Mag-Mush Macromolecule Lab- SB1 b,c

Carbohydrates, proteins, fats, vitamins, and other nutrients provide your body with energy and provide the raw materials necessary to carry on life activities. These compounds are present in the plants and animals you use as food. To determine if these substances are in a sample of Mag-Mush, we need to know what a positive test looks like for each of these components. After completing the Macromolecule virtual lab, you should be familiar with these tests. So, our first part of the experiment will be to run tests on known samples to see what a positive test looks like. The purpose of this lab is to determine the presence of the major macromolecules in our food and to relate these organic compounds to life processes.

Part I: Testing of Known Substances

***A*. Protein Test (polypeptide, amino acid):**

1. Place 3 ml of the protein solution (this is actually ground up egg white, which is pure protein) into your test tube.
2. Add 5 drops of Biuret solution.
3 Observe any color change. Record it in your chart.

B. Glucose Test (simple sugar, monosaccharide):

1. Place 2 ml of the glucose solution into your test tube.
2. Add 1 ml of Benedict's solution. Place the tube in a beaker of boiling water and boil for 1minute. Use test tube holder
3. Observe any color change. Record it in your chart.

C. Starch Test (complex carbohydrate):

1. Stir solution and place 3 ml of the starch solution into your test tube.
2. Add 1 drop of Lugol's iodine solution.
3. Observe any color change. Record it in your chart.

D. Lipid Test (fatty acid); A.K.A "the Schmee or brown":

1. Place 1 ml of vegetable oil on one small area of a paper.
2. Foods that contain lipids will leave a translucent mark on brown paper bag material. Record your results in the chart.

Part I: Copy down the following data table to record and describe your results (color descriptions):

Food Substance	Reagent test	Reagent Color	Positive Results
Protein	Biuret solution		
Sugar	Benedict's solution		
Starch	Lugol's Iodine solution		
Lipid	Brown paper	N/A	

Part II: McMush

1. Repeat the reagent tests above using 3 ml of the McMush solution for each test (except for the lipid test, where you only need **1 ml** of filtered McMush)

2. Describe and record your results.

Food Substance	Reagent test	Test Results
Protein	Biuret solution	
Sugar	Benedict's solution	
Starch	Lugol's Iodine solution	
Lipid	Brown paper	

Part III: Sucrose?

1. Repeat step B from Part 1, except instead of glucose solution use the sucrose solution. Describe and explain the results of the Benedict's test. Compare and contrast the molecular structures (on orange sheets) for glucose, sucrose and starch.

Post Lab Questions:

1. Thoroughly describe the three macromolecules from which we get energy. Distinguish between the amount of energy each provides.

2. Which of these three macromolecules do you think is the most important? Justify your answer.

3. What would happen if the gene that codes for the enzyme protease mutated and no longer functioned? Protease helps to breakdown other proteins. How would this impact life processes?

4. Although we did not test for nucleic acids, explain how they were present.

5. Explain how each of the four macromolecules of life are used in your body.

6. Explain why the element carbon is often referred to as the "building block of life". Describe the unique bonding properties of carbon.

7. Explain the following statement: "Life depends on hydrogen bonds in water".

8. Explain how both nucleic acids and proteins are polymers. Be sure to describe the monomers that make up the polymers.

9. Examine the schematic diagram below. Explain this process in detail and be sure to address how the specificity of protein structures impacts the reaction. What happens to the enzyme after the reaction? What happens to the products?