



DEPARTMENT OF BOTANY

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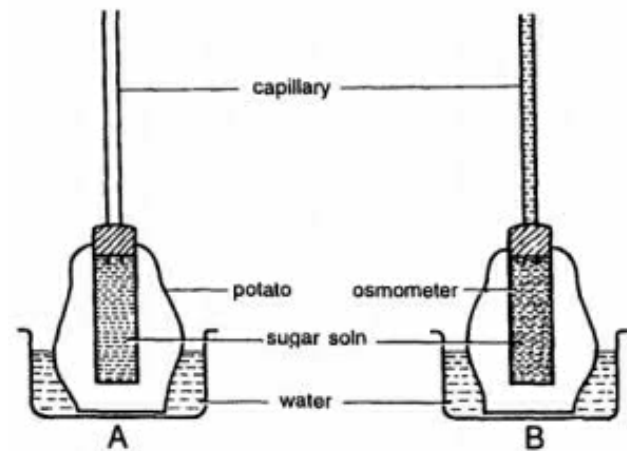
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SUBSIDIARY PART - II

GROUP C - PLANT PHYSIOLOGY

OSMOSIS

Osmosis may be defined as the movement of water through a differentially permeable membrane along the gradient from an area of higher concentration to an area of lesser concentration. It is a special type of unilateral diffusion across a differentially permeable membrane. It helps the plants to absorb water from the soil. This can be explained in the following manner :



Demonstration of osmosis by using potato osmometer.

The diffusion pressure of pure water is maximum. If some amount of salt or sugar is added to it then the diffusion pressure diminishes. This decrease in the diffusion pressure is known as diffusion pressure DPD. It is to equalise this deficit in the diffusion preferred that the solvent water is drawn into a solution. In the land plants, water enters the root hairs on this principle. In the experiment on osmosis, the mouth of the thistle funnel is tied

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with goat's bladder which acts like differentially permeable membrane. The funnel is filled with a concentrated sugar solution. The bulb portion of the thistle funnel is immersed in a beaker of water. Water enters into the funnel through the differentially highly permeable membrane which is indicated by the rise of the level in the tubular portion of the funnel. The rise of the level continues until an equilibrium is achieved. At the equilibrium stage the level becomes stationary and it appears that the diffusion pressure on the other side of the membrane is the same but it can never be so because inside the funnel there is a sugar solution although very much diluted and in the beaker there is pure water. The sugar molecules can not come out as the membrane is differentially permeable. As such the diffusion pressure is higher outside. Therefore the equilibrium can be explained on the basis of hydrostatic pressure developed into the funnel due to rise of liquid from the initial level. This hydrostatic pressure prevents the passage of water through the membrane into the aqueous solution. This pressure is known as the osmotic pressure. Osmotic pressure may be defined as the maximum pressure developed by a solution to prevent the passage of solvent molecules when the two are separated by differentially permeable membrane. This simple apparatus to demonstrate osmosis and osmotic pressure may be called as Osmometer. Osmotic pressure of pure water is zero.

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