

REAL SCIENCE: ENERGY IN FOOD LAB

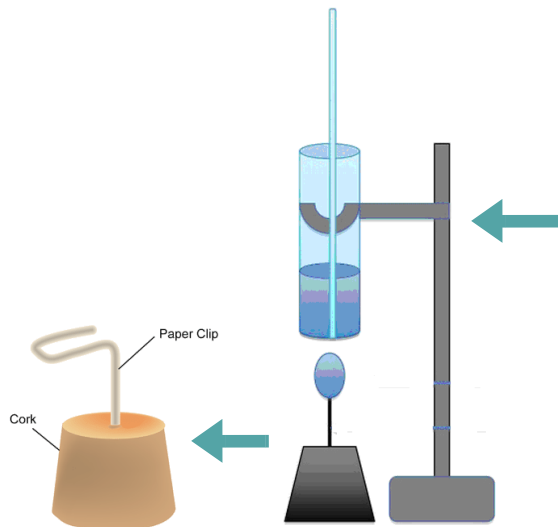
Purpose

In this lab, you will burn a peanut and a potato chip and use the energy given off to heat water. From your measurements of the mass of the water and the change in temperature, you will calculate the amount of energy that is given off.

Materials

- safety goggles
- peanut or potato chip
- scale / balance
- paperclip
- 50 mL beaker
- thermometer
- clay triangle
- aluminum foil
- ring clamp
- ring stand
- splints
- matches

Diagram



For initial setup, we wrap clay triangle around a small beaker. Then, place the clay triangle + beaker onto a ring clamp.

Procedure

1. Put on your safety goggles
2. Measure and record the mass of a peanut.
3. Set up peanut and apparatus like above and with any modifications required.
4. Place 40mL of water in the beaker. Record the starting temperature of the water.
5. Take beaker off of stand to start. Ignite the peanut with a match. Then, place beaker back onto ring clamp above the lit peanut.
6. For Trial 1, fold some aluminum foil around the burning peanut to keep heat in.
7. As soon as the peanut has stopped burning, record the final temperature.
8. Measure the mass of any peanut that did not burn

Data Table [Trial # :]

	Peanut/Potato Chip
Mass of water	
Starting temperature of water	
Final temperature of water	
Change in temperature of water	
Mass of food item before burning	
Mass of food item after burning	
Mass of food item that burned	

Note: 1mL of water = 1g of water

Calculations

1. Calculate the food calories absorbed by the water by using the following setup:
Calories = (mass of water) x (4.184) x (change in temperature) / (4200)

2. Assuming the Calories absorbed by the water is equal to the Calories given off by the food, find the amount of Calories per gram in the food item by using the following setup:
Calories per gram = (Calories given off by food item) / (mass of food item burned)

Discussion

1. Refer to the food label your teacher provides for the Calories count for the food item that was burned. Calculate the Calories per gram according to the information on the food label by following the setup:

$$\text{Calories per gram} = (\text{Calories in a serving}) / (\text{grams in a serving})$$

2. Compare your result from #2 of the Calculations section (your experimental value) with #1 of Discussion section (the posted value). The difference between the experimental and posted value is due to experimental error. That is, if the experimental value is less than the posted value, this could mean there was heat loss (ie. not all the heat that was given off by the peanut was absorbed by the water). What errors do you believe was present that caused these differences.

Design

1. What you have set up in this lab is a calorimeter - a device that measures the heat loss or gain for a chemical process (in this case, the heat released by burning a peanut). For your next trial, you will be redesigning and rebuilding your calorimeter. Explain what you will do to make a better calorimeter in your next trial (mention not only what you will use or do, but also how these changes will make your calorimeter better than before)

2. In the space provided, draw and label your design for the next calorimeter.