

INVESTIGATING THE DEHYDRATING EFFECTS OF ALCOHOL (11-14s)

SCIENCE/ ENVIRONMENTAL STUDIES WORKSHEET 4

About 60% of the adult human body is water. Our cells need plenty of water so the essential processes taking place inside them can work properly. In spite of how much water someone takes in each day, the amount of water in the body usually remains very stable. This is because hormones work to keep the balance right.

The most important of these is ADH, or anti-diuretic hormone. It acts on the kidneys to reabsorb water, so that less water leaves the body in urine. Alcohol reduces the production of ADH so the kidneys produce more urine and the body loses too much water. This means alcohol has a dehydrating effect and explains some of the symptoms of a hangover (e.g. feeling thirsty and headachey).

The dehydrating effect of alcohol (ethanol) can be used to preserve biological specimens. The alcohol kills off decay-causing microbes by dehydrating them, so the specimens do not 'go off'.

ACTIVITY ONE

In this experiment you will investigate the dehydrating effect of alcohol (ethanol) on living cells.

Safety note

An adult should supervise this experiment because ethanol catches fire easily. There must be no fires or naked flames in the room and you shouldn't eat or drink while you are doing this experiment.

Apparatus

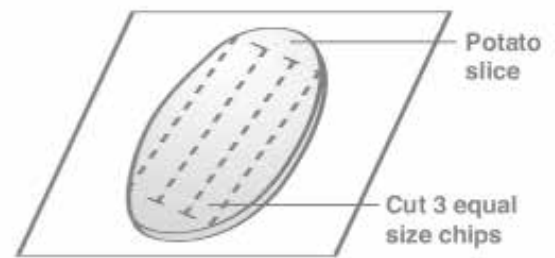
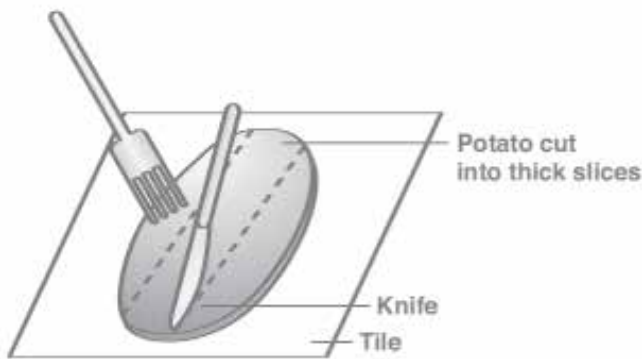
- 250ml beaker
- 100ml ethanol
- large raw potato
- white tile
- forceps or fork
- sharp knife
- cling film
- paper towel
- ruler

Method

Follow the steps shown in the diagrams and record your results in a table similar to the one given.

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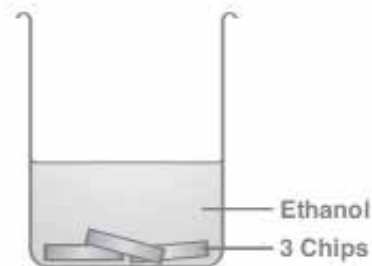
1. Assemble your apparatus.
2. Cut three potato chips of equal size.



3. Measure each chip with a ruler and record your results.



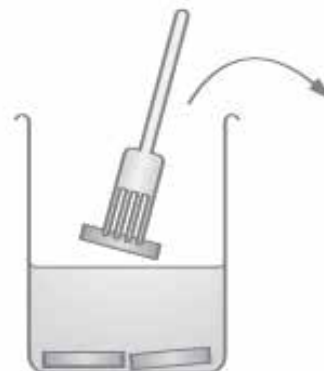
4. Put the ethanol and chips into the beaker.



5. Ensure the chips are fully submerged, and cover the beaker tightly with cling film.



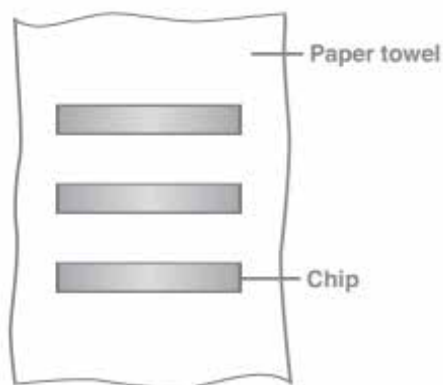
6. After 24 hours, remove the chips from the alcohol and the beaker.



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7. Place the chips onto a paper towel.



8. Measure each chip again and record your results.



Results

Record your results in a table similar to the one below.

| Start of experiment | | End of experiment | | End result |
|-----------------------------------|--|-----------------------------------|---------------------------------------|---|
| Length of each potato chip (mm) = | Average length of potato chips (mm) (add length of each of the 3 chips and divide by 3 to get the average) = | Length of each potato chip (mm) = | Average length of potato chips (mm) = | Change in average length of potato chips (mm) = |
| | | | | |

Conclusion

How does alcohol affect living cells?