**IDENTIFYING BIOMOLECULES IN FOOD**

**Background:**

Cells are composed of organic compounds called biomolecules. These biomolecules include carbohydrates, lipids, proteins, and nucleic acids. These substances are used by your cells and often obtained through foods you eat.

**Question:**

Which foods contain carbohydrates, lipids, and proteins?

**Predictions (Hypothesis):** You need to form a hypothesis

  **Create a table** **in your science notebook** to record your results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Food | Simple Sugars | Complex Sugars | Proteins | Lipids |
| Apple juice |  |  |  |  |
| Potato juice |  |  |  |  |
| Butter |  |  |  |  |
| Egg whites |  |  |  |  |
| Egg yolks |  |  |  |  |
| Distilled Water |  |  |  |  |

**Materials for Day 1**

* Timer
* Lab apron
* Safety goggles
* Gloves
* Brown paper towel
* Test tube racks
* 6 Test tubes
* Benedict’s solution
* Sharpie
* Hotplate
* Simple sugar solution
* Masking tape
* Test tube holder Test tube brush

**Day 1 Procedures :**

***This first step is for you to see a positive and a negative test result for simple sugars***

1. Label two test tubes, SS+ and SS-

2. Place 10 drops of Simple sugar solution in the test tube labeled SS+

3. Place 10 drops of distilled water in the test tube labeled SS-

4. Add 10 drops of Benedict’s solution to each test tube

5. Place both test tubes into a boiling water bath for two minutes.

6. Carefully remove the tubes with the test tube clamp, and place them in the test tube rack.

7. Observe: Any color change from the blue color of the Benedict’s solution indicates a positive test for simple sugars.

8. Record your data in the Positive/Negative Indication Table for simple sugar

**Testing for Simple Sugars in each Food Sample**

1. Label 6 test tubes for the foods (and distilled water) to be tested, with the tape and a sharpie.

2. Put 10 drops of the food item in the test tube labeled for it. Do this for each tube.

3. Add 10 drops of the Benedict’s solution to each test tube containing the food samples.

4. Place test tubes in a boiling water bath for two minutes.

5. Remove the test tubes carefully, place in the test tube rack, and record your observations in the data table for your actual results. Use a + for a positive result, and a – for a negative result, and include descriptions (i.e., turned yellow, or orange, etc…)

6. Clean up your area. Test tubes must be washed with soap and water and a brush!

**Materials for PART 2**: are the same with the exception of replacing the Benedict’s solution with Lugol’s (Iodine) solution, and simple sugar solution with starch solution

**Day 2 Procedures**:

***This step is for you to see a positive and a negative test result for Complex Sugars***

1. Label two test tubes, CS+ and CS-

2. Place 10 drops of Starch solution in the test tube labeled CS+

3. Place 10 drops of distilled water in the test tube labeled CS-

4. Add 1 drop of Lugol’s (Iodine) solution to each test tube

5. Observe: A color change from yellow/brown to bluish black indicates a positive test for complex sugars.

7. Record your data in the Positive/Negative Indication Table for complex sugars.

**Testing for Complex Sugars in Each Food Sample**

1. Label a test tubes for each food to be tested with the tape and a sharpie.

2. Put 10 drops of the food item in the test tube labeled for it. Do this for all six tubes.

3. Add 1 drops of the Lugol’s (Iodine) solution to each test tube.

4. Observe: Use a + for a positive result, and a – for a negative result, and a description of any change observed. Record your data in the data table for your actual results.

6. Clean up your area. Test tubes must be washed with soap and water and a brush!

**Testing for Lipids in Each Food Sample**

1. On a piece of brown paper towel you obtain from your teacher, write the names of the food samples we are testing with a sharpie. (See example from teacher)

2. Add one drop of each of your food samples directly below the name it corresponds with on the paper towel.

3. Set aside the paper towel until the next day, then observe it and record your data in your actual results table. A positive result is indicated by a stain on the paper.

**Materials for PART 3:** Same as PART 1, except Protein Solution replaces Simple Sugar solution, and Biurets solution replaces Benedict’s solution

**Day 3 Procedures:**

***This step is for you to see a positive and a negative test result***

1. Label two test tubes, P+ and P-

2. Place 10 drops of protein solution in the test tube labeled P+

3. Place 10 drops of distilled water in the test tube labeled P-

4. Add 10 drops of Biuret’s solution to each test tube

5. A color change from the blue color of the Biuret’s solution to pink or purple indicates a positive test for proteins.

6. Record your data in the Positive/Negative Indication Table for proteins.

**Testing for Proteins in Each Food Sample**

1. Label 6 test tubes for the food to be tested, with the tape and a sharpie.

2. Put 10 drops of the food item in the test tube labeled for it. Do this for both tubes.

3. Add 10 drops of the Biuret’s solution to each test tube.

4. Observe: Use a + for a positive result, and a – for a negative result, and record your data in the data table for your actual results.

5. Clean up your area. Test tubes must be washed with soap and water and a brush!