

Investigation of the energy content of foods

Introduction

Different foods have different energy contents. The energy content of a food can be released when you set it alight. When you hold a burning food underneath a known volume of water, the temperature increase can be measured. A simple calculation can then be used to estimate the amount of energy stored within the food.

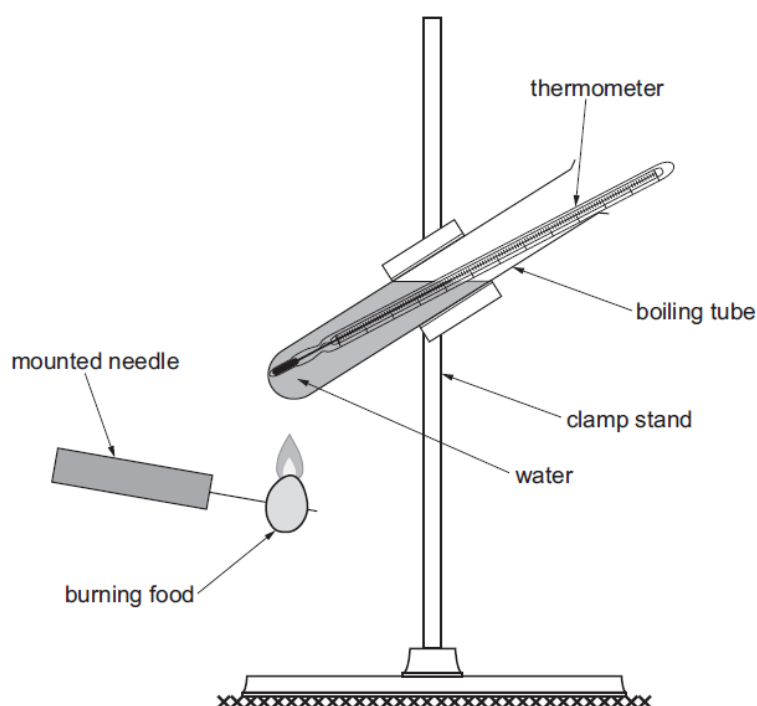
Apparatus

25 cm³ measuring cylinder
 boiling tube
 clamp stand, clamp and boss
 thermometer
 Bunsen burner
 heat proof mat
 mounted needle
 samples of foods

Access to:

electronic balance ± 0.1 g

Diagram of Apparatus



Method

1. Measure 20 cm^3 of water into a boiling tube.
2. Clamp the boiling tube to the clamp stand.
3. Record the temperature of the water using a thermometer.
4. Choose a piece of food and record its mass.
5. Place food onto a mounted needle.
6. Hold the food in the Bunsen burner flame, until it catches alight.
7. As soon as the food is alight, hold it under the boiling tube of water. Keep the flame directly underneath the tube.
8. Hold the food in this position until it has burnt completely. If the flame goes out, but the food is not completely burnt, quickly light it again using the Bunsen burner and hold it directly underneath the boiling tube.
9. When the food has burned completely, and the flame has gone out, immediately record the temperature of the water.
10. Repeat steps 1-9 for other foods.

Analysis

1. Calculate the increase in temperature each time.
2. Calculate the energy released from each food using the formula:

$$\text{Energy released from food per gram (J)} = \frac{\text{mass of water (g)} \times \text{temperature increase (}^{\circ}\text{C)} \times 4.2}{\text{mass of food sample (g)}}$$

3. Compare your results with the theoretical value on the food packet.
4. Evaluate your method and suggest how it could be improved.