GCSE Biology required practical activity: Decay

Investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change.

In this practical you will:

- decide on the range of temperatures that you wish to investigate milk decay over, considering the lesson time you have
- use an indicator to monitor the rate of decay of milk.

Apparatus

- a small beaker of full fat milk or single cream
- a small beaker of sodium carbonate solution
- a small beaker of lipase solution
- a 250 cm^3 beaker
- boiling tubes
- a boiling tube rack
- a marker pen
- 10 cm^3 plastic syringes
- a stirring thermometer
- a stop clock
- Cresol red, in a dropper bottle
- an electric kettle, for heating water
- ice, for investigating temperatures below room temperature.

Investigation

What range of temperatures have you chosen to investigate?

What affect do you think changing this variable will have on the rate of decay of milk?

Method

1. Label a boiling tube 'lipase' and add 5 cm^3 of the lipase solution.
2. Label another boiling tube 'milk' and add five drops of the Cresol red solution.
3. Use a calibrated dropping pipette to add 5 cm^3 of milk to the 'milk' boiling tube.
4. Use another pipette to add 7 cm^3 of sodium carbonate solution to the 'milk' boiling tube.

   The solution should be purple.
5. Put a thermometer into the 'milk' boiling tube.
6. Set up a water bath to your first chosen temperature.
7. Put both boiling tubes into the water bath. Wait until the contents reach the same temperature as the water bath.
8. Use another dropping pipette to transfer 1 cm^3 of lipase from the 'lipase' tube to the 'milk' tube.

   Immediately start the stopclock.
9. Stir the contents of the 'milk' boiling tube until the solution turns yellow.
10. Record the time taken for the colour to change to yellow, in seconds.
11. Then repeat the investigation for different temperatures of water bath.
12. Record your results in a table like this one.

Temperature of milk in °C	**Time taken for solution to turn yellow, in seconds**			
	Your results	**Class repeat 1**	**Class repeat 2**	**Mean**

Analysis and conclusion

a. Plot a graph of your results.

b. Write a sentence to state the relationship between temperature and time taken for the indicator to turn yellow.

c. Does this reflect the hypothesis you made before carrying out the practical? Consider in your explanation the shape of your curve and enzyme activity.