

Extracting DNA From Strawberries



Age
8-12



Time
30 mins



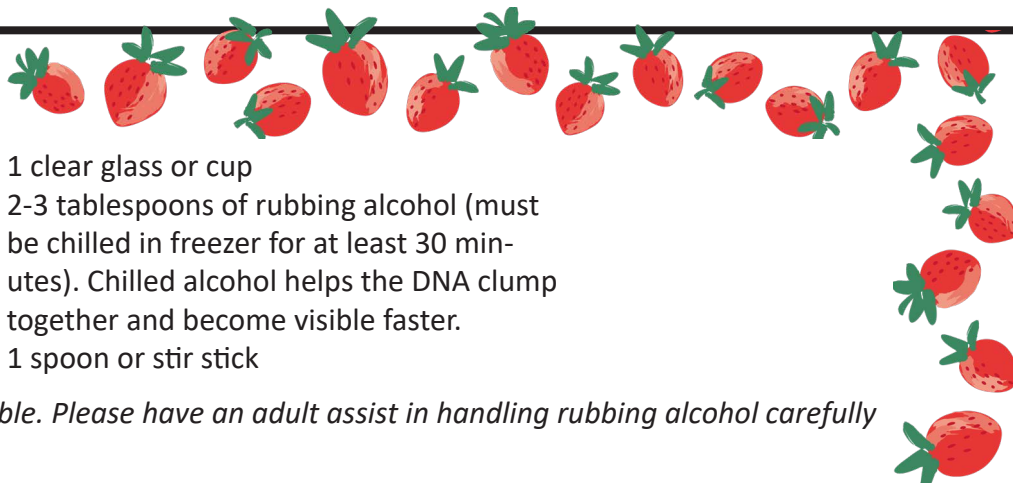
Difficulty
easy

About the Experiment

Deoxyribonucleic acid (DNA) is the molecule that carries genetic instructions in all living organisms. It is found inside cells and is protected by membranes. In other words, DNA tells cells how to grow and work.

Researchers extract DNA from strawberries to determine which cells carry the most promising traits, such as size, color, taste, and disease resistance. Using common household items like dish soap, salt, and rubbing alcohol, we can break open the cells and see what DNA looks like with our own eyes! This experiment is easy to do at home or in school. Parental or teacher supervision is recommended.

What You Will Need



- 3-4 fresh strawberries
- 1 sealable plastic bag
- A few drops of dish soap
- $\frac{1}{2}$ teaspoon of table salt
- $\frac{1}{2}$ cup of water
- 1 coffee filter or cheesecloth
- 1 clear glass or cup
- 2-3 tablespoons of rubbing alcohol (must be chilled in freezer for at least 30 minutes). Chilled alcohol helps the DNA clump together and become visible faster.
- 1 spoon or stir stick

Safety Note: Rubbing alcohol is flammable. Please have an adult assist in handling rubbing alcohol carefully and keep it away from flames.

Let's Do This!

Prepare the Strawberry:

- Remove the green leaves from the strawberries and put the strawberries in the sealable plastic bag. Mash the strawberries well until they become a pulp (or soupy).

Make the Extraction Solution:

- Mix $\frac{1}{2}$ cup of water, a few drops of dish soap, and $\frac{1}{2}$ teaspoon of salt in a cup.
- What's happening here? The soap breaks open the cell walls, and the salt helps release the DNA.

Combine the Strawberry Pulp and Extraction Solution:

- Pour the extraction solution into the bag with the mashed strawberries.
- Seal the bag and gently mix the strawberries and extraction solution for 1 to 2 minutes.



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Let's Do This! continued from previous page

Filter the Strawberry Mixture:

- Place a coffee filter over a clear glass or cup and pour the strawberry mixture through it.
- Let the liquid drip into the glass or cup. This is the DNA-containing solution.

Add Alcohol to the Strawberry Liquid:

- Slowly pour the chilled rubbing alcohol down the side of the glass so it forms a layer on top of the strawberry liquid.
- Tip: Do not mix the liquid. The DNA will appear at the boundary!

Let's Look At The Results!

- White, stringy clumps will appear in the glass or cup. This is strawberry DNA! Use a spoon or stick to lift it out.
- Make sure to wash your hands after the experiment.



*Images created with
AI technology*

Observations

- Each ingredient has a role in breaking down cells and making DNA visible to the human eye. Dish soap breaks cells open. Salt helps DNA stick together. DNA does not dissolve in alcohol, so it becomes visible.
- Did you know that strawberries have more DNA than humans? Strawberries are octoploid which means their cells contain eight (octo) sets of chromosomes (ploid) in each cell. Humans are diploid with only two (di) sets of chromosomes (one set from each parent). Because of this, it is easier to extract DNA from strawberries.
- Scientists use similar methods to extract DNA for genetic research, forensics, and agriculture.
- This experiment shows how chemistry and biology work together.
- You can do this experiment with other fruits like bananas, kiwis, peas, mangos, and papayas.

To learn more about ARS's research on strawberries, click [here](#).

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