**Strong Lab Report**

**Question(s)**

How do you test for simple sugars, starches, proteins, and lipids?

**Hypothesis**

The oil will not mix with any of the solutions because it is 100% lipid.

**Procedure**

* Step 1: Obtain lad materials and begin lab setup.  Follow all safety precautions.
* Step 2: Carry out four tests to determine if each solution contains certain organic compounds: Lipids, sugars, proteins, starches.
* Test 1: Lipids
  + Step 1: Draw and label six circles on the paper strip.
  + Step 2: Using the pipet in each unknown solution, place one drop of each solution in the respective circles on the paper strip.
  + Step 3: Allow each spot to dry while you continuing on to the next tests.
  + Step 4: When each spot has dried, hold the paper up to the light.  If a semi-transparent spot is evident, the sample contains lipids.
    - You will only need to record these results in Table 2
* Test 2: Simple Sugars
  + Step 1: be sure to use proper safety procedures.  Do not touch the hot glass.
  + Step 2: Bring the water bath to a boil on the hot plate.
  + Step 3: Label six test tubes.  Using the pipet in each unknown solution, add eight drops to the corresponding test tube.
  + Step 4: Add eight drops of Benedict’s solution to each test tube and place in boiling water for three minutes.  Remove the thermal mitts and allow to cool in your test tube rack.
  + Step 5: Record the final colors in Table 1 and if it is a positive or negative result in Table 2.  Discard the solutions and clean the test tubes.
* Test 3: Proteins
  + Step 1: Add eight drops of each solution into respective tubes in rack.
  + Step 2: Add four drops of Biuret solution to each tube.   Record results in Tables 1 and 2.
* Test 4: Starches
  + Step 1: Add eight drops of each solution into respective tubes in rack.
  + Step 2: Add two drops of iodine to each tube and note any color changes in Table 1. Record these results in Table 2 and discard solutions.

**Data**

Table 1: Color

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample # | Color before adding solutions | Benedict’s Solution | Biuret Solution | Iodine Solution |
| 1 | Clear | No change | Light Blue Tint | Dark Orange |
| 2 | Clear | Green | No change | Greenish-Black |
| 3 | Light Yellow | Purple | Purple | Orange |
| 4 | Clear | Light Green Tint | Blue-ish | Orange |
| 5 | Yellow | Dark Orange | Brown | Dark Purple |
| 6 | Light Yellow | No change | Dot of Blue in Middle | Dot of Purple in Middle |

* This table shows color changes and helps predict if the solutions do or do not have the organic compound that it was tested for
* The iodine starts as a dark orange color
* The Benedict’s solution starts as light blue color
* The biuret starts as a light blue color

table 2: Positive or Negative?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sample # | Benedict’s Solution | Biuret Solution | Iodine Solution | Paper Strip |
| 1 | Negative | Negative | Negative | Negative |
| 2 | Mildly Positive | Negative | Positive | Negative |
| 3 | Very Positive | Positive | Negative | Negative |
| 4 | Negative | Negative | Negative | Negative |
| 5 | Medium Positive | Negative | Positive | Negative |
| 6 | Negative | Negative | Negative | Positive |

* This table shows if the tests were positive or negative

**Analysis**

In this lab, there were four variables that played a part.  The independent variables were the three different solutions that were applied to the six samples.  The dependent variable was the color in which the samples changed, if they changed at all.  The experimental groups were samples two through six.  Since sample one was water, it is the control group in this lab.  There were two samples that did not react to any of the solutions, samples one and four.  Sample one was water, and water doesn’t have any of the macromolecules in it, therefor it did not react.  Sample four was sugar, and based on the lab, sugar also doesn’t contain any macromolecules.

An example of an error that could have occurred during this lab is the accidental mixture of the samples or the solutions.  Both of these things would change the results of the lab because it could have possibly changed the color outcome, resulting in false information on whether or not the sample is positive or negative.  Two outliers were sample one and sample six.  Sample one is water, as stated earlier, so it obviously will not react with any of the solutions.  Sample six was only positive for the paper strip test, which means that sample six was pure lipid.  Pure lipids, or fats/oils, didn’t react with any of the solutions because lipids don’t even mix with the solutions, so how could it react?

