**Introduction to Enzymes Lab**

**Objectives:**

Students will explore the lock and key concept of enzymes and substrates.

**Background:**

Sucrose and lactose are two types of disaccharides that are formed by combining 2 monosaccharides. They both have the chemical formula of C12H22O11. Lactose is made of a glucose bonded to a galactose, while sucrose is made from a glucose bonded to a fructose.

Test for simple sugars (monosaccharides): Benedict’s solution tests for the presence of simple sugars. A color change from blue to green, yellow, orange, or red occurs if a monosaccharide is present. The observed colors indicate the amount of monosaccharide present in the solution. A green to yellow color indicates a small amount, while orange to red indicates a higher concentration of monosaccharide. The original blue color will remain after heating if disaccharides or polysaccharides are present.

Glucose test strips can also be used. The strips give a range of colors from yellow to dark green. Each color shows the concentration of a solution. Therefore, they can be used to determine if glucose is present.

**Materials:**

Card Stock Lactose solution w/ pipette

Tape Enzyme solution w/ pipette

Glucose Test Strips (3) Glucose solution w/ pipette

**Procedure:**

1. Place the three glucose test strips on the card stock evenly spaced and tape them down.
2. Label one strip glucose, one strip lactose w/o, and one strip lactose w/. Write on the card stock not the test strips.
3. Bring the card stock to the 3 Erlymeyer flasks of glucose, lactose, and lactose w/ enzyme.
4. Place a drop of each solution using the pipettes provided for each solutions on the strips. (Remember, do NOT mix up pipettes. Put them back where you found them!!!)
5. Observe the color changes on the strips. The glucose strip will show you what a positive looks like. Compare the two lactose strips and record your data in Table 2.

**Data & Results**

**Table 1**

|  |  |  |
| --- | --- | --- |
|  | Glucose | Lactose |
| Chemical Formula |  |  |
| Monosaccharide components |  |  |

**Table 2**

|  |  |  |
| --- | --- | --- |
|  | Glucose | Lactose |
| Test w/o Enzyme  (+/- for monosaccharide) |  |  |
| Test After  (+/- for monosaccharide) |  |  |

**Analysis**

1. Name the enzyme that is in the enzyme solution. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Which sugar was this enzyme able to breakdown? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. In the space below, write a paragraph explaining your results using the terms enzyme, substrate, breakdown, active site, reactant, products, lock and key. Please highlight each term. (8 points)