*Chemistry Lab: Potato Chip Calorimetry Crunch*

Purpose: To approximate the energy stored in two types of potato chips. To compare the amount of energy stored in the two types of potato chips. To observe the principles of calorimetry.

Hypothesis: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Data Table:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mass of chip | | Mass of empty beaker | | Mass of beaker + H2O | | Mass of H2O (calculated) | | Initial temperature | | Final temperature | | ΔT (calculated) |
| Regular Chip |  |  | |  | |  | |  | |  | |  | |
| Reduced Fat Chip |  |  | |  | |  | |  | |  | |  | |

Calculations and Questions:

1. Use the water data to calculate the heat gained by the water. SHOW ALL WORK FOR BOTH CHIPS.

|  |  |
| --- | --- |
| Regular Chip | Reduced Fat Chip |
|  |  |

1. Where did the heat gained by the water come from?
2. Convert the joules from question 1 into Calories (kcal). This is the amount of chemical energy that was stored in each chip. SHOW ALL WORK FOR BOTH CHIPS.

|  |  |
| --- | --- |
| Regular Chip | Reduced Fat Chip |
|  |  |

1. To accurately compare the two types of chips, we need to eliminate the difference in mass of the chosen chips. To do this, we can determine the amount of energy per gram of chip. Take the Calories from step 3 and divide by the mass of each chip. SHOW ALL WORK FOR BOTH CHIPS.

|  |  |
| --- | --- |
| Regular Chip | Reduced Fat Chip |
|  |  |

Conclusions: Write a conclusion paragraph following the lab report guidelines:

* In paragraph format
* Restate the purpose of the lab.
* Summarize results.
* Tell whether or not your hypothesis was correct.
* Back up you hypothesis statement with specific data from the lab (three data points is good).

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*Materials*: You will need one each of the following:

regular potato chip

reduced fat potato chip (about the same size as the first one)

250 mL beaker

100 mL graduated cylinder

150 mL beaker

Thermometer

Tweezers

Ring stand with ring

Wire gauze

Stirring rod

Electronic balance

*Procedure:*

1. Everyone needs goggles. Aprons are optional but can protect your clothing.
2. Place the 150 mL beaker on the ring stand.
3. Position the ring and the wire gauze 10 cm (4 inches) above the 150 mL beaker. This beaker will catch the ashes of the burnt chip.
4. Measure the mass of the 250 mL beaker.
5. Use the graduated cylinder to add 50.0 mL of water to the beaker.
6. Find the mass of the beaker and water.
7. Place the beaker on the mesh.
8. Measure and record the temperature of the water. Give the thermometer a little time to adjust to the water temperature before reading. Be sure the end of the thermometer is not touching the beaker.
9. Measure the mass of your first potato chip.
10. Hold the chip with the tweezers above the 150 mL beaker.
11. Use a match or lighter to ignite the bottom of the potato chip.
12. Use the stirring rod to stir the water while the chip burns.
13. As the chip burns, watch the temperature. Record the highest temperature reached. Never stir with the thermometer!
14. Repeat with the other type of chip.