

MOLECULES IN LIVING ORGANISMS – *The Food Lab*

Class Set – please return!

Purpose: To examine common foods for the presence of several molecules important in nutrition.

Materials: Safety goggles, 250 ml beaker, test tubes, test tube clamp, hot plate, Benedict's solution, Iodine solution, Nitric acid, a brown bag, and various foods to test.

Procedure:

◆ **Nitric Acid Test for Protein**

CAUTION! Nitric Acid is harmful to skin & clothing. **Rinse with H₂O if spill occurs!**

NOTE: Do Not Ever Heat an Acid!

1. Place small amounts of food into individual test tubes.
2. Add 10-15 drops of nitric acid to each test tube.
3. Wait several minutes. Then record the results of the food item in Table 2.

◆ **Iodine Test for Complex Carbohydrates (polysaccharides)**

1. Add 10-15 drops of iodine solution to each test tube.
2. Hold test tube against a white sheet of paper to detect a color change.
3. Record results in Table 2.

◆ **Benedict's Test for Simple Carbohydrates (monosaccharides and some disaccharides)**

1. Add 10-15 drops of Benedict's solution to each test tube containing the food items.
2. Place the test tubes in a **boiling hot water bath** for 5 minutes.
3. Use the test tube clamp when transferring hot test tubes.
4. Record results in Table 2.

◆ **Brown Paper Test for Lipids**

1. Rub the food item on a piece of brown paper, and **LET DRY in the drying station** before analyzing!
2. Hold the paper up to the light, and check for a translucent spot.
3. Record results in Table 2.

Pre-Lab: You must copy Table 1 and Table 2 into your lab report

1. *Before testing, predict in Table 2 what substance you will find in each sample – see Table 1 for help.*
2. *Test the samples as demonstrated to you.*

◆ ***For each food sample, do all 4 tests.***

3. *Record the results of each test in your data Table 2, using a YES or NO.*

Data:

TABLE 1: REAGENT TEST OF KNOWN FOOD SUBSTANCES

Food Substance	Test Reagent	Positive Results (color change)
Protein	Nitric Acid	Yellow (dark)
simple carbohydrate	Benedict's Solution	Reddish-orange
complex carbohydrate	Iodine Solution	Bluish-black
Lipid	Brown Paper	Translucent spot

TABLE 2: ANALYSIS OF MOLECULES IN FOODS

Food Substance	Protein	Simple Carbohydrate	Complex Carbohydrate	Lipid

T.S. _____

Conclusion Questions: Please use complete sentences for FULL CREDIT!!

1. How did your predictions compare with the test results for all four foods?
2. Which of your predictions was totally correct, if any?
3. Which foods contain all the molecules for which you tested, if any?
4. On the basis of your test, which foods could be used as a good source of protein, fats, and simple & complex carbohydrates?
5. What is the difference in *molecular structure* between a simple carbohydrate and a complex carbohydrate?
HINT: use monosaccharide and chemical bond in your answer.
6. What is the difference in *molecular structure* between a protein and a fat?
7. For the foods listed below, **indicate** (✓), in a table, if it is a good source of **Carbohydrate, Protein, or Fat**.

Note: some foods may contain more than one of the above molecules (sources).

Hamburger meat	Liver	Flour tortilla	Apple	Table Sugar
Bread	Turkey	Pasta	Nuts	Lettuce
<i>Cinnabon – cinnamon roll</i>				