

OSMOSIS IN RAISINS

Aim:

To study the process of osmosis using raisins.

Learning Objectives:

- Students will learn the concept of osmosis.
- Students will learn the concept of selective permeability of membrane for water.

Concept of osmosis:

Osmosis is a necessary process in many biological systems. Through this learning unit, students will learn that there is only a net movement of water in process of osmosis. They should know how the concentration gradient works for movement of solvent (water) across membrane. This learning unit is designed for improving student's perspective about concept. Students must understand it by actual hands on activity.

Osmosis is a type of diffusion where movement of solvent (such as water) takes place across a semipermeable membrane (e.g. the outer membrane of a living cell) from a solution of lower solute concentration to a solution of higher solute concentration. Osmosis stops as soon as the solute concentration on either side of the semipermeable membrane becomes equal. In case of living cells, water plays major role as a solvent. Its concentration inside and outside the cell needs to be balanced. This is necessary to maintain the structural integrity and functional activity of cells. This is achieved by the osmotic movement of water through the cell membrane.

Osmosis is the principle on the basis of which way our kidney removes water from our body without losing important components like various salts and proteins.

Pre-requisites:

- Knowledge of diffusion and osmosis

Discussion:

- The difference between diffusion and osmosis can be discussed
- Principles of active and passive transport can be touched upon.
- Contextual examples involving the process of osmosis can be discussed (E.g. Osmotic stress faced by living organisms like marine and freshwater fish, desert rodents etc.).
- Students can be asked to name few life processes where osmosis plays crucial role.
- Discuss examples of osmotic activity found in animal as well as plant system. E.g. movement of sap in phloem cells.

Extended activity:

- Students can work out several variations by changing parameters like
 - Different solvents (Alcohol, liquid soap)
 - Temperature (low or high)
 - Type of solute (salt, soda)
 - weight of raisins
- They can use different biological materials like dried fig, dried vegetables, fruits, sabza etc. And try similar experiment.

Novelty :

- It is a very simple method of showing how osmosis occurs and how it is different from diffusion.
- Importance of negative and positive controls while doing experiment can be easily explained through this activity.

Enquiry questions: (Teachers can discuss these questions with students after activity.)

- What would happen if RBCs are suspended in tap water? Or salt solution?
- Which are the processes that use osmosis? Use examples from daily life processes used by humans as well as examples from biological systems.
- What happens to raw mangoes submerged in brine, after few days? Why?
