

DNA EXTRACTION

SUPPLIES NEEDED:

- Three containers, one with high enough sides for mixing or a blender cup for a blender.
- 1 TBS of table salt
- Liquid soap with sodium laurel sulfate
- Hot water
- Cold water
- Ice cold isopropyl alcohol
- Cheese cloth or other filtering medium
- Blending stick, blender, or a fork
- Overripe fruit such as banana, peach, strawberry, or tomato.
- Measuring spoons



PROCEDURE:

We are going to make a precipitating liquid, mix the ripe fruit with it, blend it, filter it, then extract the DNA.

To make the precipitating solution, combine 1 tablespoon of table salt with 10 drops or a few pumps of the liquid soap in a glass. Add 100ml of hot water and stir well to dissolve the salt and combine the soap.

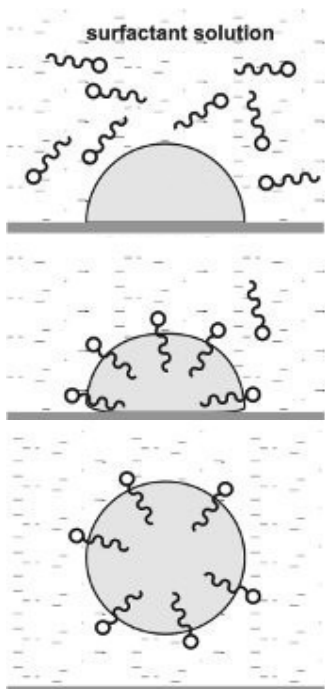
In the mixing container, put your cut fruit. If it's a banana, peel it first, then chunk it up.

Add about 5 tablespoons of the precipitating solution. Blend thoroughly. If you are using a fork instead of a blender, mash and blend the mix for several minutes trying to make it as much like puree as possible. This will yield the most DNA and make it more exciting.

Now, filter the pulp out while collecting the liquid.

After you've filtered the pulp out, slowly pour the isopropyl alcohol down the side of the glass. You don't want it to splash into the glass. After all the alcohol is added, let the mixture sit a moment. The alcohol layer should be on top. The DNA strands will form visibly as a white, cloudy layer on top of this.

Science:



The surfactant contains molecules with hydrophilic and hydrophobic portions.

hydrophilic hydrophobic

Surfactant molecules are absorbed into the surface of the molecule, lifting it away.

The surfactant molecules remain surrounding the once it has been removed, so helping to prevent its redeposition

DNA is a molecule with a complex structure that stores and passes the genetic information of every living organism on Earth from generation to generation.

This simple method for DNA extraction is based on the following principles: the liquid soap contains surfactants, which help destroy the cell membranes and nuclei, while sodium ions from the salt bind to the phosphate groups of the DNA molecules, helping isolate the DNA from the solution. Adding cold isopropyl alcohol reduces the resulting DNA and sodium compound solubility in water.

GO FURTHER:

Take this lab to the next level.

- What items could this method work for?
 - Could it work on saliva?
 - Could it work on something bark?
- Learn about the role of blotting:
 - <https://www.biotechnologynotes.com/blotting-of-dna/blotting-of-dna-southern-northern-and-western-biotechnology/13601>
- Try to remove the DNA strands with a pair of tweezers or a disposable pipette and see how big it is.
- Place the removed strand under a microscope to see if you can see anything.
- Learn about CRISPR and other technologies that could help solve genetic diseases and disorders.

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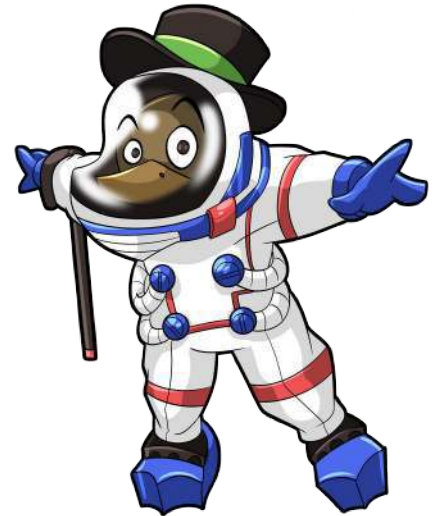
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