Brainbox learn easy

Chapter 11

TRANSPORT IN PLANTS

Water potential:

Water molecules contain kinetic energy, the greater the concentration of water, the greater its kinetic energy so the kinetic energy possessed water is called Water potential.

- Pure water contains maximum water potential.
- The water potential pure water at standard temperatures which is not under any pressure is taken as zero water potential is denoted by Greek symbol (φ) and expressed in pressure units such as Pascal's (Pa), solute potential and pressure potential are two main components that determine water potential.

Solute potential (φ_s):

The magnitude of lowering of water potential by addition of solutes is called Solute potential. It is denoted by φ_s. φ_s is always negative for solution at atmospheric pressure $\varphi_w = \varphi_s$.

Pressure potential (φ_p):

If the pressure greater than atmosphere pressure applied the water potential increases. So magnitude of increase of water potential with the application of pressure greater than atmospheric pressure is called Pressure potential pressure potential is denoted by φ_p, φ_p is usually positive but sometimes it is negative in plants. So the equation of water potential.

$$\varphi_w = \varphi_s + \varphi_p$$

Osmosis:

Osmosis is the term used to refer specifically to the diffusion of water across a differentially or selectively permeable membrane, osmosis occurs spontaneously in response to a driving force the net direction and rate of osmosis depends on both pressure gradient and concentration gradient water moves from higher water potential to lower water potential.

Thistle funnel experiment:

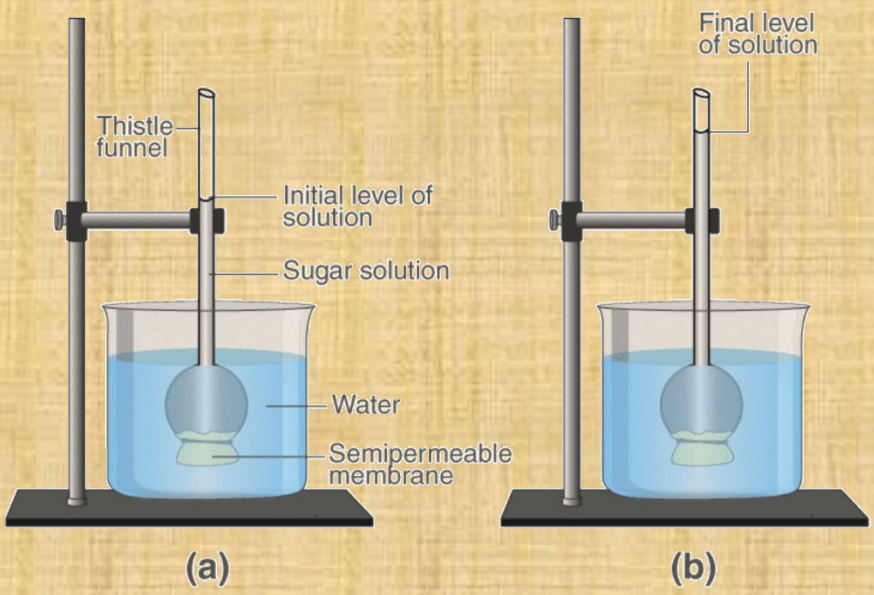

Fig. A demonstration of osmosis. A thistle funnel is filled with sucrose solution and kept inverted in a beaker containing water. (a) Water will diffuse across the membrane (as shown by arrows) to raise the level of the solution in the funnel (b) Pressure can be applied as shown to stop the water movement into the funnel.

Osmotic pressure:

The pressure required to stop osmosis is called Osmotic pressure. Osmotic pressure is equivalent to the osmotic potential but the sign is opposite.

- Osmotic pressure is positive pressure.
- Osmotic potential is negative pressure.