Name _____ Date _____ Period _____

Lab: Organic Compounds

Introduction:

Organic compounds are carbon based molecules that are found in living organisms. The most common organic compounds are carbohydrates, lipids, proteins, and nucleic acids. In this experiment, you will be conducting chemical tests using indicators to determine the presence of carbohydrates (2 types: starch and sugar), lipids, and proteins. The color change of the indicators determines the presence or absence of organic compounds.

Purpose: Test for the presence or absence of organic compounds in a variety of test substances.
Question –

Hypothesis – (if…….then…….because for each of the substances)

Materials:

<table>
<tr><td colspan="2">

- test substances (water, gelatin, corn oil, white grape juice, corn starch, peanut oil)

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- stirring rod
- graduated cylinder
- test tubes
- beakers
- brown paper

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- iodine
- Biuret reagent
- Benedict's solution
- hot plate

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Experimental Design:

Experimental Setup –

- lipid test
- starch test
- protein test
- sugar test

Control Setup –

Manipulated Variable –

Responding Variable –

Controlled Variables –

Trials –

Validity Measures –

To Test for Lipid:

Materials:

- test solutions
- stirring rod
- brown paper

Validity Measure:

- To avoid contamination, wash the stirring rod before putting it in a new test solution.

Procedure:

1. Obtain a set of test solutions, a stirring rod, and brown paper.
2. Divide a piece of brown paper into squares and label 1 square for each test solution.
3. Dip a glass stirring rod into a test solution and tap it on the corresponding brown paper square in order to leave a wet spot. Wash the stirring rod.
4. Repeat step 3 for the remaining test solutions.
5. Set the brown paper aside until the spots dry – about 10-15 minutes (move on to other tests and come back to this test to record your results).
6. Hold the brown paper up to a bright light or window. You will notice that some substances leave a translucent spot on the brown paper. This indicates the presence of a lipid.
7. Record your results in the data table.

Test Substances	Water	Gelatin	Corn Oil	White Grape Juice	Corn Starch	Peanut Oil
Positive or Negative						

To Test for Starch:

Materials:

- beaker of test tubes
- graduated cylinder
- test solutions
- iodine

Validity Measure:

- To avoid contamination, wash the graduated cylinder before pouring in a new test solution.

Procedure:

1. Obtain a beaker of test tubes. Label 1 test tube for each test substance.
2. Put 5mL of the appropriate test substance in each test tube (wash your test tube before pouring in a new test substance).
3. Add 5 drops of iodine solution to each test tube. Iodine will change the color from yellow-brown to blue-black in the presence of starch.
4. Record your results in the data table.
5. Clean all of your test tubes with soap and water.

Test Substances	Water	Gelatin	Corn Oil	White Grape Juice	Corn Starch	Peanut Oil
Positive or Negative						

To Test for Protein:

Materials:

- beaker of test tubes
- graduated cylinder
- test solutions
- Biuret reagent

Validity Measure:

- To avoid contamination, wash the graduated cylinder before pouring in a new test solution.

Procedure:

1. Obtain a beaker of test tubes. Label 1 test tube for each test substance.
2. Put 5mL of the appropriate test substance in each of the labeled, clean test tubes (wash your test tube before pouring in a new test substance).
3. Add 5 drops of Biuret reagent to each test tube.
4. Gently shake the contents of each test tube. Biuret reagent changes color from blue to blue-violet in the presence of protein.
5. Record your results in the data table.
6. Clean all of your test tubes with soap and water.

Test Substances	Water	Gelatin	Corn Oil	White Grape Juice	Corn Starch	Peanut Oil
Positive or Negative						

To Test for Sugars:

Materials:

- hot plate
- beaker half full of water
- test tubes
- graduated cylinder
- Benedict's solution

Validity Measure:

- To avoid contamination, wash the graduated cylinder before pouring in a new test solution.

Procedure:

1. Obtain a hot plate. Plug it in and turn it on. Place a half full beaker of water on the hot plate.
2. Label 1 test tube for each test substance. Fill each clean, labeled test tube with 5mL of the appropriate test substance (wash your test tube before pouring in a new test substance).
3. Add 10 drops of benedict's solution to each test tube. Place each test tube in the hot water bath.
4. When heated, Benedict's solution will turn from blue to green, yellow, orange, or red in the presence of sugar.
5. You may need to gently shake the contents of each tube.
6. Record your results in the data table.
7. Clean all lab equipment with soap and water.

Test Substances	Water	Gelatin	Corn Oil	White Grape Juice	Corn Starch	Peanut Oil
Positive or Negative						

Analysis:

1. Which test substances contain starch?

2. Which test substances contain sugar?

3. Which test substances contain lipids?

4. Which test substances contain protein?

Conclusion:

1. Which test substances did not test positive for any of the organic compounds?

2. What is the purpose of using water as a test substance?

3. What do all of the indicators have in common?

4. What conclusion could you make if a positive test for any of the organic compounds occurred in the test tube containing only water?

5. What similarities do you see between those substances that tested positive for the same organic compound?

6. How do you know if the substance tests positive for starch? protein? sugar?