Detecting the Presence of Macromolecules

Objective: In completing this lab you will investigate the purpose of macromolecules to organisms and the tests that can indicate which molecules are present in food samples.

Pre- lab: Watch the positive test demonstrations and fill out the table with the color indicator of a positive test

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test type | Monosaccharide | Starch | Protein | Lipid |
| Reagent | Benedicts | Lugols/ iodine | Biuret |  |
| Positive test color |  |  |  |  |

Procedure: (You will perform each test on two unknown samples that contain one or more macromolecules)

1. You will have three test tube racks with four test tubes in each rack. Make sure they are clean and dry.
2. Unknown A
   1. Using a graduated cylinder obtain 40 mls of Unknown A.
   2. Pour 10 mls of Unknown A into each of the four test tubes.
   3. To test for Monosaccharides add ten drops of Benedict’s solution to one of the Unknown A test tubes and stir with glass stirring rod. Clean stirring rod between test tubes. Place test tube in water bath for 2-3 minutes.
   4. To test for Starch add three drops of Lugol’s/iodine solution to one of the Unknown A test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   5. To test for Protein add 10 drops of Biuret solution to one of the Unknown A test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   6. Add a droplet of Unknown A to the test paper (brown paper bag) to test for lipids.
   7. Observe and Record the results in the data table.
3. Unknown B
   1. Using a graduated cylinder obtain 40 mls of Unknown B.
   2. Pour 10 mls of Unknown B into each of the four test tubes.
   3. To test for Monosaccharides add ten drops of Benedict’s solution to one of the Unknown B test tubes and stir with glass stirring rod. Clean stirring rod between test tubes. Place test tube in water bath for 2-3 minutes.
   4. To test for Starch add three drops of Lugol’s/iodine solution to one of the Unknown B test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   5. To test for Protein add 10 drops of Biuret solution to one of the Unknown B test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   6. Add a droplet of Unknown B to the test paper (brown paper bag) to test for lipids.
   7. Observe and Record the results in the data table.
4. Distilled water
   1. Using a graduated cylinder obtain 40 mls of distilled water.
   2. Pour 10 mls of distilled water into each of the four test tubes.
   3. To test for Monosaccharides add ten drops of Benedict’s solution to one of the distilled water test tubes and stir with glass stirring rod. Clean stirring rod between test tubes. Place test tube in water bath for 2-3 minutes.
   4. To test for Starch add three drops of Lugol’s/iodine solution to one of the distilled water test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   5. To test for Protein add 10 drops of Biuret solution to one of the distilled water test tubes and stir with glass stirring rod. Clean stirring rod between test tubes.
   6. Add a droplet of distilled water to the test paper (brown paper bag) to test for lipids.
   7. Observe and Record the results in the data table.
5. . Clean and dry your test tubes. (get materials checked by instructor) \_\_\_\_\_\_\_\_\_\_\_\_\_

Types of Macromolecules Detected

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Unknown | Carbohydrates | | | | | | Lipids | Proteins | | |
| Monosaccharides/  Disaccharides (Benedict') | | | Starch (Lugol's/Iodine) | | | Fats  Oils | Protein  (Biuret) | | |
| Color after boiling | Positive  For sugar | Negative  For sugar | Color after adding Iodine | Positive for starch | Negative  for starch | Presence  yes/no | Color after adding Biuret | Positive protein | Negative protein |
| A |  |  |  |  |  |  |  |  |  |  |
| B |  |  |  |  |  |  |  |  |  |  |
| Distilled  Water  10ml |  |  |  |  |  |  |  |  |  |  |

1. Based on the test results, predict which unknown A or B is soy milk and which is a fitness drink.

Analysis/Conclusion:

Restate your predictions about Unknown A and Unknown B. Support your predictions with the evidence given from the data table.

Reflection Questions:

1. Why did you test each solution against distilled water?
2. What conclusion could you make if a positive test for any of the macromolecules occurred in the test tube containing distilled water?
3. Was the data collected in this experiment quantitative or qualitative? Why?
4. List 3 natural food sources that contain each of the tested macromolecules in your diet.