

DNA Extraction: Strawberry

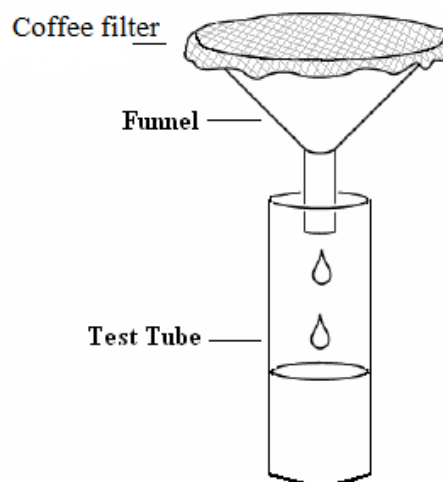
Background: The long, thick fibers of DNA store the information for the functioning of the chemistry of life. DNA is present in every cell of prokaryotes, eukaryotes, bacteria, plants, and animals. The DNA found in strawberry cells and other cells of living organisms can be extracted using common, everyday materials. We will use an extraction buffer containing salt, to break up protein chains that bind around the nucleic acids, and dish soap to dissolve the lipid (fat) part of the strawberry cell wall and nuclear membrane. This extraction buffer will help provide us access to the DNA inside the cells.

Pre-lab questions:

1. What do you think the DNA will look like in the strawberry?
2. Where is DNA found in Eukaryotic and Prokaryotic cells?

Materials:

- Ziploc bag
- 1 of the provided living sources (Strawberry)
- 10 mL DNA extraction buffer (soapy, salty water)
- Coffee filter
- Funnel
- Test tube
- Inoculating loop
- 10 mL isopropyl alcohol



Procedure:

1. Place one strawberry or other object in a Ziploc bag.
2. Smash/grind up the strawberry or other object using your fist and fingers for 2 minutes. *Careful not to break the bag!!*
3. Add the provided 10mL of extraction buffer (salt and soap solution) to the bag.
4. Knead/mush the strawberry in the bag again for 1 minute.
5. Assemble your filtration apparatus as shown to the right, with the coffee filter in the funnel.
6. Pour the strawberry slurry or other slurry into the filtration apparatus and let it drip directly into your test tube.
7. Remove filtration apparatus then slowly pour cold isopropyl alcohol into the tube. OBSERVE
8. Dip the loop into the tube where the strawberry extract and alcohol layers come into contact with each other. OBSERVE

Observations:

Before extraction	
During extraction	
After extraction	

Results and Conclusion:

Post-Lab Questions

It is important that you understand the steps in the extraction procedure and why each step was necessary. Each step in the procedure aided in isolating the DNA from other cellular materials. Match the procedure with its function:

<u>PROCEDURE</u>	and	<u>FUNCTION</u>
1. Filter strawberry slurry through coffee filter		A. To precipitate DNA from solution
2. Mash strawberry with salty/soapy solution		B. Separate components of the cell
3. Initial smashing and grinding of strawberry		C. Break open the cells
4. Addition of isopropyl alcohol to filtered extract		D. Break up proteins and dissolve cell membranes

Answer the following in complete sentences.

5. What biomolecule is DNA?
6. What is the monomer of DNA?
7. What is the monomer made out of (three parts)?
8. What are the nitrogenous bases of DNA and how do they pair up?
9. How does DNA differ from RNA?
10. What did the DNA look like? Relate what you know about the structure of DNA to what you observed today in the lab.
11. Explain what happened in the final step when you added isopropyl alcohol to your strawberry slurry in the test tube.
(*Hint: DNA is soluble in water, but not in isopropyl alcohol!*)
12. A person cannot see a single cotton thread 100 feet away, but if you wound thousands of threads together into a rope, it would be visible much further away. Is this statement similar to our DNA extraction? Explain.
13. Why is it important for scientists to be able to remove DNA from an organism? List two reasons and explain.
14. Is there DNA in your food? How do you know?