

The Biochemical Guessing Game!

BACKGROUND:

The foods you eat are made of organic compounds. You can perform chemical tests to learn what foods contain carbohydrates, lipids, and/or proteins. Hypothesis On the last page of this packet you will find a prediction table. Locate it and predict the compound found in greatest concentration for each food.

MATERIALS:

8 test tubes, test-tube rack, lab apron, Benedict's solution, stirring rod, masking tape, plastic gloves, Biuret reagent, test-tube holder, pencil, safety goggles, Lugol's solution, distilled water, newsprint paper, **Food substances:** apple juice, melted butter, raw egg white, raw potato, raw spinach, vegetable oil.

PROCEDURE:

1. Read all the directions for this activity before you begin your work.
2. Put on your safety goggles, lab apron, and plastic gloves.
3. Put 8 test tubes in your test-tube rack. Label each test tube by putting masking tape near the top edge of the test tube. Use a pencil to write one of the seven food substances on each label. Mark the eighth label water. The water is your control. Remember what a control is?
4. You need to make three data tables. Each with the variables color & amount.

PART I:

Testing for Carbohydrates (STARCH)

1. Use a medicine dropper to put ~10 drops of each food in the test tube with the matching label. Add 3-4 drops of Lugol's solution (iodine) to each test tube.
2. Starch is one form of carbohydrate. If the substance in your test tube contains starch, it will turn a blue-black color when it mixes with the iodine solution.
3. Observe the contents of your test tubes and Record the amount of starch present (0, +, ++, +++, +++) in your data chart. The food which contains the most starch should be recorded as +++. 4. Empty and wash each test tube and return it to your test tube rack.

PART II:

Testing for Carbohydrates (SUGAR)

1. Use a medicine dropper to put ~10 drops of each food into the test tube with the matching label. Add 10 drops of Benedict's solution to each test tube. CAUTION: Benedict's solution is poisonous. Do not get any in your mouth and do not swallow any!
2. Use a test-tube holder to carefully place the test tubes in the hot water bath your teacher has prepared. Heat the test tubes for 2 to 3 minutes. CAUTION: Use a test-tube holder to handle hot test tubes. Point the open end of a test tube away from yourself and others.

3. Use a test -tube holder to return the hot test tubes to the test-tube rack. If the substance in your test tube contains sugar, Benedict's solution will change color.

Table 1: Appearance of Substance after Adding Benedict's Solution

Amount of Sugar in Food	0	+	++	+++
Color	blue	blue-green	yellow/green	orange/red

4. Observe your test tubes (using white paper as a background). Record the amount of sugar present, in your data table.

5. Empty your test tubes, clean them thoroughly, and return them to the test tube rack.

PART III: TESTING FOR LIPIDS

1. Use a medicine dropper to put ~1 drop of each food onto the newsprint.

1a. The less transparent the food drop is the greater the concentration of lipids in the food.

2. Observe and compare/contrast the translucence of each food substance. Record the information, in order of translucence (0, +, ++, +++, +++) in your data chart. The food which contains the most lipids should be recorded as +++++.

PART IV: TESTING FOR PROTEIN

1. Use a medicine dropper to put ~10 drops of each food on the test tube with the matching label. Use a medicine dropper to carefully add 10 drops of Biuret reagent to each test tube. **CAUTION: Biuret reagent can burn your skin.** Wash off spills and splashes immediately with plenty of water while calling to your teacher.

2. Observe the contents of each test tube (using white paper as a background). If the food contains proteins, it will turn a pinkish purple. Record the amount (0, +, ++, +++, +++) of protein for each food substance in your data table. The food which contains the most protein should be recorded as +++++. The darker the color the greater the concentration of protein.

3. Empty the test tubes and clean them thoroughly. Before leaving the laboratory, clean up all materials and wash your hands thoroughly.

Prediction Table

FOOD	LIPIDS	PROTEINS	STARCH	SUGAR
APPLE BUTTER				
OIL WATER				
EGG WHITE				
FISH				
POTATO				
SPINACH				
VEGETABLE				

CONCLUSION QUESTIONS:

Answer the following questions on a separate sheet of paper:

1. Which compound is most common in foods that come from plants? Which compound is most common in foods that come from animals?
 2. Does water contain any of the organic compounds you tested? Explain why water was used as the control.
 3. If you wanted to reduce the amount of fat in your diet, what foods would you avoid?
 4. Which foods tested would your body use for a quick burst of energy? For energy when no carbohydrates are available? For building body parts?
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