

## G620: Science at Work – Sample Assignment E

<b>Unit Name:</b> Science at Work	<b>Unit Number:</b> G620
<b>Assignment Title:</b> Quantitative assessment of the effect of cooking on the vitamin C content in food	<b>Assignment:</b> G620 Sample Assignment E
<b>Date Set:</b>	<b>Due Date:</b>
<b>Assessment Objective(s):</b> AO3 & possible AO2(b)	

### Vocational Brief:

Vitamin C (ascorbic acid) is an important component of a balanced diet. Its function is to promote the formation of collagen and the proper functioning of the skin and mucous membranes. It also functions as an antioxidant and stimulates the absorption of iron from the gut. DCPIP is a dye and in an oxidised state is blue. It becomes colourless when it is reduced. Ascorbic acid is a reducing agent.

### Task:

The aim of this task is to safely complete an investigation to quantitatively assess the vitamin C content of fresh cabbage, cabbage heated to 100 °C for 10 minutes, and cabbage heated to 100 °C for 20 minutes.

In this task you are required to:

- identify hazards and carry out a risk assessment
- follow set procedures
- record any observations and measurements
- process and evaluate results.

*This task should be marked to a maximum of 21 and will need to be divided by two and the mark added to that of the second practical task.*

### Note:

In addition you can gain AO2(b) if you complete the:

- treatment of results.

### Resources:

- Human Health and Disease, Richard Fosbery, Cambridge Modular Sciences, CUP ISBN 0-521-42159-4
- Advanced Biology, Mary Jones and Geoff Jones, CUP, ISBN 0-521-48473-1

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### Practical Instructions

#### Quantitative assessment of the effect of heat on the vitamin C content of cabbage

#### Practical Instructions – AO3(a) & AO3(b)

Complete a risk assessment before starting the investigation.

*Ask your teacher to check your plans before you start.*

1. Weigh accurately 5.00 g uncooked cabbage.
2. Put the cabbage in a mortar with 2 spatulas of sand and 25 cm<sup>3</sup> of dilute ethanoic acid.
3. Grind the mixture together for 5 minutes.
4. Filter the mixture using vacuum filtration.
5. Transfer the filtrate in a 100 cm<sup>3</sup> measuring cylinder.
6. Make up to 100 cm<sup>3</sup> with distilled water.
7. Load the burette with the cabbage extract.
8. Use a syringe to place 1 cm<sup>3</sup> DCPIP solution into a conical flask.
9. Place the conical flask on a white tile under the burette.
10. Titrate the extract against the DCPIP solution by adding 1 cm<sup>3</sup> at a time.
11. The end point is reached when the DCPIP is colourless.  
(Do not use any more than 100 cm<sup>3</sup> of cabbage extract in any single titration.)
12. Record the volume of extract needed to decolourise the DCPIP.
13. Repeat steps 7-12 three times to obtain an accurate value.
14. Repeat steps 1-12 with two extracts made from 5.00g of cabbage heated to 100 °C for 10 and 20 minutes respectively.

#### Treatment of Results – AO2(b)

- Calculate the concentration of vitamin C in the three samples of cabbage.

#### Evaluation of Results – AO3(c)

Comment on:

- the method
- the results that you obtained for raw cabbage, cabbage heated to 100 °C for 10 minutes and cabbage heated to 100 °C for 20 minutes.