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Biology Coursework

An investigation to find the affect of Hydrogen Peroxide (H^2O^2) concentration on the production of Oxygen (O^2)

Hydrogen Peroxide is something that is broken down into oxygen and water; Hydrogen Peroxide is a waste product of metabolic reactions.

Aim

The investigation is to find out from a variety of 6 different concentrations of H^2O^2, how much froth can be produced from them. In this investigation the only two variables are; the amount of water and hydrogen peroxide within each test tube. A results table will be produced to display the different amounts of froth in the different test tubes.

Equipment

- Measuring beaker
- Bottle of Hydrogen Peroxide
- Test tubes
- Stick of celery
- A knife or scalpel
- Pestle and mortar
- Stop watch
- Eye goggles
- Ruler
- Labels

Prediction

I predict that within this investigation the increase of the hydrogen peroxide will affect and increase the amount of froth produced, this is because when an extract of celery is inserted in the hydrogen peroxide there will be a larger reaction.
The increase of hydrogen peroxide will allow a greater reaction when the celery has been added.
2cm celery extracts are used because it enables you to break down hydrogen peroxide this is because celery has a tissue, which contains an enzyme, catalyse, an enzyme is a molecule, which speeds up a reaction. Catalyse is found and made inside plant cells, it is needed to breakdown hydrogen peroxide to water and oxygen, hydrogen peroxide is a waste product of metabolic reaction.

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Method

Firstly collect all equipment, and then using a knife cut the celery stick in to tiny pieces preferably 3ml long each.
Evenly split the cut celery in to two groups, place half in to a pestle and mortar then crush celery into even smaller sections
Make sure each celery extract is not more then 2ml in size

Pour 10ml of hydrogen peroxide into one of the test tubes, in another test tube pour 8ml of hydrogen peroxide however this time add 2ml of water in it, then in another test tube place 6ml of hydrogen peroxide although this time adding 4ml of water. Each solution must not be more then 10ml after each reaction measure the froth or oxygen produced with a mm ruler and make sure you have your stop watch ready before adding the celery extract lastly carry on this method following the 6 ranges of concentration amounts shown in the table:

Concentration of solution (%)	Amount of Hydrogen Peroxide	Amount of water
100%	10ml	0ml
80%	8ml	2ml
60%	6ml	4ml
40%	4ml	6ml
20%	2ml	8ml
0%	0ml	0ml

Variables

The inputs, which will be changed each time, is the hydrogen peroxide concentration and the amount of water added, the outcome, which will vary, is the oxygen or froth produced.
The variables that we control however are the volume of celery, which will remain 2mm, the amount of solution in each test tube and lastly the duration of each reaction and the apparatus set up.

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Results

In the table below it shows how much froth or oxygen was produced in the 20-second timings, a pattern of increasing solution added produces more froth however between 40% and 80% the oxygen or froth produced begins to decrease instead of increase. The different amounts of froth produced maybe due to a mistake in the amount of hydrogen peroxide or water added, therefore affecting the pattern in the increase of froth produced.

Concentration of solution	Time – 20 seconds (mm)	Time – 40 seconds (mm)	Time – 60 seconds (mm)	Time – 80 seconds (mm)	Time – 100 seconds (mm)
100%	35	63	80	75	75
80%	20	35	50	50	70
60%	15	30	55	60	60
40%	17	40	50	60	60
20%	10	20	30	40	45
0%	0	0	0	0	0
Average	16.1	31.3	44.1	47.5	51.6

Conclusion

In conclusion the experiment gave me an understanding of how different concentrations of solutions encourage different reactions in this case how much froth or oxygen is produced by altering the concentration of hydrogen peroxide.
My prediction of the higher concentration hydrogen peroxide will produce an increasing size in froth or oxygen produced.
From the results table my prediction is partially correct however, during the concentration of the solution between 40% and 80% the froth produced, its figures begin to both increase and decrease in an uneven form and disrupts the increasing pattern.

In order to improve the results we should redo the outstanding and unreasonable results or if necessary repeat the experiment three times in order to collect a fair group of results.