Poly saccharides

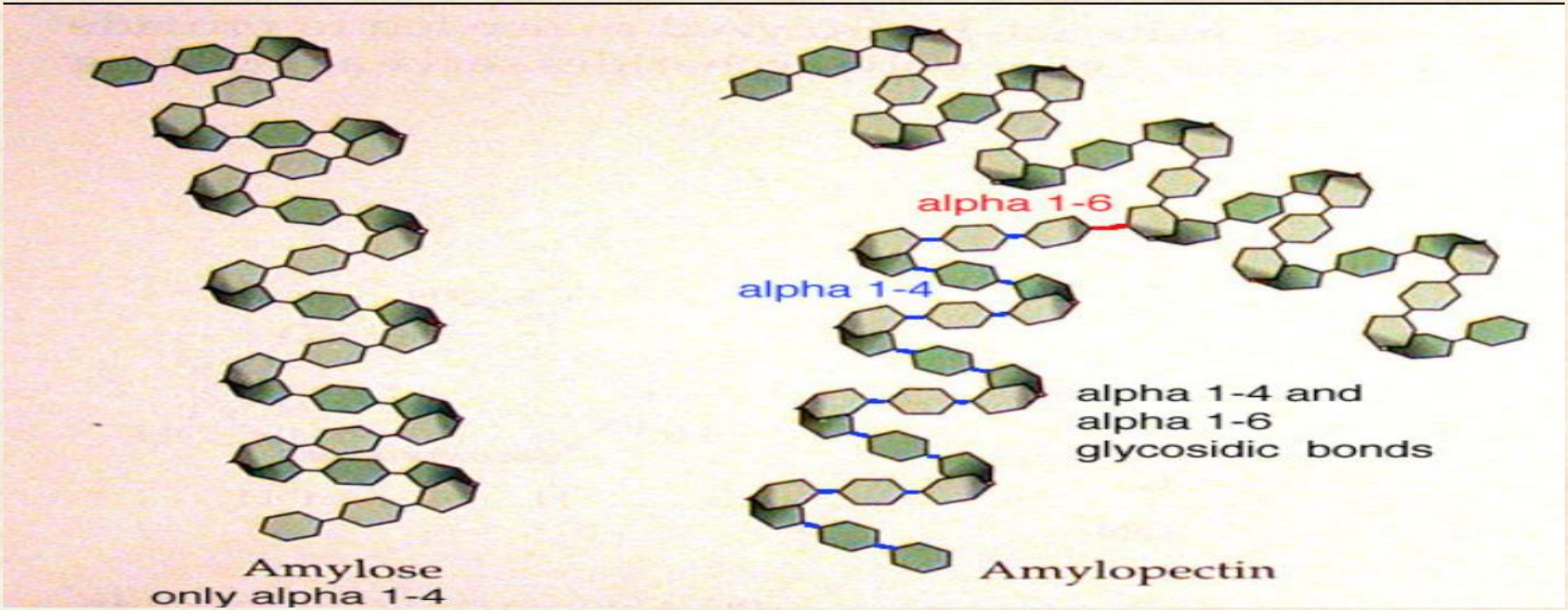
are complex **CHO** of high molecular weight they are either quite :

