ANATOMY & PHYSIOLOGY 12 NAME: _____
ROCKRIDGE BLOCK: ____ DATE: _____

Identifying Organic Compounds

INTRODUCTION

The most common organic compounds found in living organisms are lipids, carbohydrates, proteins, and nucleic acids. Common foods, which often consist of plant materials or substances derived from animals, are also combinations of these organic compounds. Substances called indicators can be used to test for the presence of organic compounds. An indicator is a substance that changes color in the presence of a particular compound. In this investigation, you will use several indicators to test for the presence of lipids, carbohydrates, and proteins in various foods.

PROBLEM

What are the major types of organic compounds in some common foods?

MATERIALS (per group)

10 test tubes
2 test-tube racks
test-tube holder
beaker tongs
spot plate
grease pencil
hot plate
hot mat

iodine solution
20 mL honey solution (A)
20 mL egg white and water mixture (B)
20 mL corn oil (C)
20 mL vegetable and water mixture (D)
20 mL gelatin and water solution (E)
20 mL melted butter (F)
20 mL potato and water mixture (G)

20 mL apple juice and water mixture (H)
20 mL distilled water (I)
20 mL unknown substance (J)
10 droppers/pipettes
paper towels
250-mL beaker
Sudan III stain
biuret reagent
Benedict's solution

PROCEDURE

Safety

Put on a laboratory apron and safety goggles. Be careful to avoid breakage when working with glassware. Always use special caution when using any laboratory chemicals, as they may irritate the skin or cause staining of the skin or clothing. Never touch or taste any chemical unless instructed to do so. Use extreme care when working with heated equipment or materials to avoid burns. Dispose of all waste as indicated on labeled waste beakers. Wash hands thoroughly after carrying out this lab.

Part A: Testing for Lipids

1. Obtain a spot plate. Label 10 wells with the letters A, B, C, D, E, F, G, H, I, and J. Each label corresponds to a sample as listed in the materials.

2. Place 5-10 drops of each sample in the corresponding labeled well. Add 1 drop Sudan III indicator stain to each well. Sudan stain will turn red in the presence of lipids. ***CAUTION: Use extreme care when handling Sudan III to avoid staining hands or clothing.*** Record any colour changes in a Data Table and place a check mark next to those substances testing positively for lipids.

3. Wash spot plate thoroughly.

Part B: Testing for Carbohydrates

1. Obtain a spot plate. Label 10 wells with the letters A, B, C, D, E, F, G, H, I, and J. Each label corresponds to a sample as listed in the materials.

2. Sugars and starches are two common types of carbohydrates. To test for starch, place 5-10 drops of each sample in the corresponding labeled well. Add 1 drop iodine solution to each well. Iodine will change colour from yellow-brown to blue-black in the presence of starch. ***CAUTION: Use extreme caution when using iodine as it is poisonous and can also stain hands and clothing.*** Record any colour changes in a Data Table and place a check mark next to those substances testing positively for starch.

3. Wash spot plate thoroughly.

4. For a sugar test, set up a hot water bath as shown in figure 1 (do not add the test tubes yet). Half-fill the 250mL beaker with tap water. Heat the water to a gentle boil using the hot plate. ***CAUTION: Use extreme care when working with hot water. Do not let the water splash onto your hands.***

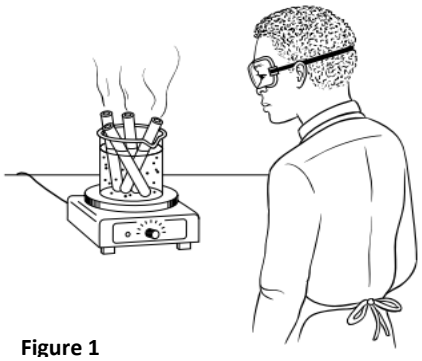

Figure 1

5. Obtain 10 test tubes in a test tube rack. Label each tube with the letters A, B, C, D, E, F, G, H, I, and J. Each label corresponds to a sample as listed in the materials.

6. While the water bath is heating, fill each test tube with 2 mL of the corresponding sample. Add 4 drops of Benedict's solution to each test tube. When heated, Benedict's solution will change color from blue to green, yellow, orange, or red in the presence of a simple sugar, or monosaccharide.

7. Gently shake the contents of each test tube. ***CAUTION: Use extreme caution when using Benedict's solution to avoid staining hands or clothing.***

8. Place the test tubes in the hot-water bath. Heat the test tubes for 3 to 5 minutes. With the test-tube holder, remove the test tubes from the hot-water bath and place them back in the test-tube rack. ***CAUTION: Never touch hot test tubes with your bare hands. Always use a test-tube holder to handle hot test tubes.*** In the Data Table, record any color changes and place a check mark next to any substances that test positive for a simple sugar.

9. After they have cooled, wash the test tubes thoroughly.

Part C: Testing for Proteins

1. Obtain a spot plate. Label 10 wells with the letters A, B, C, D, E, F, G, H, I, and J. Each label corresponds to a sample as listed in the materials.

2. Place 5-10 drops of each sample in the corresponding labeled well. Add 1 drop Biuret reagent to each well. Biuret reagent will change colour from yellow to blue-violet in the presence of a protein. ***CAUTION: Biuret reagent contains sodium hydroxide, a strong base. If you splash any reagent on yourself, wash it off immediately with water. Call your teacher for assistance.*** Record any colour changes in a Data Table and place a check mark next to those substances testing positively for protein.

3. Wash spot plate thoroughly

PRE-LAB SPECIFICATIONS

Follow the general instructions as described in your "LAB REPORTS: CRITERIA & GUIDELINES" document.

Due: _____

1. For each of the tests
   a. Identify the independent and dependent variables
   b. Write a hypothesis (including a scientific explanation; should be in "**if___,then____,because_____ format**"

2. Identify all controlled variables

3. Procedural flowchart – including safety (HEM) requirements

4. Data table with spaces to record ALL required information as described in the lab procedure.