**You Are What You Eat: Testing for Organic Compounds in Foods**

Objective: To identify macromolecules present in common food items.

Materials:

8 test tubes test-tube rack lab apron Benedict's solution stirring rod masking tape Biuret reagent test-tube holder pencil safety goggles Lugol's iodine solution distilled water newsprint paper medicine droppers Sudan IV

Food items: apple juice melted butter raw egg white raw fish raw potato raw spinach vegetable oil

Procedures: 1 Put on safety goggles, lab apron, and plastic gloves.

2 Label 8 test tubes at the top edge of tube with food name to be tested. Mark the 8th tube water. In what capacity does the water serve? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Why is it important to have water serve in this way?

PART I: Testing for Carbohydrates (STARCH) 1 Use a medicine dropper to place approximately 10 drops of each food into the correct test tube. 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. Record the amount of starch present (0, +, ++, +++, ++++) in your data chart. The food that contains the most starch should be recorded as ++++.

4 Empty, wash, and return each test tube to your test tube rack.

PART II: Testing for Carbohydrates (SUGAR) 1 Use a medicine dropper to place approximately 10 drops of each food into the correct test tube. Add 10 drops of Benedict's solution to each test tube. CAUTION: Benedict’s solution is poisonous. Do not get any in your mouth!

2 Using a test-tube holder, carefully place the test tubes into the hot water bath your teacher has provided. Heat the test tubes for 2 to 3 minutes. CAUTION: Always use a test-tube holder to handle hot test tubes. Point the open end of a test tube away from yourself and others.

3 After 2-3 minutes, 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. See below:

Amount of Sugar in Food

0 None

+ Trace

++ Little sugar

+++ Moderate sugar

++++ Much sugar

Color blue blue/green green yellow 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.

2 Observe and compare/contrast the translucence each food substance creates on the newsprint. Record the information, in order of translucence (0, +, ++, +++, ++++) in your data chart. The food that creates the largest spot (and thus containing the greatest amount of lipids) should be recorded as ++++.

PART IV: Testing for Protein 1 Use a medicine dropper to place approximately 10 drops of each food into the correct test tube. 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 and inform the teacher should this occur.

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

3 Empty, clean, and return all materials. Before leaving, wash hands thoroughly.

Results:

Data Table:

Food Lipids Present Protein Present

Starch Present (Carbohydrate)

Sugar Present (Carbohydrate)

Apple

Butter

Egg White

Fish

Potato

Spinach

Vegetable Oil Water

**Analysis Questions:**

1. Which compound is most common in foods that come from plants?

Which compound is most common in foods that come from animals? Why might this be true?

2. Does water contain any of the organic compounds you tested? Explain the role of water in the experiment.

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? Which could be used for energy when carbohydrates are available?

5. Which foods may be used for building body parts?