Lab: Macromolecule Test Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

AP Biology

**Introduction:** You should have read the section of the text pertaining to macromolecules.

**CLEANING UP:**  Remember it is important to keep the lab in the same condition as it was when you arrived. After experiments, rinse all of the equipment and glassware and place them upside down in the test tube rack. Make sure to place paper toweling under the rack and wipe down the lab stations!!!  
Any contents in the test tubes can be disposed down the drain. Tubes should be rinsed and placed in the test tube rack. Please leave used glassware near the sink area.

**Problem:** What foods contain which macromolecules?

**Hypothesis:**

**DAY 1 Protein test**

**Materials**: Biuret Reagent, test tubes, test tube rack, egg albumin, variety of food products, distilled water, HCL  
**Background information**: **Biuret Reagent** tests for the presence of protein by changing color from blue (no protein) to violet (high protein). The copper atoms of Biuret solution (CuSO4 and KOH) will react with peptide bonds, producing a color change. A deep violet color indicates the presence of protein and a light pink color indicates the presence of peptides. When proteins are digested, peptides are produced. Proteins are digested in the stomach through the enzyme pepsin and the action of HCl.

Procedure: The biuret test is performed by adding 5-10 drops of solution to the material being tested.

Data Table 1 (Title it):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Tube # | Material | Prediction | Color Before | Color After |
| 1 | Distilled water |  |  |  |
| 2 | Albumin |  |  |  |
| 3 | Albumin + HCL (hot bath) |  |  |  |
| 4 | Liver/beef |  |  |  |
| 5 | Quinoa |  |  |  |
| 6 | Oats |  |  |  |
| 7 | Glucose |  |  |  |
| 8 | Sucrose |  |  |  |
| 9 | Starch |  |  |  |
| 10 | Onion |  |  |  |
| 11 | Potato |  |  |  |
| 12 | Gatorade |  |  |  |
| 13 |  |  |  |  |

**DAY 2 Carbohydrate test**

**TESTING:**  Some sugars such as glucose are capable of reducing other compounds and are called reducing sugars. When reducing sugars are mixed with Benedicts reagent and heated, a reduction causes the Benedicts reagent to change color. The color varies from yellow to green to dark red, depending on the amount and the type of sugar.

**Procedure:**

1. Mark Test Tubes to the 1 cm from the bottom, with a marking pen.
2. Put a second mark on each tube approximately 3 cm from the bottom.
3. Number the Test Tubes 1-13
4. Fill four of the test tubes to the 1 cm mark with the solutions (see data table)
5. Fill each Test Tube to the 3cm mark with Benedicts reagent and place the tubes in a boiling water bath for 5 minutes.
6. Record you results in Table 2:

Data Table 2 (Title it):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Tube # | Material | Prediction | Color Before | Color After |
| 1 | Distilled water |  |  |  |
| 2 | Albumin |  |  |  |
| 3 | Albumin + HCL (hot bath) |  |  |  |
| 4 | Liver/beef |  |  |  |
| 5 | Quinoa |  |  |  |
| 6 | Oats |  |  |  |
| 7 | Glucose |  |  |  |
| 8 | Sucrose |  |  |  |
| 9 | Starch |  |  |  |
| 10 | Onion |  |  |  |
| 11 | Potato |  |  |  |
| 12 | Gatorade |  |  |  |
| 13 |  |  |  |  |

**Day 3 Iodine Test**

1. Number the Test Tubes 1-13
2. Fill four of the test tubes to the 1 cm mark with the solutions (see data table)
3. Put two drops of iodine in each test tube that contains each food.

Data Table 2 (Title it):

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Tube # | Material | Prediction | Color Before | Color After |
| 1 | Distilled water |  |  |  |
| 2 | Albumin |  |  |  |
| 3 | Albumin + HCL (hot bath) |  |  |  |
| 4 | Liver/beef |  |  |  |
| 5 | Quinoa |  |  |  |
| 6 | Oats |  |  |  |
| 7 | Glucose |  |  |  |
| 8 | Sucrose |  |  |  |
| 9 | Starch |  |  |  |
| 10 | Onion |  |  |  |
| 11 | Potato |  |  |  |
| 12 | Gatorade |  |  |  |
| 13 |  |  |  |  |

Conclusions/Questions:

1. Which tube is the control?\_\_\_\_\_\_ Explain
2. What is the purpose of adding HCL to tube #3?

1. Why does tube #3 need to be heated?

1. What is the difference between a polypeptide and a peptide?

1. What is the difference between a monosaccharide, disaccharide, and polysaccharide?
2. Write a conclusion of your results for protein (claim evidence reasoning).
3. Write a conclusion of your results for carbohydrates (use the iodine test as well) (claim evidence reasoning).