# Activity: The osmotic effect of honey

In this experiment, you can demonstrate osmosis using honey and potatoes.

## Background

Osmosis is the movement of water from a less concentrated solution across a semi-permeable membrane to a more concentrated solution. Honey is an example of a very concentrated solution of sugars, and it draws water from its surroundings by osmosis.

One of the reasons that Mānuka honey is good at killing bacteria is because it removes water from the bacteria by osmosis and prevents them from carrying out their life processes.

In this experiment, the cells of the potato form the semi-permeable membrane used to demonstrate osmosis.

## Aim

To observe the osmotic effect of honey.

## Materials

Honey  
Deionised water  
Potato  
Knife  
Weighing scales  
2 glass jars with lids  
Tissue paper  
100 ml measuring cylinder  
Tablespoon

## Method

1. Dissolve two tablespoons of honey in 100 ml warm deionised water.
2. Cut six pieces of potato approximately 1 cm x 1 cm x 2 cm. Pat dry and record their weight.
3. Place three pieces of potato in a clean jar and cover with 100 ml deionised water.
4. Place three pieces in a clean jar and cover with 100 ml honey solution.
5. Leave overnight.
6. Carefully remove potato pieces from jars, pat dry and reweigh.

## Results

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Start weight (g) | | | | End weight (g) | | | | Change in weight (g)  (average start weight –  average end weight) |
|  | 1 | 2 | 3 | Ave | 1 | 2 | 3 | Ave |  |
| Water |  |  |  |  |  |  |  |  |  |
| Honey solution |  |  |  |  |  |  |  |  |  |

## Conclusion

* Did the potato pieces in the honey solution gain or lose weight?
* What happened to the water inside the potato cells to cause this change?
* Explain why this happened.
* Compare what happened to the potato pieces in the honey solution to what happened to the potato pieces in the pure water.

## Extra for experts

## Aim

Examine the potato cells under the microscope. You can use iodine to stain the starch in the potato cells.   
Materials  
Microscope  
Sharp blade  
Microscope slide  
Cover slip  
Iodine stain

## Method

1. Use the blade to cut fine slices of potato from a piece of potato from each of the solutions.
2. Lie the two slices flat on the slide and stain with a drop of iodine.
3. Carefully place a cover slip over each of the specimens.
4. Observe the cells under the microscope.

## Results

* Record your observations.
* Draw what you see and label the diagram.

## Conclusion

* What did you observe?
* What does this tell you about the membrane that surrounds cells?