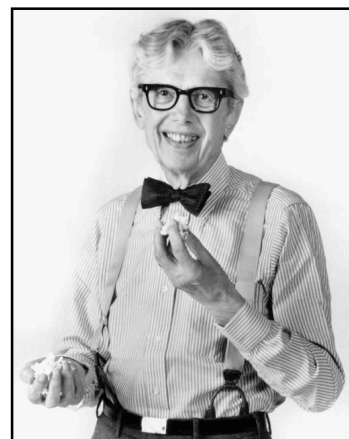


What Makes Popcorn “Pop”?

Introduction

Even though popcorn looks like it’s dry, each kernel contains a small amount of water in the center. When the popcorn is heated, the water expands and turns into steam. Once enough pressure is built up inside the kernel, the thick coating bursts, allowing the steam to escape. The hot steam cooks the white material inside the kernel, creating the light and fluffy shape that so many people love.



Materials

cooking oil

unpopped popcorn

Equipment

beaker (100-mL)

ring stand

beaker tongs

rubber stopper (1-hole)

Bunsen burner

thumbtack or sharp pin

Erlenmeyer flask (125-mL)

utility clamp

oven or hotplate

Safety Considerations

- YOU MUST WEAR GOGGLES AT ALL TIMES DURING THIS LAB.
- Be careful not to burn yourself with the open flame, hot water, or any hot equipment.
- Be careful when piercing the kernel with the thumbtack; try holding it flat on the lab station so that you don’t poke your fingers.
- DO NOT EAT THE POPCORN. It is heated in glassware that has previously held toxic chemicals, so it is not safe to eat.
- Sometimes chemicals from previous labs still remain in glassware and on other lab equipment; wash all lab equipment before and after performing this lab.
- Wash your hands thoroughly after completing this lab.

Procedure A – unpierced kernels, oven

1. Obtain exactly 10 kernels of unpopped popcorn and place them in a 100-mL beaker.
2. Label the beaker with a Sharpie marker, being careful to write your initials directly on the glass and NOT on the white label.
3. Place the beaker in an oven or on a hotplate set at a low temperature. Gradually increase the heat over a 30-minute period.
4. Carefully retrieve the beaker using the beaker tongs. Count the number of popcorn kernels that popped and record it in your data table.

Procedure B – unpierced kernels, open flame

1. Assemble the ring stand and utility clamp and so that the Bunsen burner is about 2-3 inches away from the bottom of the flask when it hangs from the clamp.

- Place a small amount of cooking oil in the bottom of a 125-mL Erlenmeyer flask, swirl it around so that it just coats the bottom, and pour the excess down the drain.
- Obtain exactly 10 kernels of unpopped popcorn and place them in the flask.
- Place a 1-hole stopper in the flask opening; make sure the size on the top of the stopper matches the size printed on the size of the flask!
- Gently heat the flask with a Bunsen burner by using a low flame and shaking the flask occasionally. Continue heating the flask for at least five minutes or until all the popcorn pops.
- Count the number of popcorn kernels that popped and record it in your data table.

Procedure C – pierced kernels, open flame

- Using a thumbtack, carefully pierce the seed coats of exactly 10 popcorn kernels.
- Perform the same steps as in Procedure B, instead using the pierced kernels.

Clean-up

- Dump any leftover oil cooking in the trash, NOT the sink.
- Throw away your popcorn (popped or unpopped).
- Return all equipment to its proper location.
- Wipe down your lab area.
- Wash your hands before leaving the lab.

Data Table

| | unpierced, oven | unpierced, burner | pierced, burner |
|--------------------------|--------------------|----------------------|--------------------|
| Number of kernels used | | | |
| Number of popped kernels | | | |

Questions

- Is there a difference between the number of kernels that popped in Procedure A vs. Procedure B? Why or why not?

- Is there a difference between the number of kernels that popped in Procedure B vs. Procedure C? Why or why not?

3. What is the purpose of the cooking oil in Procedures A & B?

4. After it has been heated, do you think that the average weight of a popped kernel is greater than, less than, or the same as the weight of an unpopped kernel? Why?

5. List one way you could change this lab and describe how your results might be different.
