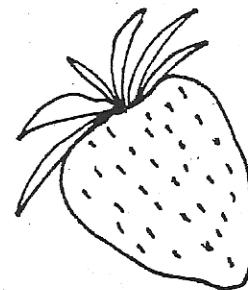


Names:



Biology

Exploring Properties of Strawberry DNA Lab Activity

Purpose: Determine how the physical properties of strawberry DNA relate to the structure of DNA molecules?

Hypothesis: What does DNA look like in a test tube? What properties can be observed with the unaided eye?

Lab Overview: In this lab you will observe the physical properties of DNA. You will break open strawberry cells, prepare a filtered extract containing strawberry DNA, and separate out molecules of DNA in a test tube.

Introduction: Grocery store strawberries are a good source of DNA because they have 8 copies of each type of chromosome. (This is called octoploid). You will break open the cells of a strawberry, and then separate the DNA from the remaining cell parts. You will never be able to eat a strawberry again without thinking about how much DNA is in it!

Materials: (per 2 students)

- Zip-lock freezer bags
- 1 strawberry (fresh or frozen)
- 10 ml DNA extraction buffer (shampoo, salt & water)
- Filtration Apparatus: cheesecloth or gauze, funnel & small beaker
- Ice-cold ethanol (90% or higher concentration) in a dropper bottle
- Large size test tubes
- Glass rod or inoculating loop
- Safety goggles
- Lab Apron

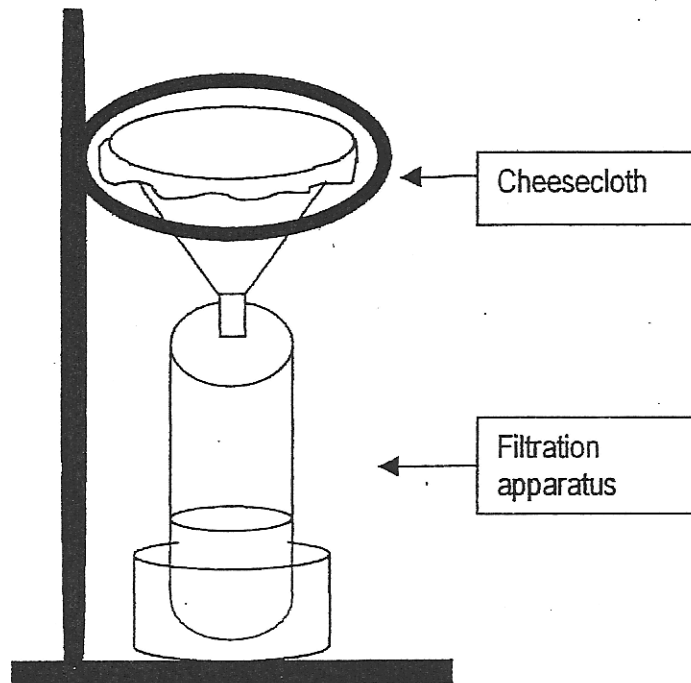
Waste & Disposal: (per 2 students)

- Throw out cheesecloth
- Wash and rinse test tubes and funnel
- Rinse and dry inoculating loop

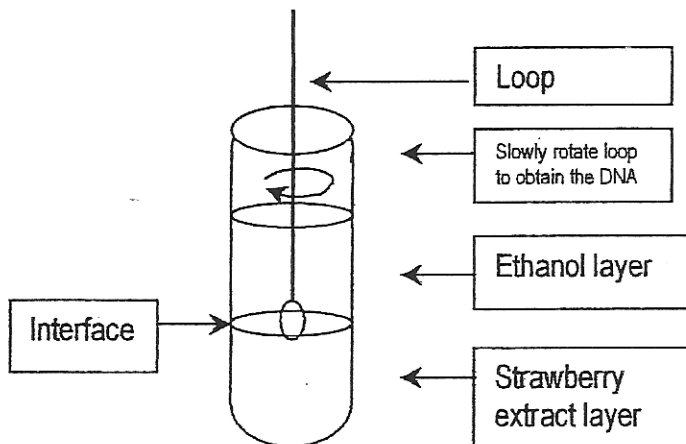
Procedures:

1. Place one strawberry in a self-sealing Zip-lock freezer bag. You may want to double bag to make sure your bag doesn't break & leak. Press the air out, and seal it. Gently mash the bagged strawberry with your fist and fingers for 2 minutes.
2. Add the 10 ml of extraction buffer to the bag. Press the air out carefully and seal the bag.

- Mash the bagged strawberry with the DNA extraction buffer for 1 minute. **CAUTION:** You do not want this mixture to be really bubbly. The fewer bubbles the better your results.
- Cut off the bottom corner of your baggie and squeeze the squished strawberry liquid into the filtration apparatus. Let it drip into the test tube as shown.



- When the test tube is about 1/8 full, take the funnel out of the test tube. (You can discard any extra mashed strawberry pulp with the cheesecloth.)
- Slowly** drizzle **ice-cold** ethanol from the dropper bottle **along the side of the test tube**, until the test tube is about half full with the liquid. (equal parts strawberry mixture to ethanol)
- Dip the loop or rob into the tube exactly where the ethanol and extract layers are in contact with each other, as shown below. Keep the test tube at eye level so you can see what is happening! Pay attention to the characteristics of the DNA as it precipitates.



Write your conclusion on the back of this paper!

Questions:

1. DNA is soluble in water, but not in ethanol. What does this fact have to do with the method of extraction that you used? Explain what happened when ethanol came in contact with the strawberry extract.
2. A person cannot see a single cotton thread 100 feet away. But if thousands of threads are wound together into a rope, the rope can be seen at some distance. How is this statement an analogy to the DNA extraction that you did?
3. Could this experiment be done with other sources of plant cells? animal cells? Give examples of each. If you wanted to extract DNA from a living person, what cells would you use and why?
4. List two reasons why a scientist might want to study the DNA of strawberries.
5. How could you view the double helix pattern of the D.N.A.?
6. What is the function of salt, shampoo, and ethanol in this lab?
7. Could the order of the procedure be changed? Explain.
8. A researcher identifies the nucleotide sequence AAC in a long strand of RNA inside a nucleus. In the genetic code, AAC codes for the amino acid asparagine. When that RNA becomes involved in protein synthesis will asparagine necessarily appear in the protein? Explain.
9. How many guanines are in a DNA molecule 1000 base pairs long if 20% of the molecule consists of thymines?
10. Why is it advantageous to have weak hydrogen bonds between complementary base pairs and strong covalent bonds between phosphate and deoxyribose groups in a DNA molecule?