

Osmotic pressure

(Ireland)

Background:

This model demonstrates osmotic pressure across a semipermeable barrier, using water and Golden Syrup

You will need:

- ✓ Golden Syrup (or a honey of the same consistency)
- ✓ 35 mm film cannister
- ✓ Small rubber stopper with a hole
- ✓ 5 cm of glass tubing
- ✓ Craft knife
- ✓ Felt-tip marker
- ✓ 250 cm³ beaker
- ✓ Cling film
- ✓ Scissors
- ✓ Water

Follow these steps:

1. Turn the film cannister upside down and draw the outline of the narrow end of the rubber stopper, onto the bottom of the cannister.
2. Using the craft knife cut out this disc carefully.
3. Working at a slow pace, cut out the central disc of the cannister cap, but leave the lock-ring in place.
4. Place the cling film over the end of the cannister, secured by the lock ring of the cap. Trim off an excess with a scissors.
5. Carefully fill the cannister from the opposite end, with golden syrup, to within 5mm of the stopper end.

6. Put the stopper, with glass tube, in place, and sit the cannister into a beaker of water to half its depth.
7. Within 2 minutes the syrup will be seen to rise in the glass tube.

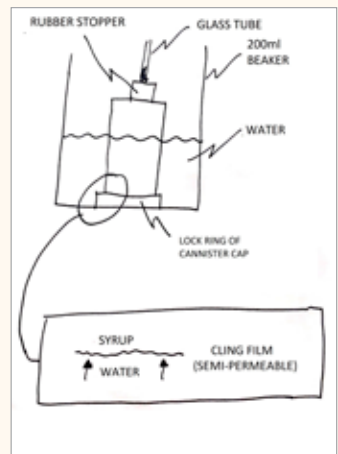
So what happened?

Water has no sugar, while Golden Syrup has a high sugar content. This means that there is a concentration gradient across the cling film barrier. This creates osmotic pressure causing the water to move into the film cannister.

Water passes through the semi-permeable barrier of cling film into the cannister increasing the total liquid volume. The larger molecules in the Golden Syrup cannot pass through the barrier. The increasing total volume causes the Golden Syrup to rise up the glass tube. If there was not a glass tube the internal pressure would stretch or burst the cling film.

This simple model shows how root tips and cellular membranes work as selective/semi-permeable barriers

concentrations. Additionally, the permeability of a variety of thin laminas could be tested.



What next?

The model could be used to explore the factors affecting osmosis, by varying the contents of either or both the cannister or beaker, or their