**The Effect of pH on the Reaction between Pepsin and Egg-white**

The protease group of enzymes break down protein. There are a number of types of protease.

**Pepsin** is one type of a protease. It is produced in the stomach and is one of the main digestive enzymes. Certain enzymes work best at certain pH. This experiment is to find which pH the enzyme pepsin works best at.

Egg white is made of protein. When it is broken down by pepsin it will become clear. In this experiment we will look at what pH the pepsin turns the egg white clear. This will show the pH that protease works best at.

What are we trying to find out in this experiment?

Which pH do you think the Pepsin will work best at?

What is the thing that is varying in each test tube?

What is the change we are watching for?

What to do.

**(a)** Label five test-tubes 1-5.

**(b)** Using a measuring cylinder place 5 cm3 of egg-white suspension in each tube.

**(c)** Using a measuring cylinder, add the chemicals indicated in the table below to each of the test tubes.

**(e)** Using a measuring cylinder, add 1 cm3 1% pepsin solution to each tube.

**(f)** Place all five tubes in the water bath. To make the water bath pour some of the heated water the teacher has prepared into a 500ml beaker.

**(g)** Copy the table below into your notebook.

**(h)** After five minutes, return the tubes from the water bath to the test-tube rack and

compare the appearance of the contents.

**(i)** Compare the pH of each tube using universal indicator. Compare the colour produced on the standard chart supplied. Repeat this for each tube.

**(j)** Record your results.

|  |  |  |  |
| --- | --- | --- | --- |
| *Tube* | *Egg-white suspension and pepsin plus:* | *pH* | *Appearance of contents after 5 minutes* |
| 1 | 2 cm3 sodium carbonate solution |  |  |
| 2 | 0.5 cm3 sodium carbonate solution |  |  |
| 3 | Nothing |  |  |
| 4 | 1 cm3 hydrochloric acid |  |  |
| 5 | 2 cm3 hydrochloric acid |  |  |

***Is the activity of pepsin affected by pH? Does it have an optimum pH? Why/Why not?***

|  |  |  |
| --- | --- | --- |
|  | Possible mark | Mark scored |
| Aim | 2 |  |
| Introduction  Why do think your will get the results you predict in the hypothesis | 3 |  |
| Hypothesis | 2 |  |
| Independent Variable | 1 |  |
| Dependent Variable | 1 |  |
| Controlled Variables | 2 |  |
| Materials/ Equipment | 2 |  |
| Results  Table | 4 |  |
|  |  |  |
| Discussion | 2 |  |
| Conclusion | 2 |  |
| References  At least two | 2 |  |
| Total | 23 |  |

**Title** – Should tell the reader something about your experiment. Eg NOT “Biology Investigation”, instead “The effect of temperature on enzyme activity”

**Aim** – Why are you doing this experiment? What do you want to find out?

**Introduction** - Give some background on any assumed scientific knowledge or what previous studies have found. Eg if your investigation is about the effect of temperature on enzyme activity you should explain here what an enzyme is and how they work.

You will need to do some research for this section and put your sources in your reference section

**Hypothesis** – Your own prediction on what you think will happen. Do not say ‘I predict” or “I think”. It doesn’t matter if you are right or not.

**If** *we do this to the independent variable*

**Then** *this will happen to the dependent variable*

**Independent variable** - The variable changed

When you change the independent variable the variable you are measuring (the dependent variable) will probably change too.

**Dependent Variable** - The variable you are measuring. Any change in this variable **depends** on what you do to the independent variable.

**Controlled Variables** - All the things you keep the same to make it a fair test. You should usually list at least three. Be specific eg don’t just say temperature, say temperature of the water bath.

**Materials** - A list, not a paragraph, of the equipment you used.

You should include amounts eg 3 x 250ml beakers or 15g of salt.

**Results** - This will nearly always include quantitative data (numbers) in a table and a graph.

**Discussion** -

What went wrong? Were there any errors? Note: no experiment is perfect – there are always some errors or improvements to be made.

What may have been the effect of these errors on your results?

What could you improve about your procedure next time?

**Conclusion** - Did the results support the hypothesis?

**References** Set out as shown in your student diary