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Title

DNA Extraction of an Onion

Objective

The objective of this lab is to extract DNA from onion cells, separate DNA from other cellular materials using chemical techniques, visualize and collect DNA strands, and explore their unique physical properties.

Introduction

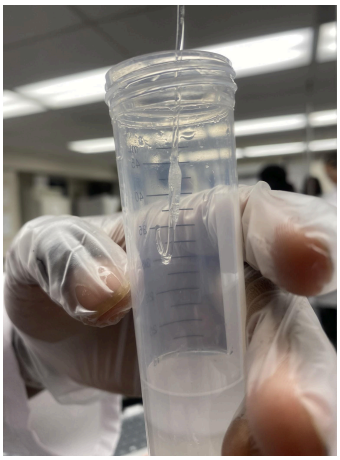
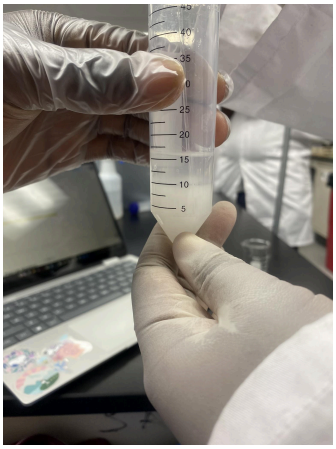
Many methods exist to extract and isolate DNA, depending on the source and purpose. For example, high-end laboratories may use centrifuges, phenol extraction, and automated systems to isolate and visualize DNA. However, in this lab, we performed a simplified DNA extraction using laboratory reagents. We broke down onion cells using a homogenizing solution, which disrupts membranes and proteins. We then isolated the DNA by precipitation in ice-cold ethanol. We will then spool the DNA using a hooked pipette to collect and observe it.

Materials

- ★ 25 g diced Onion
- ★ Homogenizing Solution
- ★ Ice-cold 95% Ethanol
- ★ Blender
- ★ Pasteur Pipet
- ★ Razor Blades
- ★ Balance
- ★ 250 mL and 500 mL Beakers
- ★ 60 C Water Bath
- ★ Ice Bath
- ★ Cheesecloth and Funnel
- ★ Thermometers
- ★ 50 mL Conical Centrifuge Tubes

Results

Homogenizing the onion in the solution, followed by heating, produced a frothy mixture. The mixture was then filtered through layers of cheesecloth, which removed insoluble wall debris and foam, isolating the translucent lysate. It was then chilled in 95% ethanol, which resulted in a precipitate. This precipitate appeared as delicate, white strands. With agitation and rotation, these strands formed a gelatin-like mass that remained on the hook upon removal.

Discussion

Homogenization through the dicing and blending tears the plant tissue, initiating the wall breakdown. Keeping the lysate at 60 degrees Celsius thermally disrupted the membrane bilayers and accelerated lysis while also denaturing DNA. The phase separations and precipitation seen in the 50 mL conical centrifuge tube reflect differences in solvent polarity and macromolecular properties.