Biology 10

Title : “Organic Molecules”

Date of experiment : 6/11/14

**Group member**

Palmy, Suthita Swatesuthisan

Ting Ting, Vetaka Prajakchaikul

Po, Sarin Termteerakij

Pun Pun, Sumanas Chamneandamrongkarn

**Introduction/Purpose**

  Organic molecules are molecules that contain carbon and hydrogen. Organic molucules that we have leanrt are carbohydrate, protein, nucleic acid, and lipids. A polymer contains many monomers. Monomers are linked together by dehydration reactions, which are covalent bonds. They are broken down by hydrolasis, which is to add water to broke it down from polymer to monomers.

  The objective of this experiment is to identify which organic molecules are  in the unknown substances by using Benedict’ solution, Iodine solution, Biuret solution, and ethanol to test them.

**Hypothesis**

  If the sample contains monosaccharide or disaccharide, then when it reacts with Benedict’s  solution, it will turn from blue to green, yellow, orange, and red depending on how high the concantration of sugar in the sample is.

  If the sample contains polysaccharide, then when it reacts with Iodine solution, it will turn to blue-black color.

  If the sample contains protien, then when it reacts with Biuret solution,, it will turn from blue to purple.

  If the sample contains lipids, then when absolute ethanol is added, it will turn the solution white with homogenous mixture.

**Materials**

1. Water
2. Benedict  solution
3. Biuret solution
4. Iodine solution
5. Starch solution (Polysaccharide)
6. Glucose (Monosaccharide)
7. Gelatin (Peotein)
8. Unknown 1
9. Unknown 2
10. Unknown 3
11. Test tube
12. Test tube tong
13. Test tube rack
14. Hot plate
15. Gloves
16. Goggles
17. Lab coat
18. Pipettes
19. Beaker
20. Vortex mixer
21. Absolute Ethanol
22. Lipids

**Procedures**

Pocedures (Carbohydrate and protein)

1) Fill 300ml of water into the 500ml beaker with a magnetic stirrer. Place the beaker on the hot plate. (DO NOT TURN ON THE HOTPLATE UNTIL TOLD)

2) Ask an instructor or a lab technician to show you how to use a hot plate. Turn on the hot plate and the stirrer to the instructed levels.

3) Make labels (using the abbreviations in the Table 4) on provided marking tape to be placed on the outside of each test tube. This is done so you do not forget which test tube contains what sample. Use the chart below for abbreviation.

4) Apply the label on each test tube. And arrange the test tube on the rack according the Table

5) Put on protective gloves and a goggle (for members who will be dealing with chemicals).

6) Adding approximately 1cm of each sample according to the label. Do NOT forget to arrange the test tube according to the chart.

6.1 In total you should have 3 tubes of each of the following samples

6.1.1 Water  negative controls

6.1.2 Glucose solution (Monosaccharide)  positive controls for Benedict’s solution

6.1.3 Starch solution (Polysaccharide)  positive controls for Iodine solution

6.1.4 Gelatin solution (Protein)  positive controls for Biuret solution

6.1.5 Unknown 1

6.1.6 Unknown 2

6.1.7 Unknown 3

7) In ROW1: Add 5 drops of Biuret solution into each of the sample.

7.1 Gently swirl the test tube around so that the solution is evenly spread out in the test tube.

7.2 Observe and take note any the color change in the result section.

8) In ROW2: Add 5 drops of Iodine solution into each of the sample.

8.1 Gently swirl the test tube around so that the solution is evenly spread out in the test tube.

8.2 Observe and take note any the color change in the result section.

9) In ROW3: Add 5 drops of Benedict’s solution into each of the sample.

9.1 Gently swirl the test tube around so that the solution is evenly spread out in the test tube.

9.2 Use the beaker tong to transfer the test tube ONE AT A TIME into the boiling water in the beaker for

around 3-5 minutes.

9.3 Observe and take note any the color change in the result section.

10) Turn of the hot plate and stirrer. Be careful not to touch the hot plate as it will remain hot for a long time.

11) Once have finished the experiment, remove the marking tape on the test tubes.

12) Continue to the next part of the experiment.

Procedures (Oils)

1) Collect two test tubes labeled A&B from your instructor.

2) Unscrew the cap of the tube

3) Add approximately the same amount of absolute ethanol into each tube.

4) Screw the cap back on tightly.

5) Shake each tube vigorously. Observe the change and record the findings in the results section.

6) Call your instructor to show you the brown-paper test and record the findings in the results section.

**Results (table & question)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | content | Water | Glucose | Starch | Gelatin | Unknow1 | Unknow2 | Unknow3 |
|  |  | abbreviation | W | GL | ST | GE | U1 | U2 | U3 |
| testing regent | row1 | Benedict | Clear blue | Papaya orange | blue | cloudy dark purple | yellow | clear blue | cloudy yellow |
|  | row2 | Iodine | clear yellow | clear yellow | black | clear yellow | yellow | black | yellow |
|  | row3 | Biuret | clear light blue | clear light blue | cloudy white | clear purple | clear light green | clear light blue | cloudy light purple |

**Emulsification Test**

|  |  |  |
| --- | --- | --- |
| Tube | Without Ethanol | With Ethanol |
| A | Clear | Clear |
| B | Cloudy one yellow layer | Separate layer - clear & yellow |

**Analyzing Result Question**

1.       Does rice store glucose as starch? How do you know from your results?

    Yes, it does. We know from using Iodine solution. Rice reacts with Iodine solution, and it turn to black, which means it contains starch.

2.       Do onions store glucose as starch? How do you know from your results?

No, it doesn't. We know from using Iodine solution. Onion reacts with Iodine solution, and it doesn't turn to black, it is yellow. So it doesn't contain starch.

3.       What sugar is most likely present in diluted milk?

Lactose is most likely present in diluted yogurt.

4.       A test tube contains starch, a digestive enzyme for starch, and water. The Biuret test is negative showing no change. However, after 30 minutes, the Benedicts test is positive. What substance is present? How do you know?

Starch is polysacharide but when a digestive enzyme react with it, polysacharide break to monosacharide. It is hydolysis. So, this substance is monosacharide.

5.       Explain how you would test an unknown solution for each of the following:

a.       Sugars  ---Benedict Solution

b.      Fats  ---Absolute Ethanol

c.       Starch ---Iodine Solution

d.      Proteins ----Biuret Solution

**Conclusion**

Our negative control is water which never change by any reagents. Each solution have their positive control such as positive control of Benedict's solution is glucose solution, positive control of Iodine solution is starch solution, positive control of Biuret solution is gelatine solution, and positive control of absolute ethanol is tube B.

There are three unknown in the test tube rack and according from the result we can know that there are monosaccharide, polysaccharide, and protein in order. In the final color, first, glucose get change by Benedict’s solution as a papaya orange color which mean it has high monosaccharide. Second, starch get change by Iodine solution as a black color which mean it has polysaccharide. Third, gelatin get change by Biuret solution as a purple color which mean it has peptide or protein. Lastly, fats get change by absolute ethanol from being separate layer into one clear yellow layer.





