

Difference Between Imbibition and Osmosis

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Key Difference - Imbibition vs Osmosis

Molecules move from one area to another area by different processes. Imbibition, [diffusion](#) and osmosis are three methods involved in plants in the molecule movement. Imbibition is the process of absorbing water by a solid substance. These solid substances are known as imbibants, and they are [hydrophilic](#). Osmosis is a process where the water molecules move from high water potential area to low water potential area across a semi-permeable membrane. It is a type of passive process driven due to the gradient of the water potential. Both processes are very important for plants. The **key difference** between imbibition and osmosis is **imbibition does not need a semipermeable membrane whereas osmosis occurs via a semi-permeable membrane**.

What is Imbibition?

Imbibition is the process of absorbing water by a solid substance without forming a solution. The substance is known as an imbibant, and these substances do not dissolve in water. Imbibants should be hydrophilic. They should not repel water molecules.



Figure 01: Seed Germination

Dry seeds are a good example for imbibant. For the [germination](#) purpose, it absorbs water from the environment. Different imbibants show different capacities to absorb water. Proteins show good imbibing capacity than [starch and cellulose](#). Due to this reason, proteinaceous seeds show more swollen nature than starchy seeds. This process is very important for plants mainly because of two reasons. They are the absorption of water from the soil by the [cell walls](#) of the root hair cells and seed germination. Both processes occur via imbibitions.

What is Osmosis?

Osmosis is the process of water movement from a region of higher water potential to a region of low water potential via a semipermeable membrane. Osmosis is a type of diffusion process. It is a passive process meaning it does not require energy. It is driven by the water potential gradient across the semipermeable membrane. Osmosis is two types; [endosmosis and exosmosis](#). During the endosmosis, water molecules enter the cell due to low water potential compared to that in the solution outside.

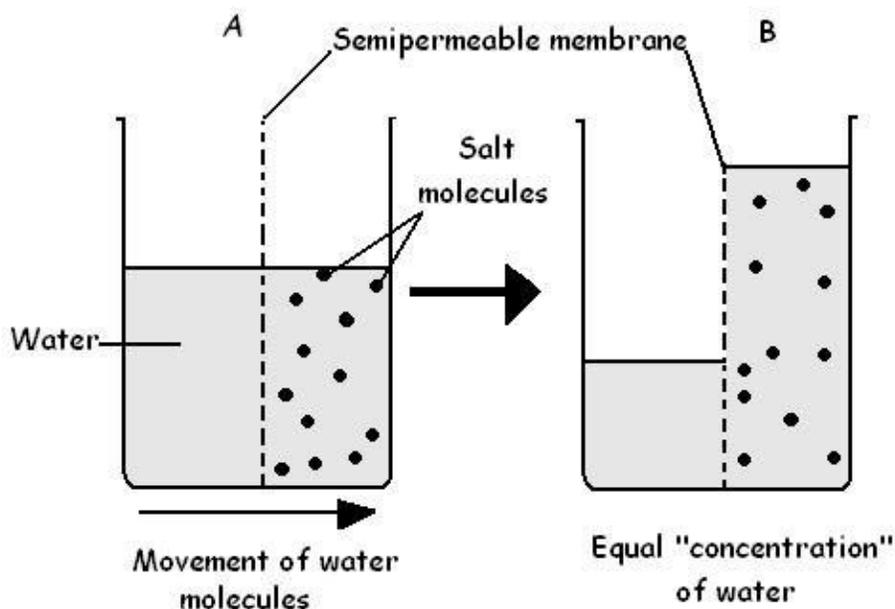


Figure 02: Osmosis

During the exosmosis, water molecules leave the cell due to the high water potential inside the cell with comparison to that in the outside solution. Therefore, endosmosis causes [turgidity](#) while exosmosis causes [plasmolysis](#). Endosmosis and exosmosis occur in [hypertonic and hypotonic solutions](#) respectively.

What are the Similarities Between Imbibition and Osmosis?

- Water molecules move in both processes.
- Both methods are the type of molecule movement methods.
- In both processes, water molecules are absorbed (in the case of osmosis, absorption and release both are possible).
- Both processes are very important for plants.
- Both are types of diffusion.

What is the Difference Between Imbibition and Osmosis?

Imbibition vs Osmosis	
Imbibition refers to the process of absorbing water by a solid substance.	Osmosis is the process of movement of water molecules from high water potential area to low water potential area through a semi-permeable membrane.
Involvement of a Solid Substance	
Imbibition involves a solid substance.	Osmosis does not involve a solid substance.
Involvement of a Semi-permeable Membrane	
Imbibition does not involve a semi-permeable membrane.	Osmosis is involved with a semi-permeable membrane.
Requirement of Colloidal Particles	
Imbibition requires colloidal particles.	Osmosis does not require colloidal particles. It requires solute particles.
Heat Generation	
Imbibition can generate heat during the imbibitions.	Osmosis does not generate heat.
Pressure Development	
High pressure can be developed during the imbibitions.	Compared to imbibitions, osmosis does not develop a high pressure.
Types	

Imbibition has no types.

Osmosis has two types; endosmosis and exosmosis.

Summary - Imbibition vs Osmosis

Imbibition and osmosis are two processes that facilitate water movement in plants. Absorption of water molecules by a hydrophilic solid substance is known as imbibitions. Imbibition is very important in seed germination and water absorption by root hairs. The substances are known as imbibants, and they attract water molecules. However, imbibants do not dissolve in water. Osmosis is another process that involves water movement. Water molecules move from a region of high water potential to region of low water potential through a semi-permeable or selective membrane. The movement of water molecules in and out of the cells occurs via osmosis. It can be explained in two ways; endosmosis and exosmosis respectively. Imbibition does not occur via a semi-permeable membrane. But osmosis occurs via a semi-permeable membrane. This is the difference between imbibitions and osmosis.

Reference:

- 1.“Imbibition: Conditions, Characteristics, Factors, Role and Significance | Botany.” Biology Discussion, 26 Oct. 2015. [Available here](#)
- 2.“Osmosis.” Wikipedia, Wikimedia Foundation, 16 Jan. 2018. [Available here](#)

Image Courtesy:

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