Genetically Modified Soy, Part 1
DNA – Collection & Purification Protocol

Materials
- Two Hot-Water Baths
- Vortexer
- Bench-top Microcentrifuge
- Soy Product (soybeans, soy flour, or soy powder)
- 15 mL Polypropylene Falcon Tube (1 per group)
- Lysis Buffer A (stored at -20 °C)
- Ethanol (stored at 4 °C)
- Sterile Water
- 1.5 mL Microcentrifuge Tubes (2 per group)
- Micropipets and Tips (20, 200, and 1000 µL)

Protocol
1. Preheat two water baths to 60 °C and 90 °C respectively.
2. Look at the label for your soy product, and predict whether you think it will be genetically modified.

Obtaining Soy DNA
3. Add either 200 mg of soybean, 32 mg of soy flour, or 32 mg of soy powder into a 15 mL Falcon tube containing 2.0 mL of Lysis Buffer A and vortex for 30 seconds. Try your best to ensure that the soy product does not stick to sides of the Falcon tube.
   - Lysis buffer contains the enzyme proteinase K, which breaks down cell walls to help isolate DNA.
4. Label tube with your assigned sample number.
5. Place tube in a 60 °C water bath for 10 minutes. Proteinase K is activated at this temperature.
6. Place tube in a 90 °C water bath for 10 minutes. Proteinase K is deactivated at this temperature.
7. Remove tube from water bath and let solution cool to room temperature.
   - Potential stopping point if needed due to time constraints.
8. Vortex tube for 30 seconds.

Purifying Your DNA
9. Pipette 1.0 mL of soy/buffer solution into a 1.5 mL microcentrifuge tube; centrifuge for 2 minutes at 15,000 rpm.
   - Centrifuging brings non-DNA cell components to the bottom of the tube – DNA remains in the liquid.
   - Place the microcentrifuge tubes into the microcentrifuge with the cap hinge facing outward. Now you can always expect the pellet to form on the same side of the tube as the hinge.
10. Pipette 0.5 mL of supernatant into a separate microcentrifuge tube; add 0.5 mL of cold EtOH (ethanol); mix by inverting tube ten times; wait 10 minutes.
    - DNA is not soluble in ethanol. The colder the ethanol, the less soluble the DNA will be in it.
    - Supernatant is the clear liquid overlying the deposited solid at the bottom of your tube.
11. Centrifuge for 10 minutes at 15,000 rpm.
    - During these steps, be careful not to place your pipette tip directly onto the solid when drawing out the supernatant, as some of your DNA may end up being drawn up with it! (Refer to picture to thr right)
12. Remove supernatant; wait for 5 minutes (for excess EtOH to evaporate).
13. Re-suspend in 100 µL of sterile water. Label your tube, then store at 4 °C.

Overview: We are collecting DNA from soy food products by breaking apart the cell walls of plant cells, removing the proteins and carbohydrates, and then purifying the remaining DNA.
Time: ~45-50 minutes

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