

Effect of temperature on enzyme activity



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Effect of temperature on enzyme activity In this experiment... Independent variable: Temperature of the amylase Dependent variable: Enzyme activity which is measured by the time for disappearance of starch Controlled variables: Volume of amylase; volume of starch solution; concentration of amylase; concentration of starch solution Prediction of results i) At low temperature, the rate of amylase activity is very low. ii) At optimum (= best) temperature, the rate of amylase activity is the highest. iii) Increase the temperature below the optimum temperature, the rate of amylase activity increases iv) At high temperature (beyond the optimum temperature), the rate of amylase activity is very low.

3. Precautions — why? 1. The starch and amylase solutions must be left in the water bath for 5 minutes before mixing. (To make sure that the starch and amylase have enough time to reach the required temperature before mixed. 2. The dropper must be cleaned before transferring each mixture into the iodine drop? (To prevent contamination by previous mixtures which can affect the results.

Temperature / °C	Time for disappearance of starch / min	Relative activity
0	> 12	0
10	> 12	0
20	11	$1/11 = 0.09$
30	9	$1/9 = 0.11$
40	7	$1/7 = 0.14$
50	9	$1/9 = 0.11$
60	11	$1/11 = 0.09$
80	> 12	0

Report I. Aim: To study the effect of temperature on amylase activity Time for disappearance of starch (min.) Relative activity = $1 / \text{time (min}^{-1})$ Title: graph showing the effect of temperature on relative activity of amylase X-axis? Y-axis? Use pencil to draw!!!!

IV. Analysis and Discussion (past tense) Describe and explain how the amylase activity changes with temperature. At low temperature at 0 to 10°C, the rate of amylase activity was low because the amylases were inactive. When temperature rose from 10°C to 40°C, the rate of amylase activity increases because the kinetic energy was higher and

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speed of molecular vibration was higher. Chances of collision to form enzyme-substrate complex was higher. At 40°C, the rate of amylase activity was the highest because the amylase is at its optimum temperature which it works best. When temperature increased further from 40°C to 80°C, which was above the optimum temperature, the rate of amylase activity decreases because the amylases were denatured.

V. Conclusion (simple present tense) When the temperature is low, the rate of amylase activity is low. When the temperature increases, the rate of amylase activity increases. Amylase has the highest activity at optimum temperature. When the temperature increases beyond optimum temperature, the rate of amylase activity decreases.

Temperature range	KE	Speed	Chances of collision	Rate
0-10°C (low)	Low	Low	Low	Low
10-40°C (rising)	Higher	Higher	Higher	Higher
40°C (optimum)	Even higher	Even higher	Highest	Highest
40-80°C (above the optimum)	Highest	Highest	Highest	Highest
	Low	Low		