EXTRACTING DNA FROM A STRAWBERRY

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WHAT YOU WILL NEED:

- 1 strawberry
- Cold isopropyl alcohol
- Quart size resealable plastic bag
- ½ cup of water
- ½ teaspoon clear dish washing liquid
- ½ teaspoon salt
- Funnel
- coffee filter
- 2 plastic cups
- Test tube/narrow jar
- Tweezers
- Mixer or spoon
- Eye dropper

Overview and objective:

To use basic chemical techniques to isolate DNA from a strawberry. Students can relate the molecule of DNA as common to all plants and animals as the chemical that holds genetic information.

Major concepts:

DNA is found in the cells of every living organism. It is incredibly small, but we can see it by extracting DNA and isolating chains of it.

The soap solution contains sodium laurel sulfate, which can break up fats and proteins. During the DNA extraction, the soap pulls apart the fats (lipids) and proteins that make up the membranes surrounding the cell and nucleus. Once these membranes are broken apart, the DNA is released from the cell. The salt enables the DNA strands to come together, or aggregate.

The DNA precipitates out of the solution when the alcohol is added. The alcohol separates the DNA from the other cell components, which are left behind in the water solution.

Procedure:

1. Chill a bottle of rubbing alcohol by placing it in a freezer for 10 minutes or more.
2. Add (2 – 3 teaspoons) of water to a clear cup.
3. Add a tablespoon of soap to the cup.
4. Add 1/2 teaspoon of table salt to the cup.
5. Stir the ingredients in the cup.
6. Place a strawberry in a resealable plastic bag.
7. Add the water, soap and salt mixture into the plastic bag with the strawberry and seal the bag (remove as much air as possible).
8. Gently mash the strawberry in the bag until there are no pieces.

Facts: Smashing the strawberry breaks cell walls and separates cells. The detergent breaks the fatty cell membrane surrounding each cell as well as the fatty nuclear membrane surrounding the nucleus. The contents of the ruptured cells and ruptured nuclei are part of the mushy strawberry mixture. The salt helps separate the DNA from the mixture.

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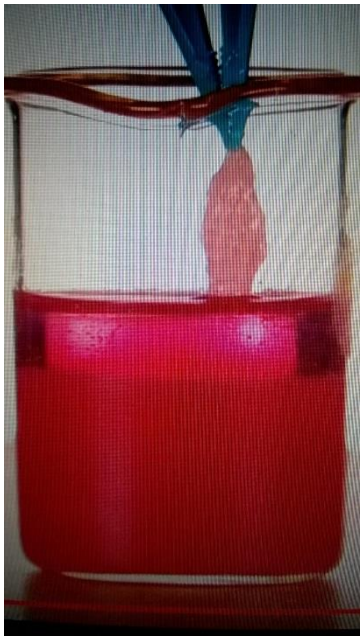

Procedure continued:

9. Place a coffee filter in a funnel and place it over a cup (use a new cup).
10. Pour the contents of the bag into the filter in the funnel to separate the liquid from the solids (the liquid will pour into the cup, any remaining strawberry pieces will remain in the filter).

Facts: The liquid that passes through the filter and collects in the cup is called the **filtrate.** The solid materials collected by the filter are called the **residue.**

11. Use a spoon to press on the coffee filter to drain any remaining liquids (or squeeze the coffee filter).
12. Dispose of the filter and its content (place in the plastic bag).
13. Pour some of the liquid in the cup into a test tube (fill the test tube approximately 2/3 full).
14. Place the test tube in a cup so it stands upright (you can you the cup you originally used to create the water, salt and soap mixture).
15. Use the eye dropper to add 1 teaspoon of cold isopropyl alcohol to the test tube and close the lid.
16. Wait a few seconds and watch as DNA appears at the top of the test tube as a white “cloud”.
17. Open the lid and remove the precipitated DNA strands with a toothpick.
18. Discard the test tube contents in the sink.

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