Extracting DNA in Your Kitchen

Materials

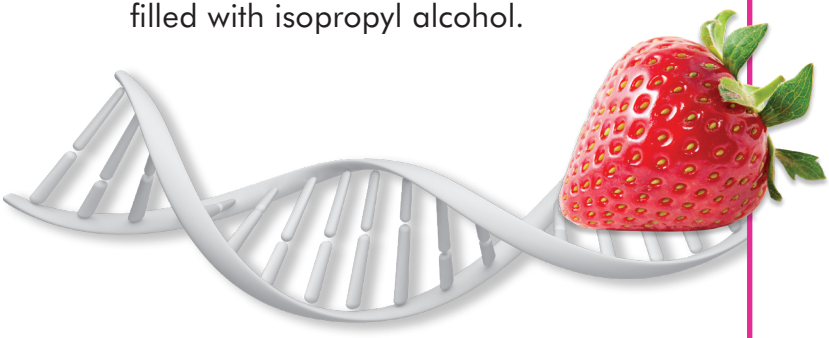
- 1 cup water
- ½ cup of strawberries
- 2 tablespoons of liquid dish soap
- 1/8 teaspoon table salt
- Isopropyl (rubbing) alcohol (70-95%)
- Meat tenderizer (found in grocery spice aisle)
- Measuring cups and spoons
- Kitchen timer
- Blender
- Sieve
- Spoon
- 1 medium-sized glass bowl and 3 small, clear glass containers
- Cotton swab, toothpicks, tweezers, or bamboo skewers

Key pre-preperation

Place the bottle of isopropyl alcohol in the freezer at least **1 hour before performing the experiment**.

Steps

1. Pour 1 cup of water into blender.
2. Add strawberries and table salt.
3. Blend for 15 seconds.
4. Pour the strawberry solution from blender through a sieve into a glass bowl.
5. Add 2 tablespoons of liquid dish soap to the strawberry solution, stir and let sit for 5-10 minutes.
6. Divide the strawberry solution into the three small glass containers.
7. Add a pinch of meat tenderizer to each glass. Stir carefully! Stirring too hard can break the DNA strands apart.
8. Tilt one glass container and slowly pour chilled isopropyl alcohol down the inside of it, about the same amount as the strawberry solution. The alcohol layers over the strawberry solution.
9. Repeat step 8 with the two remaining clear glass containers.
10. Return to the first small glass container and hold it up to eye level. Look for a clump of white strands. That is the DNA of the strawberry!
11. Gently remove the DNA from the solution using a cotton swab, toothpick, tweezers, or bamboo skewer.
12. Remove the DNA clumps from the other two clear glass containers.
13. If you want to keep the DNA strands, transfer them to a small lidded container filled with isopropyl alcohol.



What's happening when you do this experiment?

DNA (DeoxyriboNucleic Acid) carries instructions for the structure of every living thing, or organism. Organisms are made of cells, and each cell has a copy of the DNA coiled into its nucleus.

When the cell wall and nucleus are opened, DNA can be extracted. Strawberry fruits have long DNA strands that are easy to see, so they are a good choice for DNA extraction.

The first steps separate the strawberry cells from each other, suspending them in water.

Dish soap breaks down the cell walls and nucleus. Salt breaks the bonds holding protective protein to the coiled DNA strands.

Meat tenderizer is an enzyme that further breaks down the protein-DNA bonds and dissolves the DNA.

Isopropyl alcohol solidifies the dissolved DNA strands where the alcohol and strawberry mixture meet. Salt helps the strands clump and stick together.

Presto! Nature's instructions for strawberry structure.

DENVER MUSEUM OF NATURE & SCIENCE
DMNS.ORG • MONTVIEW & COLORADO BLVD.• 303.370.6000