

Strawberry DNA Extraction

Purpose

Extract genomic DNA from strawberries and examine DNA superstructure.

Background

One of the reasons strawberries work so well is that they are soft and easy to pulverize. Also, ripe strawberries are producing pectinases and cellulases which are already breaking down the cell walls. Most interestingly, strawberries have huge genomes. They are octoploid, which means they have eight copies of each chromosome.

The detergent helps dissolve the phospholipids bilayers of the cell membrane and organelles. The salt helps to keep the proteins in the extract layer so they aren't precipitated with the DNA.

DNA is not soluble in ethanol. When molecules are soluble, they are dispersed in the solution and are therefore not visible. When molecules are insoluble, they clump together and become visible. The colder the ethanol, the less soluble the DNA will be in it. This is why it is so important for the ethanol to be kept in the freezer or in an ice bath.

When ethanol is layered on the strawberry extract, fine white strands of DNA will form at the interface. When they stir the DNA into the ethanol layer, the DNA will form long, cotton candy-like fibers that will spool onto the stirring rod.

Procedure

Work in pairs or a small group

1. Clean the strawberries by removing green sepals
2. Place 1-2 strawberries in the sealing bag and seal bag closed
3. Squeeze or knead the bag for 5 minutes
4. Add 10 ml of DNA Extraction Buffer and continue to knead the mixture for 5 minutes
5. Filter the mixture through cheesecloth set in a funnel into the test tube
 - a. Try to avoid foam/ bubbles!
6. Collect the filtrate in the test tube
7. Carefully pour 20 ml of cold alcohol down the side of the tube so that it forms a separate layer on top of the strawberry liquid
 - a. Keep the tube upright and do not mix the tube contents
8. Watch the material for about 1 minute
9. When you see a fluffy white cloud form at the interface between the two liquids, use the coffee stirrer to collect it
 - a. This is the DNA!
10. Gently spool the DNA onto the coffee stirrer and transfer the material to a piece of plastic wrap to view
11. Examine the texture of the DNA carefully



Be sure to check your instructor's website for extra credit questions and announcements.

