

Amylase Action Experiment

Aim:

We are doing the experiment is to work out what temperature amylase works best at.

Background Information:

Amylase – an enzyme made in the salivary glands in the mouth and begins the digestive process by breaking down starch when you chew your food. It turns the food into maltose a smaller carbohydrate. - healthyeating.sfgate.com/functions-amylase-protease-lipase-digestive-enzymes-3325.html

Iodine – It is needed for the normal metabolism of cells. Metabolism is the process of converting the food you eat into energy. - healthyeating.sfgate.com/action-starch-human-diet-1699.html

Starch – Also known as a carbohydrate, starch's only function in the human diet is to convert into glucose for energy. - healthyeating.sfgate.com/action-starch-human-diet-1699.html

Control Variables:

- Amount of amylase or starch suspension in the test tubes racks
- Amount of iodine applied to each well
- Amount of amylase/starch added to each well
- Time between each drop of amylase/starch solution added to each well.

Safety:

- Iodine is an irritant
- Eye protection to protect eyes from chemicals such as iodine/amylase.

Equipment:

- Amylase solution – the enzyme we're testing
- Beaker of water – to wash out the pipette
- Pipette – to hold substances from the test tubes
- Six test tubes – to hold the amylase and the starch suspension
- Starch suspension – substance with amylase to test how it works at different temperatures.
- Stop clock – to measure the time
- Test tube rack – to hold the test tubes once out of the water bath
- Two syringes – to measure small amounts precisely

Amylase Action Experiment

- Well tray or spotting tile – to hold the substances we put on it
- Eye protection – to make sure nothing gets into our eyes
- Three water baths at different temperatures – to heat the test tubes for the experiment (10, 40 and 60 °C)

Diagram:

Method:

1. Using a syringe put 5cm³ of starch suspension into three test tubes.
2. Put these test tubes into the water baths at different temperatures. Only put one test tube into each water bath.
3. Using another syringe, put 1cm³ of amylase solution into the other three test tubes
4. Put the amylase test tubes into water baths. Make sure it's only one test tube per water bath.
5. Start the stop clock and time 5 minutes. While you are waiting, use the pipette to add one drop of iodine solution to each well in the well tray/spotting tile.
6. Wash out the pipette once you're done.
7. After the 5 minutes have finished, pour the amylase into the starch suspension in each water bath and swirl the tubes to mix the amylase with starch
8. Immediately take one drop from the tube with starch and amylase, and it to one of the wells in the spotting tile. If a blue/black colour shows that starch is present or there
9. Wash out the pipette before taking each drop.

Amylase Action Experiment

10. Test all test tubes this way
11. Reset and start the stop clock. Repeat step 8,9 and 10 every 2 minutes.

Table:

Temperature of tube (°C)	Time after adding amylase (min)									
	2	4	6	8	10	12	14	16	18	20
10	yes	yes	yes	yes	yes	yes	yes	yes	no	no
40	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
60	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Graph not necessary

Conclusion:

The results show that amylase works better at the temperatures 40 or 60 degrees Celsius. Amylase actually works better at 40 degrees Celsius because that is the temperature of the human body. Amylase does not work well at 10 degrees Celsius because it is 30 degrees colder than the body temperature of the human body.

Evaluation:

I think that if we are to do this experiment again we would need more time as there wasn't enough time to do the full table. Towards the end of the experiment we rushed trying to fit as many goes in as possible and broke some of the control variables such as the amount of amylase/starch solution added to each well or the time between each drop of amylase/starch solution. If I was to do this test again, I would improve it by shortening the length between each drop of amylase/starch by 1 minute. I would change the temperatures of the water baths to 30, 40 and 45 degrees Celsius to make the conclusion and evidence more accurate.