

The Banana Experiment

Science English Experiment: Extraction of Banana DNA

Introduction:
All living things are made up of cells.
Each cell has a nucleus which controls the life of the cell.
Each nucleus has chromosomes which contain DNA.
DNA dissolves in salt water and precipitates in alcohol.

Purpose:
To extract DNA from banana cells by using items easily available in the kitchen.

Materials:

Banana	Liquid detergent	Cooled ethanol
Mortar and pestle	Glass rod	2 Beakers
The bag	Salt	Tap water

Procedure:

- Preparation of Solution:**
In a beaker mix 1g of salt with 3mL of liquid detergent.
Fill the beaker with water to a volume of 50mL and stir gently with glass rod.
- Sample Preparation:**
Mash-up a 5cm piece of banana and place it in the beaker.
- Extraction of DNA:**
Identify the mashed banana suspension then let it stand for 10mins.
(The liquid detergent is a surface acting agent [or surfactant] and helps DNA dissolve in salt water.)
- Filtration:**
Use a tea bag to filter the mashed banana suspension into a test tube. Fill the test tube about halfway.
- Precipitation of DNA:**
Add an equal amount of ethanol to the beaker by slowly pouring it down a glass rod. Ethanol is less dense than water, so it sits on the water solution making 2 different layers.
Wait for a white precipitate to form on the boundary phase. (DNA does not dissolve in ethanol, it will precipitate out.)
- Collection of DNA:**
Identify the solution with a wooden chopstick. The fibers will stick to it and the DNA can be spooled and collected.
(Write down what you see and observe, and draw!)

SCIENCE!

With your partner discuss why this step is important?

Procedure:

1. Preparation of Solution:

In a beaker mix 8g of salt with 3mL of liquid detergent.

Fill the beaker with water to a volume of 50mL and stir gently with glass rod.

Step 1

What is the Salt for?



- Makes the DNA less soluble in water.
- Helps the DNA stick together.

Step 1

Why do we use Liquid detergent?

- Breaks down the cell and nucleus membranes to release the DNA.
- The membranes are made from lipids (fats/oils etc)
- Liquid detergent is a surfactant.



With your partner discuss why this step is important?

2. Sample Preparation:

Mash-up a 5cm piece of banana and place it in the beaker.

Step 2

Why mash up the banana?



- Increases the surface area.
- More DNA can be extracted.

With your partner discuss why these steps are important?

3. **Extraction of DNA:**

Gently stir mashed banana suspension then let it stand for 10mins. (The liquid detergent is a surface acting agent [or surfactant] and helps DNA dissolve in salt water.)

4. **Filtration:**

Use a tea bag to filter the mashed banana suspension into a test tube, fill the test tube about halfway.

Step 4

Why do we filter the mixture?



- Removes the larger particles of banana.
- Allows collection of the DNA and cellular substances.

With your partner discuss why this step is important?

5. **Precipitation of DNA:**

Add an equal amount of ethanol to the filtrate by slowly pouring it down a glass rod. (Ethanol is less dense than water, so it sits on the water solution making 2 different layers.)

Wait for a white precipitate to form on the boundary phase. (DNA does not

Step 5

What is the ethanol used for?

- DNA is not soluble in alcohol (ethanol).
- Ethanol causes the DNA to precipitate.
- Must be poured slowly so the ethanol does not mix with the solution.



With your partner discuss why this step is important?

different layers.)

Wait for a white precipitate to form on the boundary phase. (DNA does not dissolve in ethanol. It will precipitate out.)

Step 6

What is the white precipitate?

- Strings of DNA from millions and millions of cells in the banana.