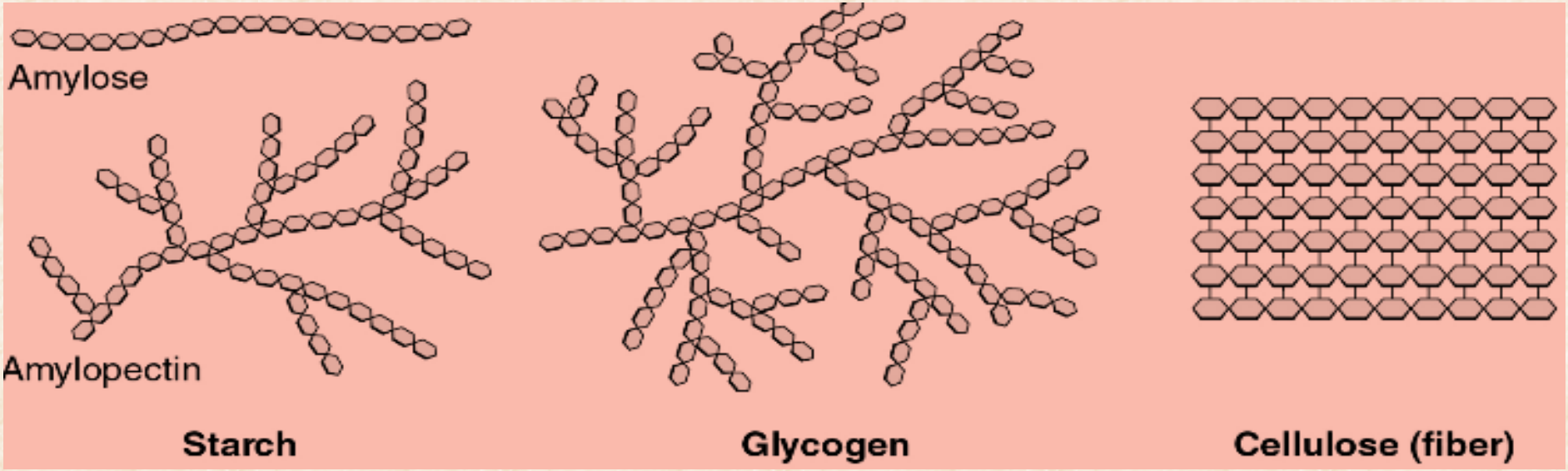
1. insoluble in water
2. when soluble form colloidal solution.

They can be hydrolyzed by dilute acid or enzymes into simpler compounds

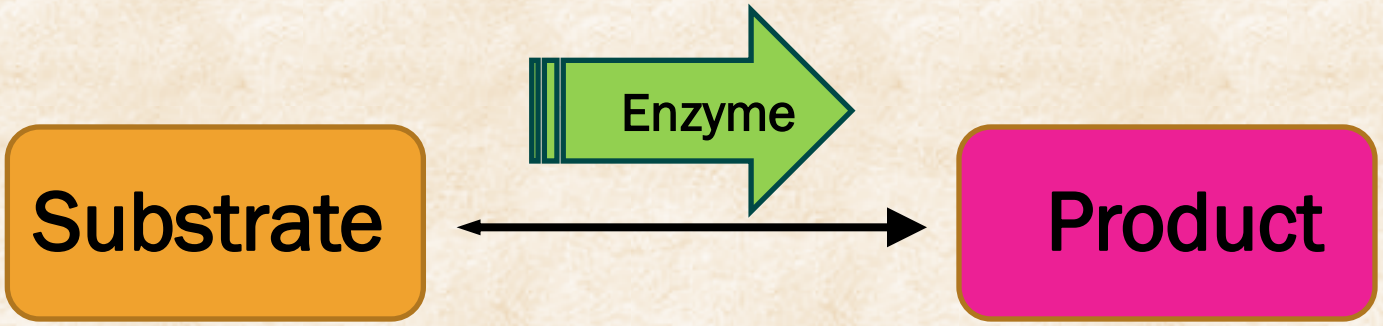
hydrolysis

Starch → α 1-4 glucoside bond
α 1-6 glucoside bond

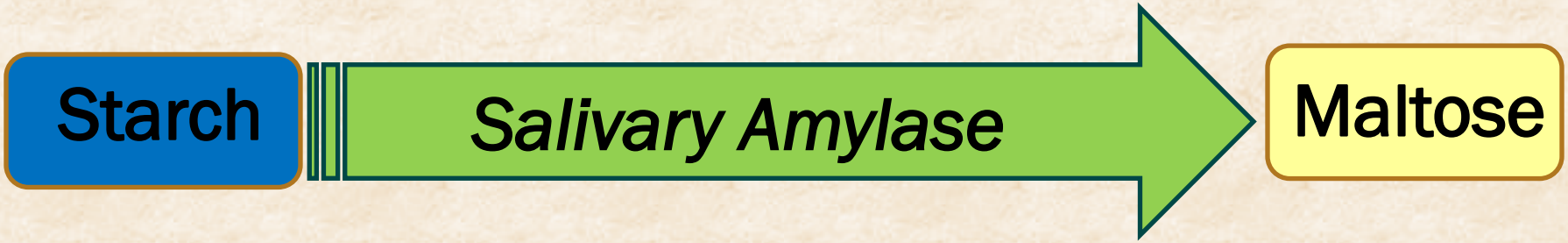

alpha 1-6
alpha 1-4
alpha 1-4 and
alpha 1-6
glycosidic bonds
Amylopectin
Amylose
only alpha 1-4


