

Teachers Notes

This activity can be used to investigate how different preparations (treatments) can affect the volume of the popped maize. Comparisons can be made between different treatments. You may wish to give students the facts sheet Explaining the popcorn explosion before they design their experiment. All material has been designed to be photocopied for classroom use.

What is special about popcorn?

Types of corn and how to prepare in advance.

Hydrated corn

This can be made by soaking normal popping maize in water overnight. Drain and pat dry before use. **Unpopped popcorn bought in shops contains approximately 14% water. This is the optimal water content for popping maize. By soaking it overnight, the water content in the kernel is raised above the optimum level.**

Broken maize

Maize can be slightly damaged by placing it in a transparent plastic bag and cracking the pericarp with a rolling pin. You are aiming to damage the pericarp without breaking the kernels open. **Popping maize requires a high pressure to build up in the kernel. If the pericarp (outer casing) is broken, this high pressure cannot be maintained and the maize will not pop.**

Non-popping maize

Maize that is used for feeding animals can be obtained from pet shops. You may need to extract these from a mixed feed. **Starch granules in popcorn are very tightly packed within the cells. This tight packing is essential for popping. Other varieties have less tightly packed starch.**

Normal popcorn

Popcorn can be bought in bags ready to pop from most supermarkets. Do not use microwave popcorn.



Risk assessment

It is necessary to reinforce the message to students that even though the laboratory where the experiment is done may be clean. It is not good practice to consume food which has been in the laboratory.

Because of the high temperatures involved in popping maize, the equipment used is likely to be hot.

Suggested Equipment

Measuring cylinders (of varying volume 10 — 20 cm³ for unpopped maize and 50 — 100 cm³ for popped samples). Popcorn machine or heavy based saucepan with lid and oil for popping.

Popcorn machines can be purchased at many catalogue stores. These do not require the use of oil and normally cost £15 — 25 each.

Predictions

You may wish to go through the information on Explaining the Popcorn Explosion with students before they make their predictions.

Method

Measure a small volume of each sample, approximately 10 cm³. Record this initial volume in the table. Pop each of the samples if you are using a popcorn machine, follow the manufacturer's instructions). Otherwise heat 10 cm³ of oil in the pan and then add one sample of the maize, cover and place on a high heat. As soon as the maize starts popping, turn the heat down and wait for popping to stop. Measure the volume of popped maize and record the final volume in the table. In each case a time limit should be recorded for the control sample and maintained when popping other samples. You should make sure that the maize is popped at the approximately same temperature to make it a fair test.

By using the results table to determine changes in volume, the students will be able to make a fair comparison of different samples.

Observations and discussion points;
Some popping may occur in all cases. However, the volume of the normal popcorn will be greater than that of the other maize samples. The normal popcorn can be used as a comparison and is called a control.

Students may be asked to:

- E make comparisons between samples
- E use their observations and results to draw conclusions
- E judge level of uncertainty in observations

