Forensic Botany and Fake Barf: A Plant Anatomy Exercise for Intro Biology

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The Handbook of Forensic Botany

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The Case of the Sick Singer

Plant Materials
- pear
- celery
- broccoli
- banana
- dumbcane (Dieffenbachia) stem

Equipment
- microcentrifuge tubes
- blender
- vortex mixer
- pipettors
- slides and cover slips
- spatulas, toothpicks
- histological stains

Pre-Lab Prep
- make single species homogenates
- aliquot into separate tubes

Make barf!

Phil's Homemade Simulated Vomitus
- Equal parts of pear, broccoli, & celery.
- Add dumbcane equal to amounts of other homogenates.
- Aged banana homogenate and water until you have desired color and consistency.
The Case of the Sick Singer

Singer Jason Beeper was considered to be the likely winner of the latest hit talent TV show *You Call This Talent?* However, twenty minutes before he was to take the stage and sing his final song, his mouth and throat became extremely swollen and painful preventing him from taking the stage. This allowed the closest competitor, CeeLo Bean, to win the $1,000,000 with his puppetry act.

Jason was taken to the emergency room where several detectives asked him a number of questions about what happened. He explained that he had no allergies and had simply gone through his normal routine of drinking a “health drink” of celery, pears, and broccoli before going on stage. Then Jason barfed on the detective.

The detective decided the vomit might be a clue and put some in a test tube for analysis. Half was sent to a lab for chemical analysis. The other half was given to you for forensic analysis. What was the detective thinking? How should you analyze the sample? Was there foul play or did Jason let his nerves get the best of him?
The Case of the Sick Singer

Using the samples of food, stain the tissue and look at the cells to see if there are any unique cells in the pure samples.

What kinds of cells do you see in them? Do different stains show better detail?

Prepare labeled diagrams of the pure food samples. Think of them as reference standards.

Do the same with the vomit sample. Do you see the cells characteristic of the standards?

COMPLETE YOUR STOMACH CONTENT ANALYSIS REPORT DESCRIBING WHAT YOU OBSERVED.

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Procedure:

1. Students stain single species homogenates in microcentrifuge tubes.
   - iodine
   - toluidine blue
   - fast green
   - safranin

2. Groups can do one set of all food-stain combinations, just one stain, or just one food type.

3. Students stain barf sample and compare to pure samples.
Forensic Analysis Report Form

Diagram #__________

Sample:_________________ Magnification:_______ Stain:________

Single Species Homogenates

Broccoli - Fast Green

Celery – Toluidine Blue

Pear - Safranin

Celery – Fast Green
Evidence

The Unexpected Ingredient
The Case of the Sick Singer

Why do this?
- Makes an important but static lab topic more inquiry based.
- Build upon the case study approach.

What should students get out of this?
- Provides an opportunity to apply plant anatomy knowledge.
- Learn about histology techniques.
- Broaden perspective on botany and future careers

Other modifications
- Use different foods that have different cells.
- Consider different scenarios.