One thing that would improve the lab is to have bigger sample sizes.  With the small sample sizes used, it was hard to tell what color the sample was before or after applying the solutions at times.  WIth bigger sample sizes, it would be easier to tell what the colors are, therefore resulting in more accurate results.  A way that this lab could be applied is if you are on a diet and are careful not to eat too much fatty foods.  If you don’t know how much fat a food has, you could simply rub it against a brown paper bag to see just how fat a food has.

**Conclusion**

The point of this lab was to learn how to test for the different macromolecules.  In this lab, we tested six different samples for macromolecules using benedict’s solution, biuret solution, and iodine solution.  We also used a paper strip to test for lipids.  The six samples were as follows: Water, potatoes, gelatin, sugar, gravy, and oil.  In this lab, we learned how to test for different macromolecules and what we should look for to see if the results of the test are positive or negative.

My hypotheses are as follows:

* The oil will not mix with any of the solutions because it is 100% lipid.
* The samples will react to iodine if they have simple sugars, or carbohydrates.
* The samples will react to benedict if they have starches.
* The samples will react to biuret if they have proteins.

All of these hypotheses were confirmed.  All of the samples that had a certain macromolecule tested positive when the corresponding solution was applied.  Also, the oil did not mix with any of the solutions but tested positive in the paper strip test.  In conclusion, this lab proves that foods can be tested for macromolecules using various solutions and answers the question of how to test for macromolecules.

**WEAK LAB REPORT**

**Questions:**

1. **How do the solutions react?**
2. **How do the simple sugars react to the Benedict solution?**

**Hypothesis:**

1. **I think they react by the many different mixtures and chemicals.**
2. **I think that the simple sugars react because of their chemical compounds.**

**Procedure:**

1. **Got safety gear**
2. **Got into groups**
3. **Got supplies**
4. **Got each of the test water**
5. **Tested them**
6. **Began the report**

**Data:**

|  |  |  |
| --- | --- | --- |
| **Benedict Sugar** | **Biuret Protein** | **Iodine Starch** |
| 1. **blue** | 1. **clear** | **1. orange** |
| 1. **green** | **2. clear** | **2. black** |
| 1. **purple** | **3. lavender** | **3.orange** |
| 1. **blue** | **4. clear** | **4.orange** |
| 1. **orange** | **5. yellow** | **5.black** |
| 1. **blue** | **6. clear** | **6.orange** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Benedict** | **Biuret** | **Iodine** | **Paper** |
| **1.positive** | **1. negative** | **1.negative** | **1.negative** |
| **2.negative** | **2. negative** | **2.positive** | **2.negative** |
| **3.negative** | **3.positive** | **3.negative** | **3.negative** |
| **4.positive** | **4.negative** | **4.negative** | **4.negative** |
| **5.negative** | **5.negative** | **5.positive** | **5.negative** |
| **6.negative** | **6. negative** | **6.negative** | **6.positive** |

|  |  |  |
| --- | --- | --- |
| **Prediction** | **Identity** | **Application** |
| **1.sugar** | **1.water** | **1. hydrates** |
| **2.starch** | **2.potatoes** | **2. energy** |
| **3.protein** | **3.gelatin** | **3.growth and repair** |
| **4.sugar** | **4.sugar** | **4.glucose** |
| **5.starch** | **5.gravy** | **5.polysaccharides** |
| **6.lipid** | **6.oil** | **6.triglycerides** |

**Bio Lab Conclusion**

**For our lab we had to test and see if the test subjects would change by the chemicals we added to it. Each test subject had a different type of food in it to test. We learned how chemicals react with certain food. We also had seen what color they could change too if they were to react to any of the chemicals. Only certain ones reacted to certain mixtures.**

**The first mixture contained sugar and turned blue due to the reaction with the other chemicals. The reason for this is dependent on what you add like sugar and water make sugar water add a chemical mixture in this case kool aid and it changes color and everything about it. The kool aid dosent only change the color but it also changes the flavor DEPENDING on what mixture/type you add. My hypothesis was correct about how I think the mixtures react it is by and depends on what is added. So like the kool aid no kool aid equals sugar water but with kool aid changes it all.**

**The lab overall was great and I enjoyed it. The beast part for it I would say was wearing the garbage bags. The main thing for it though was to learn about different chemicals and how they react. The one part that confused me mainly was the part about the chemicals and their colors but later on I got it. I think we should do things like this more often and outside.**