

WJEC England Biology A Level

SP CC 05: Simple extraction of DNA from
living material
Practical notes



Introduction

DNA carries genetic information as **genes**. DNA molecules are packaged into thread-like structures known as **chromosomes**.

Strawberries are a good specimen for DNA extraction as they have **large genomes**, containing up to **eight** copies of each chromosome. The DNA extracted is visible as white clumps.

Equipment

- Strawberry
- Acetic-orcein stain
- 10 cm³ detergent
- 100 cm³ water
- 90% ethanol
- Table salt
- 2× 250 cm³ beakers
- Mesh strainer
- Glass rod
- Scalpel
- Resealable plastic bag

Risk assessment

| Hazard | Risk | Precaution | Emergency |
|--------------|---------------------------|--|--|
| Broken glass | Cuts | Keep glassware away from the edge of the desk | Dispose of broken glassware carefully; elevate cuts and apply pressure; do not remove glass from cuts; seek medical assistance |
| Scalpel | Cuts | Direction of cut away from the body; do not attempt to change blade; keep scalpel away from the edge of the desk | Elevate cuts and apply pressure; wash minor cuts in cold water; seek medical assistance |
| Ethanol | Highly flammable | Make sure that there are no naked flames in the room | Put out small fires with a damp cloth; evacuate the building |
| | Irritation to respiratory | Do not directly inhale the ethanol; ensure the room | Seek medical assistance |



| | system | is well-ventilated | |
|---------------|--------------------|---|---|
| Acetic orcein | Skin burns | Wear gloves when handling acetic orcein | Remove contaminated clothing; run the affected area under cold water; seek medical assistance |
| | Irritation to eyes | Wear safety goggles | Flood eye(s) with tap water; seek medical assistance |

Method

1. **Chill** the **90% ethanol** in a freezer for two hours prior to the practical
2. Using a scalpel, remove the **calyx** of the strawberry
3. Place the strawberry into a plastic bag. Seal it and completely **crush** the strawberry. *This breaks the cells apart and increases the surface area exposed to the detergent.*
4. Mix **10 cm³** detergent, **100 cm³** water and **two pinches** of salt in a 250 cm³ beaker
5. Pour this solution into the plastic bag, reseal and gently mix with the crushed strawberry for **2 minutes**. *The detergent disrupts cellular and nuclear membranes, releasing DNA into solution. The salt helps the DNA to precipitate.*
6. **Filter** the mixture into a 250 cm³ beaker using a mesh strainer
7. Tilt the beaker **45°** and gently pour the **chilled** 90% ethanol down its **side**. *The ethanol is chilled to slow down the activity of enzymes which could break down the DNA.*
8. DNA is **insoluble** in ethanol so it forms **white clumps** where the ethanol layer meets the water layer (ethanol is **less dense** than water so floats on top)
9. Use a glass rod to **extract** the clumps of **DNA**
10. Add a few drops of **acetic-orcein** to the sample. A **red-purple** colour indicates a positive test for DNA.

