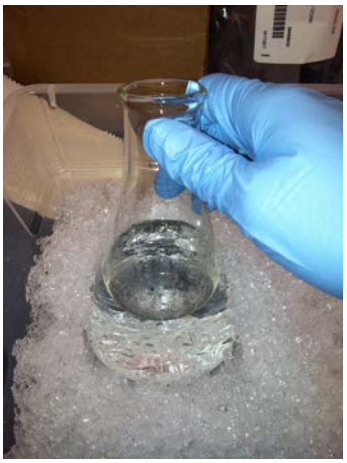
DNA Extraction Lab

Materials: bananas, kiwis, knife, 0.9% NaCl (9g in 1 L), 10% SDS (20g SDS in 200 mL), glass rod, 250-mL Erlenmeyer flask, 10 mL graduated cylinder, 3 M sodium acetate solution, ethanol, ice-water bath, 15-mL beakers, 100 x 13-mm test tubes, Pasteur pipettes, rubber bulbs, Ziplock bags, centrifuge, centrifuge tubes

Safety: wear splash-proof goggles and gloves

Procedure:

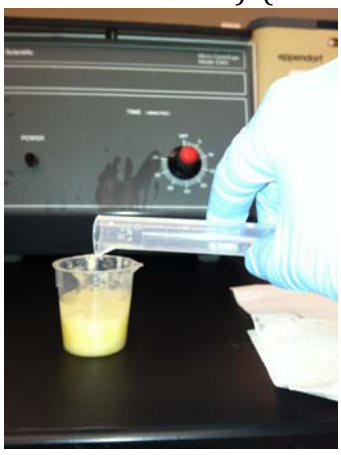
1. Chill a flask of 50 mL ethanol in an ice-water bath. (Picture A)
2. Place a small piece of banana or kiwi in a Ziplock bag and smash with fist until it is at a uniform consistency. (Picture B)



A

B

3. Put the smashed banana/kiwi into a 15-mL beaker and add 10 mL of NaCl solution and 2 mL of 10% SDS to the beaker. (Picture C) Stir with a glass rod. (Mixture should bubble.) (Picture D)



C

D

4. Transfer the mixture into two different centrifuge tubes and centrifuge for about 3 minutes. (Picture E) Be sure that each centrifuge tube has another across from it in order to keep the centrifuge balanced. (Picture F) When the

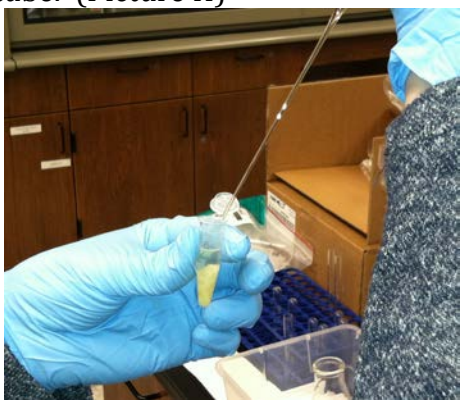
centrifuge is complete, the denser cell components should be on the bottom, and the DNA solution should be on the top. (Picture G)


E

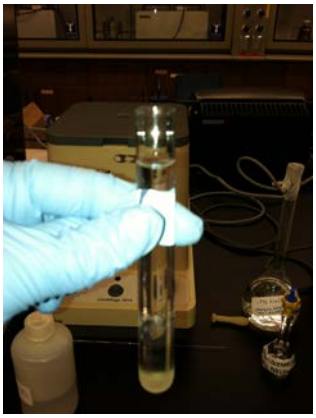

F

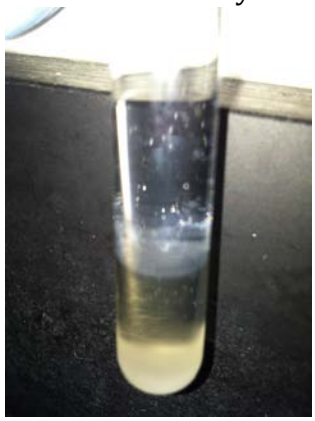

G

5. Transfer the DNA solution at the top from the two centrifuge tubes and into a 100 x 13 mm test tube. (Picture H)


H

6. Add about 10 drops of 3 M sodium acetate solution and gently stir.
7. Slowly add 6-10 mL of ice-cold ethanol down the side of the test tube. Continue to add the ethanol until it is just about two centimeters from the top of the tube. (Picture I) Two layers should form, and the DNA should be a clear, mucus-like substance at the interface of the two layers. (Picture J)


I


J

8. Chill the mixture for a few minutes in an ice-water bath.

9. After the DNA has formed, use a glass pipette to slowly twirl the strands of extracted DNA. (Picture K)

K

For the teacher:

- Prepare the 3 M sodium acetate by adding 61.52 grams of sodium acetate to a 250-mL volumetric flask. Add distilled water up to the 250-mL mark.
- Prepare the 0.9% NaCl by mixing 9 grams of NaCl into 1 Liter of distilled water.
- Prepare the 10% SDS by mixing 20 grams of SDS is 200 mL

** Note: Under-ripe bananas hold the greatest concentration of DNA

Source:

"Liver and Onions: DNA Extraction from Animal and Plant Tissues." Journal of Chemical Education. Vol. 76 No. 3. March 1999.
http://pubs.acs.org/doi/pdf/10.1021/ed076p400A

"Tomato and Banana DNA Extraction." Institute of Arctic Biology.
http://mercury.bio.uaf.edu/~kevin_mccracken/genetics/labs/lab2/lab-2.pdf

VWR Consumable Part Numbers:

1.5 mL microcentrifuge tubes	89000-028
250 mL Erlenmeyer flasks	89000-362
PTFE stir rods	89026-280
15 mL beakers	414004-143
10 mL graduated cylinders	65000-000
13x100 mm test tubes	47729-572
Pasteur pipets	14672-380
Rubber bulbs	82024-554
SDS	97064-496
Sodium chloride	BDH0286-500G
Ethanol, 4L	BDH1148-4LP
Sodium acetate	97061-864