

Edexcel IAL Biology A Level

Core Practical 2

Investigate the vitamin C content of food and drink.

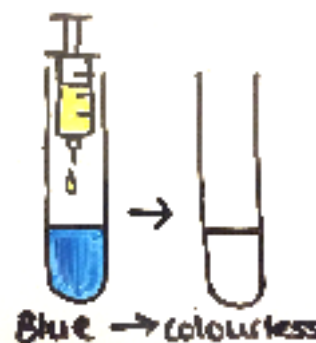


Equipment list

- 1% DCPIP solution
- 5 cm³ syringes
- Test tubes
- Test tube rack
- Pipettes
- 4 different fruit juices
- 1% vitamin C solution

Method

1. Use a pipette to transfer 1 cm³ of DCPIP solution to a test tube.
2. Then fill a 5 cm³ syringe with 5 cm³ of vitamin C solution.
3. Add the vitamin C solution from the syringe **one drop at a time** to the test tube containing the DCPIP, being sure to **gently shake** the test tube after each addition.
4. Stop adding the vitamin C once the **blue DCPIP** has turned **colourless**. Record the **volume** of the solution that has been added to cause the colour change.
5. Repeat steps 1-4 to obtain 2 further results for the **vitamin C solution** and then calculate a **mean volume** added, first discarding any anomalous results.
6. Then repeat steps 1-5 using each of the **4 fruit juices** in place of the vitamin C solution.



Risk assessment

Hazard	Risk	Precaution
DCPIP	Could irritate skin	Avoid skin contact and always transfer it using pipettes/ a syringe Wear eye protection
Fruit juices	Could have been kept in the school lab for a long time.	Do not drink it
Glassware	Cuts from sharp objects	Take care when handling glass objects Keep away from edge of desk
Liquids	Spillage that could cause surfaces to be slippery leading to an accident	Wipe up any liquid spillages as soon as they occur Put lids on bottles Put them away once used Keep away from edge of desk



Results table

Drink used	Volume 1 (cm ³)	Volume 2 (cm ³)	Volume 3 (cm ³)	Mean volume needed to decolourise DCPIP (cm ³)
Vitamin C solution				
Fruit juice 1				
Fruit juice 2				
Fruit juice 3				
Fruit juice 4				

Conclusion

This experiment can be used to estimate the **concentration of Vitamin C** in fruit juices since vitamin C is an **antioxidant** and DCPIP is an **oxidising agent**. When vitamin C is added to DCPIP the DCPIP is reduced which eventually causes a colour change from **blue to colourless**. Since the volume and concentration of both the vitamin C solution and DCPIP are known, the concentration of vitamin C in each fruit juice can be calculated by comparing it to the standard solution.

The calculation

1 cm³ of 1% vitamin C solution contains **10 mg of vitamin C**. Using this information you can calculate the mass of vitamin C needed to **decolourise a given volume of DCPIP** (for instance if 1.6 cm³ were needed that would be 16 mg). From there you can calculate the concentrations of the fruit juices.

$$\text{Concentration} = \frac{\text{mean volume of standard solution}}{\text{mean volume of fruit juice}} \times \text{concentration of standard solution.}$$

Example

conc. of fruit juice 1 =

$$\frac{1.4}{2.0} \times 1 = 0.7\% \text{ concentration}$$

↳ volume of fruit juice needed to decolorise DCPIP

