

EXPERIMENT

4

Aim

To study the process of plasmolysis in epidermal peels of Tradescantia or Rhoeo leaves.

THEORY

PLASMOLYSIS

Plasmolysis is the process of shrinkage or contraction of the protoplasm of a plant cell takes place due to the movement of water out of cell when it is placed in hypertonic solution of sucrose or salt. We can observe the plasmolysis by conducting following experiment.

MATERIAL REQUIRED

Leaves of coloured plants like Rhoeo/Tradescantia, blade, forceps, glass slides, coverslips, measuring cylinder, beaker, needle, brush, microscope, salt solution (20%) and petridish.

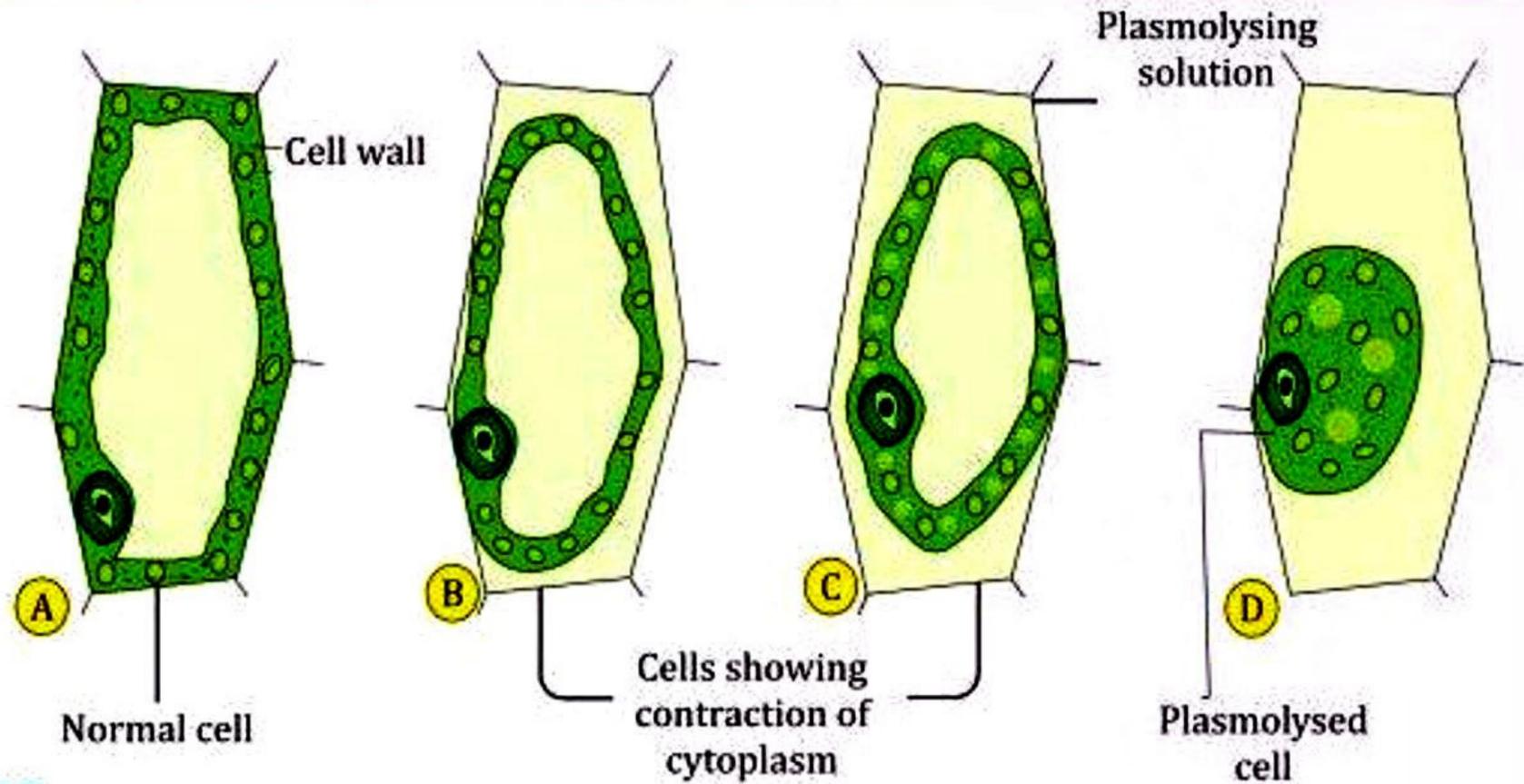
PROCEDURE

1. Take a Rhoeo leaf and with the help of forceps, gently pull a thin peel from it. Mark this peel as A.
2. Keep this peel A in a petridish containing water to avoid dehydration.
3. Repeat the above two steps with four other leaves of the same plant. Label them as B, C, D and E.
4. Make a concentrated solution of salt with salt concentration as 20% (hypertonic).
5. Transfer the peels B, C, D and E in this solution.
6. Now, transfer the peel A carefully with the help of needle and brush on a clean glass slide.
7. Put a coverslip over it.
8. Examine the slide under microscope. Make a sketch of the cell particularly showing the cell wall and cell membrane.
9. Repeat the steps 6th, 7th and 8th with the peels labelled B, C and D at intervals of 5 minutes, 15 minutes and 20 minutes, respectively. Make the sketch of the cell particularly showing the cell wall and cell membrane of each peel.
10. Transfer the peel E from the conc. salt solution into a new Petri dish containing pure water (hypotonic).
11. Wait for another 10 minutes and observe the slide under microscope.
12. Draw the cell observed under microscope and also record the observation in the table.

OBSERVATION

	Time (minutes)	Total no. of cells in a field of microscope (M)	No. of cells showing plasmolysis (N)	% of plasmolysis $\left(\frac{N}{M} \times 100\right)$
Peel A(control)	5			
	15			
	20			
	30			

Peel B	5		
Peel C	15		
Peel D	20		
Peel E	30		



RESULT

The cells get plasmolysed in hypertonic solution and become deplasmolysed when kept in hypotonic or dilute solution.

PRECAUTIONS

1. Fresh and active plant material must be used.
2. The peel should be of proper size and should not be exposed to dry conditions.
3. Different slides should be used for viewing different peels.