Amylose
Amylopectin
Starch
Glycogen
Cellulose (fiber)

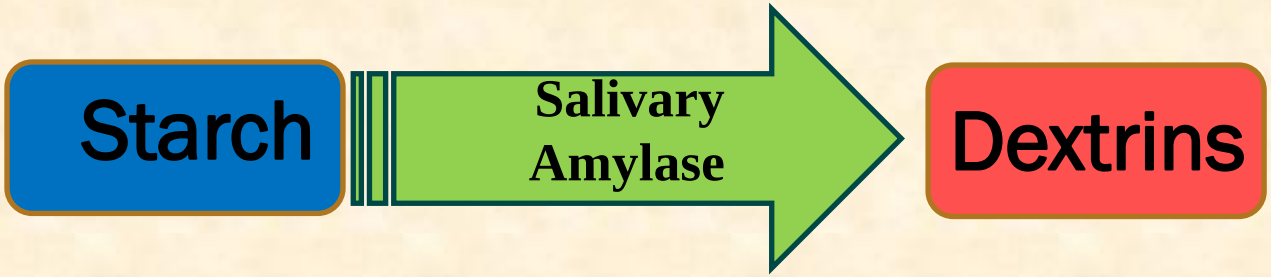
CHEMICAL REACTIONS INSIDE HUMAN BODY



SALIVARY AMYLASE



SALIVARY AMYLASE



SALIVARY AMYLASE

SALIVARY AMYLASE

- **Procedure**

1. **Preparation of Saliva**
2. **Preparation of substrate**

   5 ml starch + 2 ml D.W. + 2ml NaCl $\longrightarrow$ $37^{o}C$
3. **Prepare 4 test tubes with 5 drops Iodine**

REPORT

Time	Result	Conclusion
Zero time		
5 minutes		
10 minutes		
15 minutes		
20 minutes		

REPORT

Time	Result	Conclusion
Zero time	Blue	No time for hydrolysis of Starch Starch + Iodine = Blue
5 minutes		
10 minutes		
15 minutes		
20 minutes		

REPORT

Time	Result	Conclusion
Zero time	Blue	No time for hydrolysis of Starch Starch + Iodine = Blue
5 minutes	Red or Blue	Partial hydrolysis of starch Dextrin + Iodine = Red
10 minutes		
15 minutes		
20 minutes		

REPORT

Time	Result	Conclusion
Zero time	Blue	No time for hydrolysis of Starch Starch + Iodine = Blue
5 minutes	Red or Blue	Partial hydrolysis of starch Dextrin + Iodine = Red
10 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
15 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
20 minutes		

REPORT

Time	Result	Conclusion
Zero time	Blue	No time for hydrolysis of Starch Starch + Iodine = Blue
5 minutes	Red or Blue	Partial hydrolysis of starch Dextrin + Iodine = Red
10 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
15 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
20 minutes	yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow

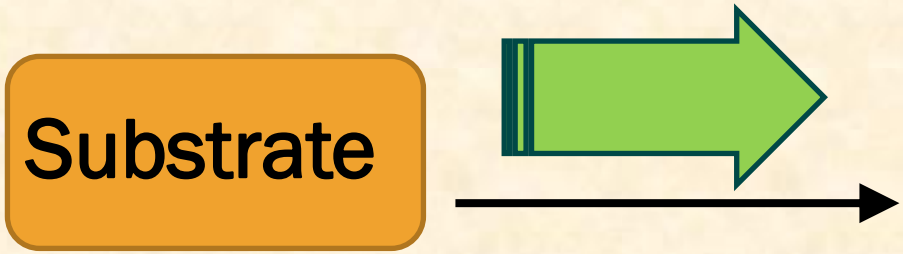
REPORT

Time	Result	Conclusion
Zero time	Blue	No time for hydrolysis of Starch Starch + Iodine = Blue
5 minutes	Red or Blue	Partial hydrolysis of starch Dextrin + Iodine = Red
10 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
15 minutes	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
20 minutes	yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow

