

Strawberry DNA Extraction Lab

Background:

The long, thick fibers of DNA (deoxyribonucleic acid) store the information for the functioning of the chemistry of life. DNA is present in every cell of plants and animals. The DNA found in strawberry cells 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?
2. Where is DNA found?

Materials:

1 quart sized Ziploc bag (freezer bag is best, but 2 non-freezer resealable sandwich bags will work)	coffee filter or paper towel
2-3 strawberries (fresh or frozen, thaw if using frozen)	funnel (or cut top 1/3 off a plastic water bottle)
1/2 c. water	clear plastic cup
1-1/2 tsp. dish soap (like Dawn, Palmolive, etc.)	toothpick or skewer
1/4 teaspoon salt	2 T. 70% or 91% isopropyl alcohol (chilled in the freezer) (NOT 50%)
measuring cup to measure ½ cup	1 teaspoon, ½ teaspoon, ¼ teaspoon

Procedure:

1. In a cup, prepare the DNA extraction buffer by adding 1-1/2 tsp. dish soap and 1/4 teaspoon salt to 1/2 c. water. Stir gently with a spoon.
2. Place two strawberries in a Ziploc bag.
3. Gently smash the strawberry using your fist and fingers for 2 minutes. Careful not to break the bag!
4. Add 2 teaspoons of DNA extraction buffer to the bag.
5. Knead/mash the strawberries in the bag again for 1 minute.
6. Open the coffee filter in the funnel. Place the funnel in the cup.
7. Pour the strawberry slurry out of the bag and into the filter. Let liquid drip into cup for about 5 minutes.
8. Slowly pour 2 tsp. of ice cold isopropyl alcohol into the cup. Observe what happens to the liquid in the cup.
9. Dip the toothpick into the cup where the strawberry extract and alcohol layers come into contact with each other and slowly lift the toothpick out of the liquid.

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Conclusions and Analysis:

1. 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:

	PROCEDURE	FUNCTION
	Initial smashing of strawberry	a) Break up proteins and dissolve cell membranes
	Mush strawberry with DNA extraction buffer	b) To precipitate DNA from solution
	Filter strawberry slurry through coffee filter	c) Break open the cells
	Addition of alcohol to filtered extract	d) Separate components of the cell

2. What did the DNA look like?

3. Why is it important for scientists to be able to remove DNA from an organism?