

## Study no. - 2

**Name of the study:** Study on demonstration of plasmolysis and deplasmolysis with the help of *Rhoeo discolor* leaf

### **Plasmolysis:**

The shrinkage of protoplasm by the influence of external hypertonic solution is known as plasmolysis. Plasmolysis is the result of specialized exo-osmosis which occurs in living plant cell.

### **Or**

Shrinkage or condensation of protoplasm away from cell wall of a living plant or bacterial cell caused by exo-osmosis.

**Inceptient plasmolysis:** It is the starting or initial stage of plasmolysis when protoplasm starts to shrink. In this stage, protoplasm starts to move away from the cell wall towards the centre.

**Evident plasmolysis:** In case of evident plasmolysis the protoplasm is shrunk and becomes concentrated at the centre or one side of the cell. In this stage, the highest shrinkage of protoplasm is observed.

**Deplasmolysis:** When a plasmolised cell is placed in a hypotonic solution, the protoplasm gets back to its original condition due to endo-osmosis. This phenomenon is known as deplasmolysis. However, certain damage may be occurred in case of protoplasm.

### **Materials required:**

1. *Rhoeo discolor* leaf
2. Salt/Sugar solution
3. Beaker
4. Pipette
5. Slide
6. Cover slip
7. Microscope
8. Blade/Scalpel
9. Watch glass
10. Distilled water
11. Brush

**Procedure:**

A sugar solution was made first. A *Rhoeo discolor* leaf was collected and kept in a beaker with water. A small piece was cut out from the entire leaf and kept in water for the experiment. After that a small thin scrap was taken from the lower epidermal purple portion of the leaf and placed in a slide with distilled water. The specimen was covered with cover-slip and was observed under the microscope. Another purple portion of the leaf was placed in a slide with hypertonic sugar solution. This specimen also covered with cover slip and observed under microscope. After some times the slide was finally observed and recorded the condition of the protoplasm. Finally, a third scrap of purple portion of leaf was placed in strong solution again and it was allowed to reach up to evident plasmolysis condition. Then it was washed with sufficient distilled water to remove the sugar solution and was placed in distilled water for sometimes. This specimen was also observed under microscope and the condition was recorded.

**Observation:**

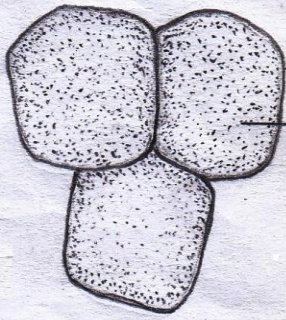
In case of first slide with distilled water with normal cells it was observed that protoplasm showed no change. In the second slide shrinkage of protoplasm started in initial stage and finally became accumulated at the centre of the cell. In the third and the final slide the protoplasm got back to its initial condition.

**Inference:**

In this experiment it was found that plasmolysis and deplasmolysis occurred due to the influence of hypertonic solution and hypotonic solution (normal distilled water) respectively.

**Precautions:**

1. A healthy fresh *Rhoeo discolor* leaf should be taken.
2. The solution must be stronger.
3. Purple portion of the leaf should be taken.
4. The scrap should be thin enough.
5. To observe deplasmolysis sugar solution should be washed properly.



Cell wall  
Protoplasm

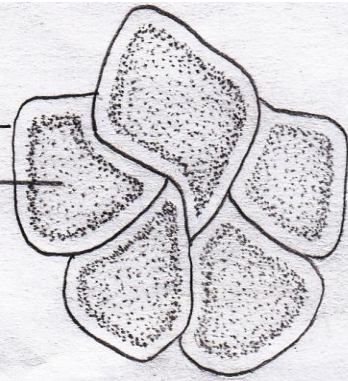


Fig: Normal stage

Fig: Incipient stage

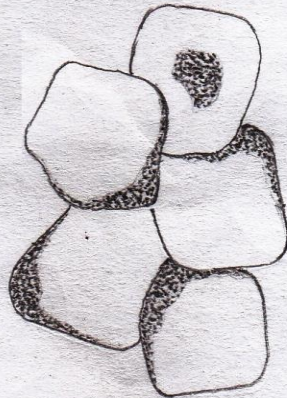


Fig: Evident stage

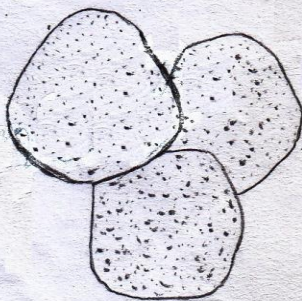


Fig: Final deplasmolysis

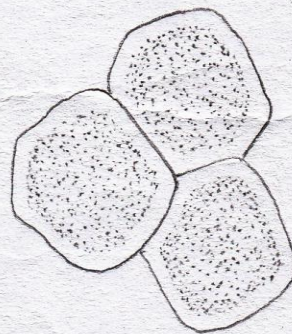


Fig: Initial deplasmolysis

$H_2O$