4. Slides must be kept dried by removing extra solution with blotting paper.
5. The cells must be kept undisturbed for 5-10 minutes in hypertonic solution, so that sufficient exosmosis may take.

VIVA VOCE

Q1. Name the plant whose cells can be used to show the phenomenon of plasmolysis.

Ans. The Rhoeo or Teradescantia leaf cells show the plasmolysis in a good way because their leaves are purple coloured. They contain anthocyanin pigment.

Q2. Name the materials/chemical used for making concerned or dilute solutions.

Ans. Sugar or NaCl.

Q3. What happen in the cells of epidermis of Rhoeo leaves when these are placed in highly concentrated solutions?

Ans. The water starts moving out of the cells towards solutions and exosmosis occurs. Protoplasm starts shrinking.

Q4. What will happen to these shrunken protoplast cells when kept in pure water?

Ans. The water will move inside the cell and it will regain its shape again.

Q5. What is plasmolysis?

Ans. Plasmolysis is the shrinkage of the protoplast of a cell from its cell wall under the influence of hypertonic solution

Q6. Why is plasmolysis observed in cells of peels kept in salt solution?

Ans. When the peel is kept in the salt solution the cells become plasmolysed due to exosmosis. The water from the cells comes out to maintain the concentration of both the regions, i.e. to attain equilibrium.

Q7. Why are Tradescantia leaves preferred for study of plasmolysis?

Ans. The leaves of Tradescantia are preferably used to study plasmolysis because the red colour of leaf cell will make plasmolysis and plasma membrane clearly visible.

Q8. What do you mean by incipient plasmolysis?

Ans. The stage at which the process of plasmolysis has just begun is known as incipient plasmolysis.

Q9. Why is the plasma membrane also called semipermeable membrane?

Ans. Plasma membrane allows only few substances to pass through it, therefore, it is called semipermeable membrane

Q10. Why do cells of peel A kept in water remain turgid?

Ans. The peel A is kept in water or isotonic solution, that has a similar concentration as the cell sap of the cell. Therefore, no change occurs in the cells of peel A and it remains turgid.

Q11. Does animal cell show plasmolysis, Why?

Ans. Yes, animal cells also show plasmolysis. When an animal cell is placed in hypertonic solution, it gets shrunked and thus, shows plasmolysis across its semi-permeable membrane