

Effect of Amylase on Starch

Amylase is an enzyme produced by the pancreas and salivary glands and plays an important role in the digestion of starch. To investigate the effect of amylase on starch, some students performed the experiment described below.

1. [SP 3] Propose a hypothesis about the effect of amylase on starch.
2. [SP 1] Describe the purpose of the Lugol test for starch and the Clinitest reagent test for glucose.

The students prepared five test tubes as described in Table 1 and recorded the results of the Lugol or Clinitest test on each tube.

Table 1 Preparation of tubes and results.

Test tube	amylase	starch	HCl	Lugol's iodine	Clinitest reagent	initial color	final color
1	-	10 mL	-	2 drops	-	purple	purple
2	2 mL	10 mL	-	2 drops	-	purple	yellow
3	2 mL	10 mL	1 drop	2 drops	-	purple	purple
4	-	10 mL	-	-	5 drops	blue	blue
5	2 mL	10 mL	-	-	5 drops	blue	red

3. [SP 3] State the purpose of each tube.
4. [SP 3, SP 4] The students forgot to include a positive control for Clinitest.
 - a) Describe the contents of a tube that would serve as a positive control for Clinitest.
 - b) Describe the expected results of adding the Clinitest reagent to that tube.
5. [SP 4, SP 6] Identify the molecule that disappeared from the mixture in tube 3 when amylase and starch were both present. Provide reasoning to support your response.
6. [SP 4, SP 6] Identify the molecule that appeared when amylase and starch were present together in tube 6. Provide reasoning to support your response.
7. [SP 6] Use the data to support or reject your hypothesis.
8. [SP 1, SP 6] a) Describe the effect of HCl on amylase. Provide reasoning for your response.
b) Make a claim about the effect of stomach acid on enzymes like amylase.
9. [SP 3] In tube 2 starch was digested by amylase. Design a simple experiment to show if the amylase was used up during starch digestion or if it is still present after digestion.
10. [SP 1] Provide an explanation for the relative lack of amylase in the saliva of carnivores like dogs and cats.
11. [SP 1] Suggest a reason a plant might require an enzyme like amylase.