**ENERGY CONTENT IN A CASHEW NUT**

**AIM:** To investigate the energy content (heat released) from burning of a cashew nut. **Skill: AI**

**APPARATUS and MATERIALS:**

* Thermometers
* 2 Test tube holder
* Retort stand with clamp
* Matches
* Scale or balance
* Boiling tube
* Measuring cylinder
* Bunsen burner
* Electronic balance
* Cashew nut
* Distilled water/ water

**DIAGRAM:**

DIAGRAM SHOWING THE SET UP OF APPARATUS TO INVESTIGATE ENERGY CONTENT OF A CASHEW

**METHOD:**

1. Measure out 20cm3 of water into a boiling tube
2. Record the starting temperature of the water.
3. Set up the boiling tube on a retort stand with clamp, or held in a test tube holder by a student.
4. Measure the mass of a cashew nut, record this mass.
5. Holding the cashew nut securely in a second test tube holder, use the Bunsen burner to set it alight.
6. Hold the lighted cashew nut under the boiling tube of water; ensure that it keeps lighting (reigniting if it goes out.).
7. Record the highest (final) temperature of the water.
8. Work out the energy released form the cashew nut in joules using the formula

$$Energy release \left(J\right)=increase in temperature \left(°C\right)x mass of water \left(20g\right)x 4.2$$

1. Also find the energy release per gram of cashew nut.

*Rewrite your method into past tense in the space below or on a separate page.*

**METHOD**:

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**RESULTS:** (*Add a title to the table and collect your measurements, then plot a graph.)*

**Table** showing \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |
| --- | --- |
| **Feature** | **Units of measure** |
| Starting temperature (T1) | \_\_\_\_\_\_\_°C |
| Highest (final) temperature (T2) | \_\_\_\_\_\_\_°C |
| Increase in temperature (T2- T1) | \_\_\_\_\_\_\_°C |
| Mass of cashew nut | \_\_\_\_\_\_\_ g |

**DISCUSSION:** (On a new page, using full sentences in paragraphs)

1. What form is energy stored in food? Name some biomolecules.
2. In organisms energy is released from food through what process?
3. In the lab, this lab, the energy content of a cashew nut was found by burning. Name a device that can give even more accurate results. (Hint: a calorimeter)
4. Energy is measured in joules. Heat energy released by burning can be measured as in this lab by recording the increase in temperature of a particular mass of water. (Hint: 1g of water is raised 1°C by 4.2 Joules (J) of energy.

**CONCLUSION:** (Relate to your aim and findings/results.)

 What did you find out in this lab about heat released from cashew nuts?

**MARKSCHEME – OBSERVING, RECORDING AND REPORTING SKILLS (ORR)**

|  |  |
| --- | --- |
| **ORR CRITERIA** | **Mks** |
| **Observations** | * Significant changes noted
* Original and final conditions compared
* Control noted OR diagram
 | **3** |
| **Recording**Tables/ Graph | * Title – above, in capitals - 1
* Column & row headings (with units) - 1
* Enclosed and neat -1

OR* Title – at base, in capitals, underlined -1
* Both axes labelled with units - 1
* Accurate plots – 1
 | **3** |
| **Reporting** | * Format - **ALL** sections present – 1
* Aim in capital letters - 1
* Acceptable language and expression –

grammar – 1 and spelling – 1 | **4** |
| **TOTAL** | **10** |

**MARKSCHEME - ANALYSIS AND INTERPRETATION (AI)**

|  |  |
| --- | --- |
| **Criteria (AI)** | **Marks** |
|  | 1 |
|  | 2 |
|  | 3 |
|  | 2 |
|  | 2 |
| **TOTAL** | **10** |