

## Decomposition of Hydrogen Peroxide

**Aim:** My aim in this experiment is to investigate the effect of changing the concentration of the substance (Hydrogen Peroxide) in an enzyme controlled reaction.

**Prediction:** I predict that the higher the amount of Hydrogen Peroxide I use then the faster the displacement reaction will be. Therefore, the less substrate I use then the slower the displacement reaction will be.

**Hypothesis:** I performed a preliminary experiment to distinguish the amount of yeast I will use for the actual experiment.

0.5 grams	1.0 gram	1.5 gram	2.0 grams	2.5 grams
30	72	94	140	202

This therefore shows me that the amount of yeast is directly proportional to the amount of bubbles.

### **Apparatus:**

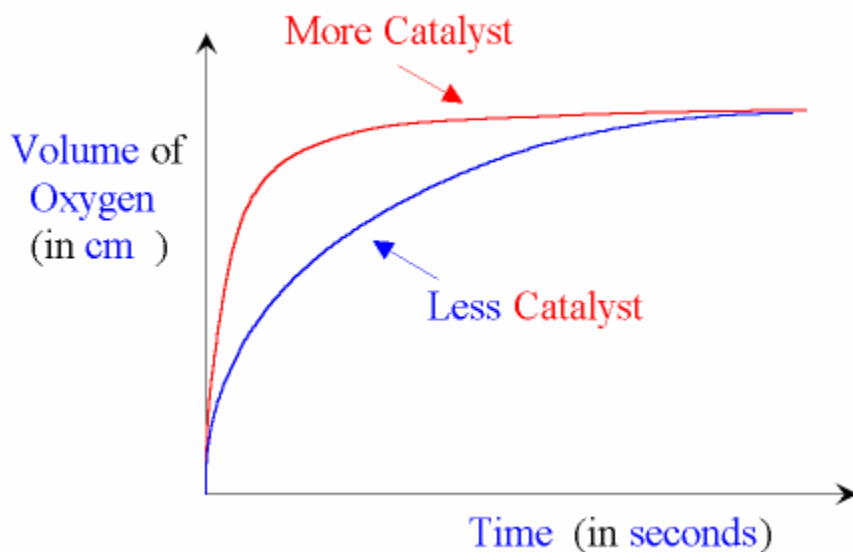
In order to complete this experiment I will need the following apparatus

- Measuring beaker
- Measuring cylinder
- Side arm test tube & cork
- Rubber bung
- Large syringe
- Small syringe
- Metal rod
- Metal scoop
- Electronic scales
- Stop watch
- Goggles
- Hydrogen Peroxide
- Water
- Yeast

**Method:** To begin this experiment I set up the apparatus like its shown in the diagram. I got my two syringes and filled each with a different solution. I

filled one of the syringes with one millimetre of yeast solution and the other with ten millimetres of hydrogen peroxide. I then squirted each substance into the side arm test tube to form the reaction. I then waited to see how much oxygen would fill the measuring cylinder. After three minutes I measured to see how much oxygen had passed into the cylinder. This first test was done with 100% hydrogen peroxide and no water. This time I was going to repeat the same experiment but with different amounts of solution. I made this test 80% hydrogen peroxide and 20% water. I took the results and repeated it again with 60% hydrogen peroxide and 40% water. I now made it 40% hydrogen peroxide and 60% water. Then I made it 20% hydrogen peroxide and 80% water. After doing this and collecting the results I had to repeat the whole procedure twice more so I could then get an average results table. This made sure that I got an average and not just one set of results. This makes it a fair test as well as keeping all measurement roughly the same and room temperature kept the same throughout the entire experiment. I would also need to keep this experiment safe by wearing goggles to protect my eyes.

**Diagram:**



**Results:**

**1<sup>st</sup> Results**

<b>% Of H2O2</b>	<b>Volume of H2O2 in ml</b>	<b>Volume of H2O in ml</b>	<b>Minutes</b>	<b>Seconds</b>
100%	10	0	1.36	96
80%	8	2	1.57	117
60%	6	4	2.25	145
40%	4	6	4.18	258
20%	2	8	8.42	522
0%	0	10	Infinity	Infinity

**2<sup>nd</sup> Results**

<b>% Of H2O2</b>	<b>Volume of H2O2 in ml</b>	<b>Volume of H2O in ml</b>	<b>Minutes</b>	<b>Seconds</b>
100%	10	0	1.27	87
80%	8	2	1.43	103
60%	6	4	2.07	127
40%	4	6	3.59	239
20%	2	8	7.42	462
0%	0	10	Infinity	Infinity

**3rd Results**

<b>% Of H2O2</b>	<b>Volume of H2O2 in ml</b>	<b>Volume of H2O in ml</b>	<b>Minutes</b>	<b>Seconds</b>
100%	10	0	1.14	74
80%	8	2	1.36	86
60%	6	4	1.57	117
40%	4	6	3.32	212
20%	2	8	6.30	390
0%	0	10	Infinity	Infinity

**Average Results**

<b>% Of H2O2</b>	<b>Volume of H2O2 in ml</b>	<b>Volume of H2O in ml</b>	<b>Minutes</b>	<b>Seconds</b>
100%	10	0	1.26	86
80%	8	2	1.45	105

60%	6	4	1.96	156
40%	4	6	3.70	250
20%	2	8	7.38	458
0%	0	10	Infinity	Infinity

**Evaluation:** The experiment went well, this is because I had no anomalous results and the results agreed with my prediction. I think I had accurate results as they were as I predicted and also there were no abnormal patterns that occurred. If I were to make one improvement on my method, it would be to have a larger range of concentrations of yeast to prove that the results continue proportionally. I did not have any anomalous results as my experiment was done well and precisely. I feel that if I had used a larger range of concentrations for my experiment such as 0.1% - 2.0% concentration my method would be improved as my best-fit line would probably become more precise and it would help even more to prove that the oxygen produced would increase proportionally. If I were to extend the range of concentration, the oxygen would increase proportionally.