

Energy In Food Lab

All foods contain energy but the amount varies greatly from food to food. Which foods contain the most energy? In this lab, you will use a calorimeter to measure the amount of energy in some foods.

This energy will be measured in calories. One calorie is the amount of heat required to raise the temperature of 1 mL (1g) of water 1°C. Calorie values of food in diet charts are listed in kilocalories (kcal), which is 1000 calories.

You will be measuring the change in temperature of a known volume of water. The temperature change is caused by the absorption of the heat given off by the burning of a known mass of food. Based on the change in temperature, you can calculate the amount of energy in the food.

Procedure

1. Obtain and set up your calorimeter
2. Obtain and mass your food samples. Record the masses on your data table.
3. Place your food sample on the needle anchored in the cork. **CAUTION: The needle is sharp. Be careful!**
4. Place the food, needle, and cork setup on a folded piece of foil and set the calorimeter over the setup. Adjust the can so that it is about 2 cm above the food.
5. Remove the can from the calorimeter. Measure 100mL of water and carefully add it to the can.
6. Measure the temperature of the water in the can and record it on the data table. Remove the thermometer.
7. **CAREFULLY** set fire to the food sample by holding a lit match to it until it stays burning. Quickly position the can on the ring stand over the burning food item. Place the used match in the container designated by your teacher.
8. When the item has burned completely, measure the temperature of the water. Record the temperature on your data table.
9. Repeat the procedure with all the food items listed by your teacher. Change the water in the can each time you burn a new food item. Allow the can to cool between trials.
10. Calculate the amount of energy in each type of food tested by completing the data table. Answer the questions on your data sheet.

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DATA TABLE

	Food Sample 1	Food Sample 2	Food Sample 3
Mass of sample			
Mass of water			
Water temp Before heating			
Water temp After heating			
Change in temp			
Calories			
Kcal			
Kcal/g			

Average kcal/gram of your 3 food samples

Conclusion Questions:

1. If the same amount of each food you tested were completely burned in the cells of the human body, would you expect the energy release to be greater or less? Why?
2. Why might some foods with fewer kcals be better food choices than food with more kcals?
3. What was the original source of energy in all of the foods tested?
4. Bears are known to eat the fatty parts of many animals. Why is this a good food source for bears?
5. How is burning food with fire like cellular respiration? (Hint: your answer should have something to do with ADP and ATP in your cells.)