

Diffusion of H₂O

Purpose

To demonstrate osmosis in two directions using a raw egg.

Materials

400 mL beaker

5 % acetic acid (vinegar)

3 raw eggs

simple syrup (50:50 karo/water)

Procedure

1. Place 2 raw eggs in a 400 mL beaker.
2. Pour enough 5% acetic acid to immerse the eggs, cover the beaker with plastic wrap and punch a few holes in the wrap.
3. Allow the eggs to set for 24-48 hours and observe the disappearance of the egg shell and the obvious increase in size of the egg.
4. Remove one egg and rinse it.
5. Place the enlarged egg back in the beaker, immersing it with a simple syrup solution.
6. Wait another 24-48 hours and observe the egg has reduced in volume less than the original size of the raw egg.
7. Show students original egg, one in vinegar and one in syrup solution.

Additional Information

1. This demonstration shows osmosis across a selectively permeable membrane (egg membrane).
2. The acetic acid reacts with the egg shell:



3. A high concentration of protein (albumin) exists in the egg. Water enters the egg to equalize the solute concentration on both sides of the egg membrane.
4. By placing the egg in the syrup solution, a higher solute concentration (glucose) is outside the egg. Water, thus is removed at a higher rate to equalize the solute concentration on both sides of the egg membrane.

Questions for the Students

1. Why does the egg become larger when placed in vinegar?
2. Write the reaction for dissolving the egg shell.
3. Why does the egg become smaller when placed in the syrup solution?

Disposal

All solutions can be poured down the sink with excess water and the egg can be thrown away.

Reference

Summerlin, L., Borgford, C., Ealy, J. Chemical Demonstrations, Volume II, 1987.