

Sec. _____ Name: _____

Experiment: Enzyme Activity and Factors That Affect It (B. Science 10-2-4d)

Purpose: To study the digestion of starch by the enzyme amylase (diastase), & to determine the factors that affect the speed of enzyme activity.

Materials: 1% starch 25 mL beaker
iodine dropper 6 sm test tubes
test tube rack.

Methods: 1. **Demonstration of enzyme action.**

a. Place 10 drops of starch solution in a 25 ml beaker. Add 5 drops of saliva solution to this.
b. Use a dropper to immediately remove one drop of this mixture & place in small test tube #1. To this drop, add a drop of iodine solution. Record observations (Record color of solution & sediment).

- c. Compare the relative amounts of starch that was present & sugar that is formed.
d. Repeat steps b, and c every 5 minutes.

2. **The effect of the concentration (amount of) substrate (starch).**

- a. Prepare 5 test tubes each containing 5 drops of diastase. Increase the amount of starch in each test tube by adding 1, 5, 10, 15, and 20 drops of starch respectively to each test tube.
b. Test each test tube with iodine, all at the same time.
c. Record this in results.

3. **The effect of the concentration (amount of) enzyme (diastase).**

- a. Prepare 5 test tubes each containing 10 drops of starch. Increase the amount of enzyme in each test tube by adding 1, 5, 10, 15, and 20 drops of enzyme respectively to each test tube.
b. Test each test tube with iodine, all at the same time.
c. Record this in results.

4. **The effect of heat on enzyme activity**

- a. Heat 3 test tubes (each with 5 drops of diastase solution), place fourth on ice.
b. Heat one for only a few minutes, heat the other until it just comes to a boil and heat the last till it comes to a full boil and boils for a few minute.
c. Test the action of each on 10 drops of starch. Use iodine as the indicator. Record in results.

Results:

Part 1 time	Color of solution / sediment	Starch	Sugar
0	/		
5	/		
10	/		
15	/		
20	/		
25	/		

Part 2

starch amount	results
1 drops	_____
5 drops	_____
10 drops	_____
15 drops	_____
20 drops	_____

Part 3

enzyme amount	results
1 drops	_____
5 drops	_____
10 drops	_____
15 drops	_____
20 drops	_____

Part 4

	results
on ice	_____
heating	_____
just boiling	_____
full boiling	_____

Conclusions:

1. What happened to the indicator color as you continued step 1?
2. What is the function of the iodine in this experiment?
3. What happens to an enzyme when it is warmed a little?
4. Does boiling have a greater effect on enzyme activity than heating?

Discussion:

1. What action does the diastase have on the starch?
2. What do you conclude is the function of the diastase?
3. Why are enzymes important in the digestive process of humans?
4. What is the function of iodine in testing the effect of diastase on starch?
5. How has the increase in starch affected the rate of enzyme action?
6. What is the effect of increasing the enzyme level in a reaction?
7. Does a little heating of an enzyme affect it in any way? If so, how?
8. What happens when an enzyme is boiled?
9. List four factors that affect the action of enzymes.
 - a.
 - b.
 - c.
 - d.
10. What would happen if cells had no enzymes?
- 11a. Read Rev. 3: 14 - 22. Why would God "spit" us out of his mouth?
- 11b. What does God invite us to do (vs. 20)?