Achromic point = 20 minutes

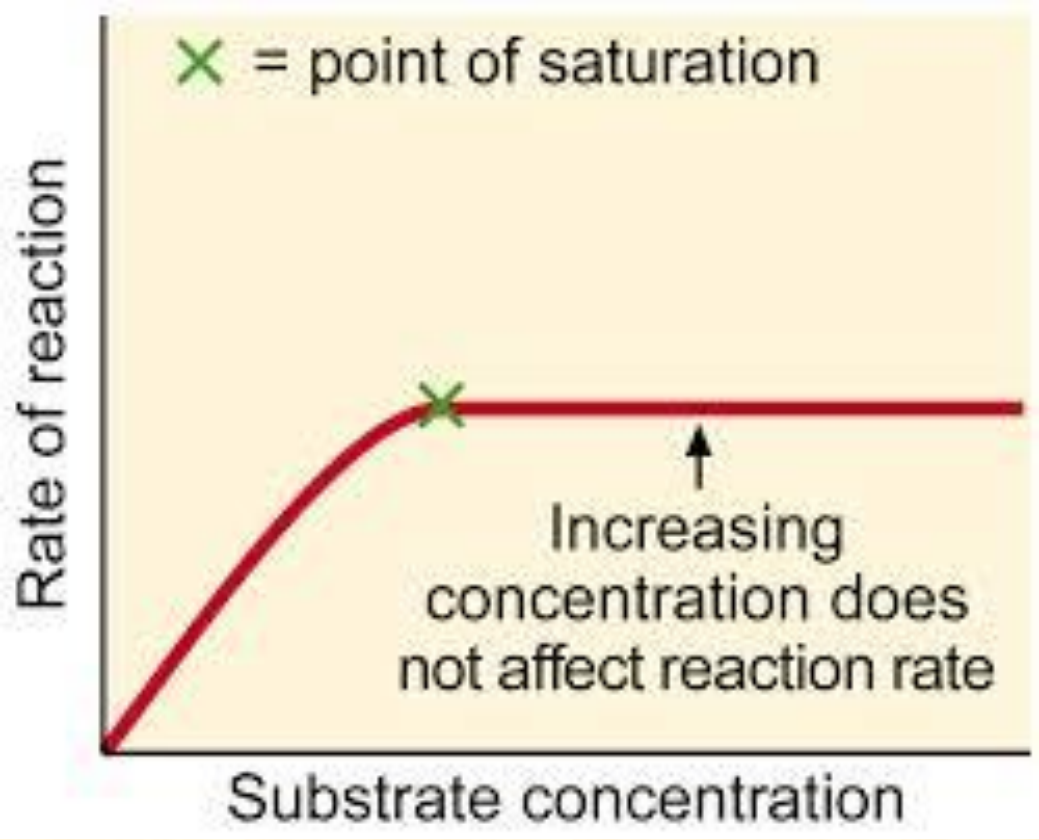
FACTORS AFFECTING ENZYME ACTIVITY

- *Concentration of Substrate*



FACTORS AFFECTING ENZYME ACTIVITY

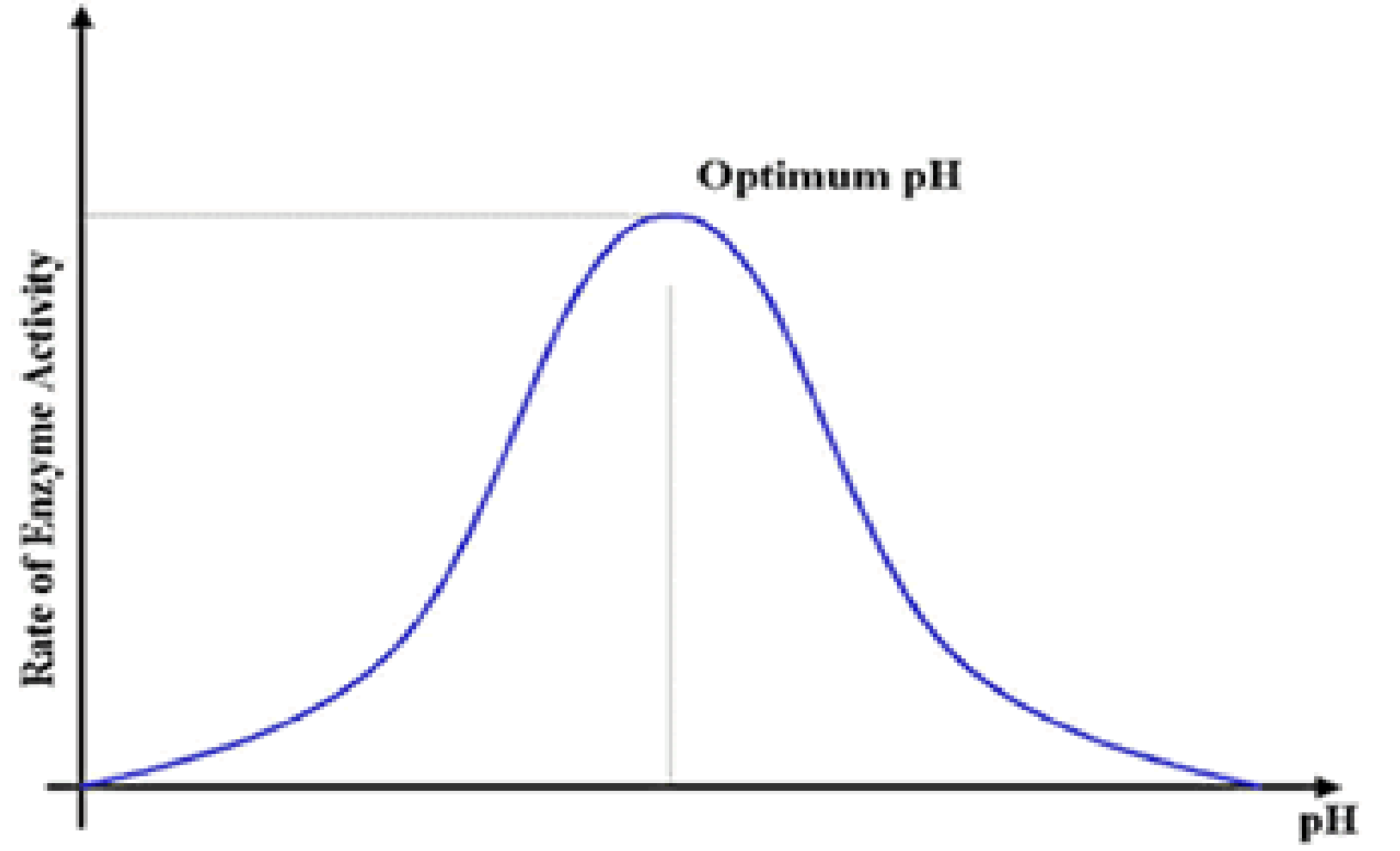
- *Concentration of Substrate*



FACTORS AFFECTING ENZYME ACTIVITY

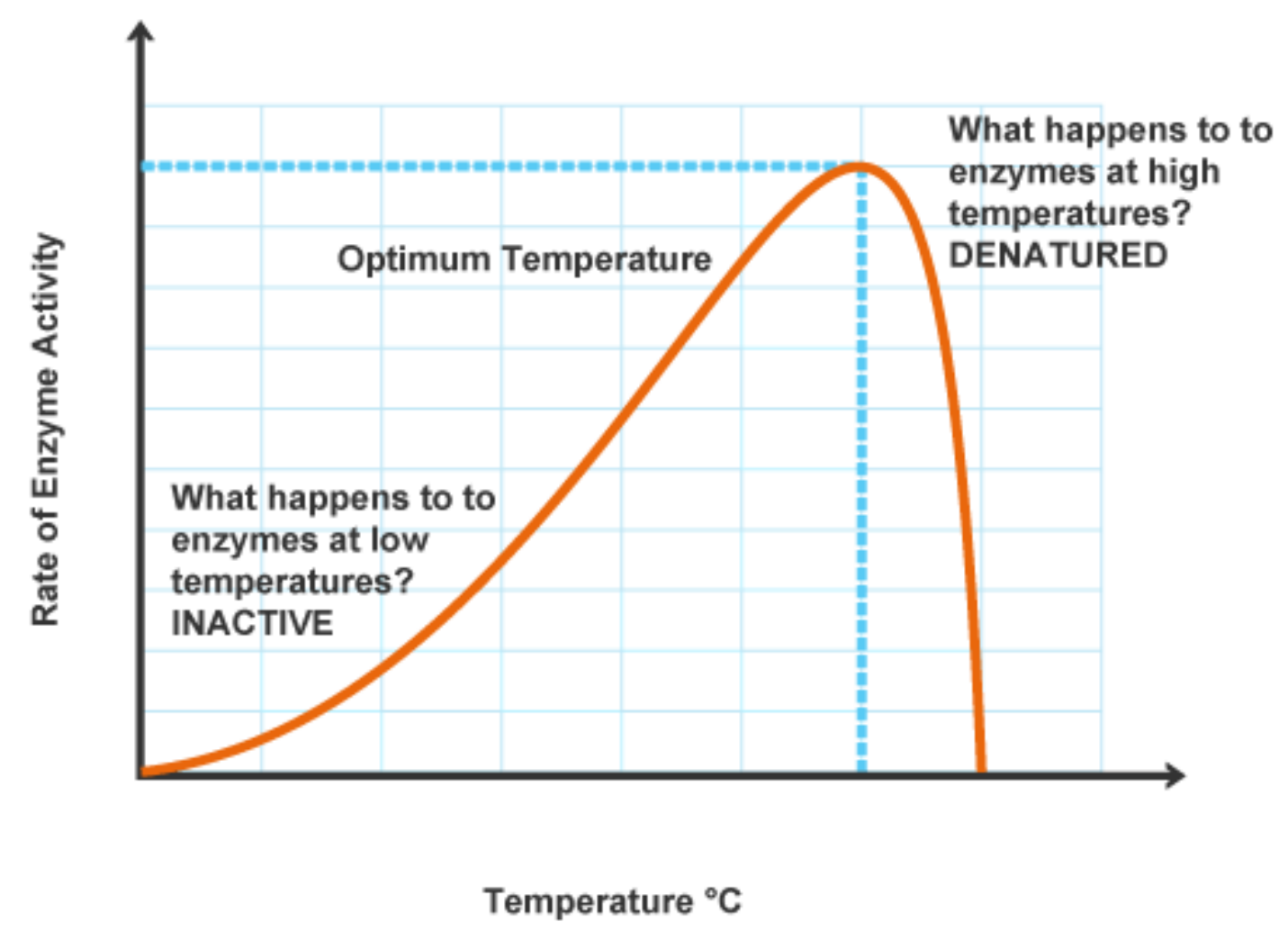
- *Concentration of Substrate*
- *Concentration of Product*
- *Concentration of the enzyme*
- *pH*
- *Temperature*
- *Presence of Activator*
- *Presence of Inhibitor*

FACTORS AFFECTING ENZYME ACTIVITY
1- PH



- “optimum pH” is that pH at which the enzyme will cause the reaction to progress most rapidly.
- 2-*Temperature*
- optimal temperature is that temperature at which the reaction is most rapid.

FACTORS AFFECTING ENZYME ACTIVITY



SALIVARY AMYLASE

- **Procedure**

1. **Preparation of Saliva**
2. **Preparation of substrate**

A. **(N) 5 ml starch + 0.5 ml NaCl . .+ 1 ml Saliva**

B. **(A)5 ml starch + 0.5 ml HCl. .+ 1 ml Saliva**

C. **(B)5 ml starch + 0.5 ml NaOH. .+ 1 ml Saliva**

D. **Incubation in water bath for 20 minutes**

3. **Prepare 4 test tubes with 5 drops Iodine**
4. **Add 1 ml from each substrate tube to one iodine tube**

REPORT

Test	Result	Conclusion
Normal		
Acidic		
Alkaline		

REPORT

Test	Result	Conclusion
Normal	Yellow	
Acidic		
Alkaline		

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic		
Alkaline		

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	
Alkaline		

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	Low pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour
Alkaline		

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	Low pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour
Alkaline	Blue	

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	Low pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour
Alkaline	Blue	High pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	Low pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour
Alkaline	Blue	High pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour

REPORT

Test	Result	Conclusion
Normal	Yellow	Optimum pH , the enzyme is active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Acidic	Blue	Low pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour
Alkaline	Blue	High pH , inactivation of the enzyme, No hydrolysis of starch, Starch + Iodine = blue colour

