DNA extraction from corn

How can we see the raw material of life?

DNA, deoxyribose nucleic acid, is the backbone of every living thing. The greatest amount of DNA is found in the nucleus of cells; it contains the genetic information that determines each organism's traits since it holds the instructions for proteins manufactured by the cell.

Each step of the process is necessary to "liberate" the DNA. Detergent helps to dissolve lipids and proteins, which are part of cell membranes. Enzymes cut DNA into segments and the alcohol helps it to precipitate out of solution. In this activity, collect corn's DNA in the form of a white stringy precipitate.

Materials

- Canned yellow sweet corn
- Blender
- Table salt
- Beakers (500 ml)
- Metal strainer
- Scale
- Graduated cylinder
- Test tubes
- Test tube rack
- 70-95% Isopropyl or Ethyl Alcohol
- Palmolive liquid detergent
- Microtubes
- Meat tenderizer
- Coffee stir sticks

Instructions

1. Place 100 g of corn, 1 g of salt and 200 ml of water in a blender. Blend on high for 30 seconds.
2. Pour the thin corn soup through a strainer into a 500 ml beaker.
3. Add 30 ml of liquid detergent to the corn soup mixture and let sit for 10 minutes.
4. Pour the mixture into glass test tubes, each about one-third full.
5. Add 1 g of meat tenderizer (enzyme) to each test tube and stir gently (be careful, if you stir too hard you will break up the DNA strands).
6. Tilt your test tube to the side and slowly add isopropyl alcohol down the side of the tube so that it sits on top of the corn mixture. Pour until you have about the same amount of alcohol as you do corn mixture.
7. Look for layers of white stringy stuff (DNA) where the layers of alcohol and corn mixture meet.
8. Use a stir stick, cotton swab or pipette, to collect the DNA and transfer it to a microtube two-thirds full of isopropyl alcohol. Cap the microtube.

Reflection

1. Why did you use a blender in step 1 to chop up the corn cells?
2. How does the liquid detergent help to extract the DNA from the corn cells?
3. The meat tenderizer that you add to the test tube in step 5 acts as an enzyme on the corn DNA. What does this enzyme do to the DNA?
4. Why does the alcohol allow us to see the white stringy DNA molecules? What is a precipitate?

Resources adapted with permission from the Kansas Corn Growers Association.