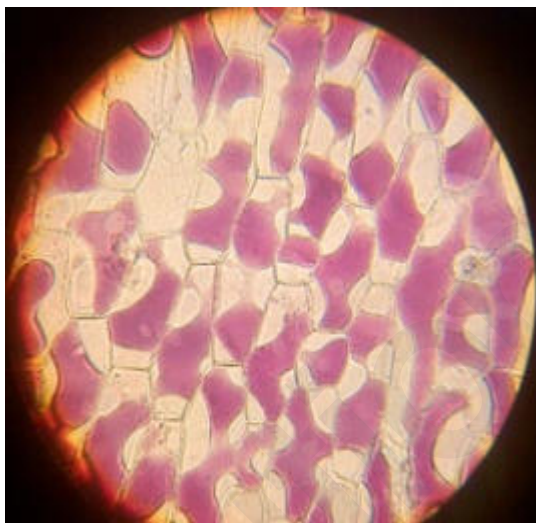
5. Give reasons of selecting the leaf peel from the lower surface of *Tradescantia* leaf.

The epidermal peel is generally taken from the lower surface of the leaf because; the lower surface of the leaf has more number of stomata than the upper surface.

{ Multiple Choice Questions }

1. When water enters the cell, the pressure exerted by its swollen protoplast is
 - a. **turgor pressure**
 - b. D. P. O.
 - c. osmotic pressure
 - d. Imbibition
2. In a fully turgid cell, what will be zero?
 - a. WP
 - b. OP
 - c. TP
 - d. **Water potential**
3. In a turgid cell surrounded by pure water, the wall pressure
 - a. **increases**
 - b. decreases
 - c. fluctuate
 - d. remain unchanged
4. The osmotic pressure of cell sap is more in
 - a. mesophytes
 - b. xerophytes
 - c. hydrophytes
 - d. **halophytes**
5. The protective cover of vacuole is called
 - a. cell wall
 - b. leucoplast
 - c. plasmalemma
 - d. **tonoplast**

Observe the slide and draw the diagram.



Remark and Signature of Teacher