SALIVARY AMYLASE TEMPERATURE

- **Procedure**

1. **Preparation of Saliva**
2. **Preparation of substrate**

A. **(37č) 1 ml starch + 4 ml H2O..+ 1 ml Saliva**

B. **(25č)1 ml starch + 4ml H2O. .+ 1 ml Saliva**

C. **(0 č) 1 ml starch + 4 ml H2O. .+ 1 ml Saliva**

D. **(100č)1ml starch + 4 ml H2O..+ 1 ml Saliva (boil it on burner)**

Incubation in water bath for 20 minutes

3. **Prepare 4 test tubes with 5 drops Iodine**
4. **Add 1 ml from each substrate tube to one iodine tube**

Test	Result	Conclusion
Ordinary salivary(37c)	Yellow	
Ordinary salivary(25c)		
Ordinary salivary(0c)		
Killed salivary(100c)		

Test	Result	Conclusion
Ordinary salivary(37c̊)	Yellow	Optimum temperature , the enzyme is more active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Ordinary salivary(25c̊)		
Ordinary salivary(0c̊)		
Killed salivary(100c̊)		

Test	Result	Conclusion
Ordinary salivary(37c̊)	Yellow	Optimum temperature , the enzyme is more active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Ordinary salivary(25c̊)	Red	
Ordinary salivary(0c̊)		
Killed salivary(100c̊)		

Test	Result	Conclusion
Ordinary salivary(37c̊)	Yellow	Optimum temperature , the enzyme is more active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Ordinary salivary(25c̊)	Red	Moderate temperature, the enzyme is less active ,Partial hydrolysis of starch. Dextrin + Iodine = Red colour
Ordinary salivary(0c̊)	Blue	
Killed salivary(100c̊)		

Test	Result	Conclusion
Ordinary salivary(37c̊)	Yellow	Optimum temperature , the enzyme is more active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Ordinary salivary(25c̊)	Red	Moderate temperature, the enzyme is less active ,Partial hydrolysis of starch. Dextrin + Iodine = Red colour
Ordinary salivary(0c̊)	Blue	Low temperature, inactivation of the enzyme, No hydrolysis of starch. Starch + Iodine = blue colour
Killed salivary(100c̊)		

Test	Result	Conclusion
Ordinary salivary(37c̊)	Yellow	Optimum temperature , the enzyme is more active ,complete hydrolysis of starch . Maltose + Iodine = yellow colour
Ordinary salivary(25c̊)	Red	Moderate temperature, the enzyme is less active ,Partial hydrolysis of starch. Dextrin + Iodine = Red colour
Ordinary salivary(0c̊)	Blue	Low temperature, inactivation of the enzyme, No hydrolysis of starch. Starch + Iodine = blue colour
Killed salivary(100c̊)	Blue	The enzyme is denaturated (killed), No hydrolysis of starch. Starch + Iodine = blue colour

SALIVARY AMYLASE ACTIVATORS AND INHIBITORS

- **Procedure**

1. **Preparation of Saliva**
2. **Preparation of substrate**

A. **2ml starch + 4 ml Nacl..+ 1 ml Saliva**

B. **2ml starch + 2 ml Nacl. .+ 1 ml Saliva**

C. **2ml starch + 4 ml H_2O. .+ 1 ml Saliva**

Incubation in waterbath for 20 minutes

3. **Prepare 4 test tubes with 5 drops Iodine**
4. **Add 1 ml from each substrate tube to one iodine tube**

REPORT

Test	Result	Conclusion
4 Nacl	Yellow	
2 Nacl		
4 H_2O		

Test	Result	Conclusion
4 Nacl	Yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow
2 Nacl		
4 H_2O		

Test	Result	Conclusion
4 Nacl	Yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow
2 Nacl	Red	
4 H_2O		

Test	Result	Conclusion
4 Nacl	Yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow
2 Nacl	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
4 H_2O		

Test	Result	Conclusion
4 Nacl	Yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow
2 Nacl	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
4 H_2O	Blue	

Test	Result	Conclusion
4 Nacl	Yellow	Complete hydrolysis of Starch Maltose + Iodine = Yellow
2 Nacl	Red	Partial hydrolysis of starch Dextrin + Iodine = Red
4 H_2O	Blue	No hydrolysis of Starch Starch + Iodine = Blue