

Title: Enzyme—Catalase Activity

Before you begin, save this Lab Report Template on your computer as

LastNameAPBIOCatalase

Read all instructions *BEFORE* you start the lab

Purpose:

- to observe the catalytic action of yeast catalase on hydrogen peroxide
- to determine the effect of concentration on yeast catalase activity
- to determine the effect of temperature on yeast catalase activity
- to determine the effect of pH on yeast catalase activity

Background information:

Hydrogen peroxide (H_2O_2) is a common but poisonous by-product of cellular metabolism, but H_2O_2 does not accumulate in cells because it is decomposed to water and oxygen gas. The decomposition of the hydrogen peroxide is mediated by catalase, an enzyme present in most cells. The balanced equation for the reaction is $2H_2O_2 \rightarrow 2H_2O + O_2$. One molecule of catalase can catalyze the decomposition of approximately 4×10^7 molecules H_2O_2 per second! In this lab activity, you will be using yeast catalase, but you could also use catalase from potatoes, carrots, plant leaves, chicken liver, or steak...to name just a few of the many places where you can find catalase. Use your textbook as a source of additional information about the function and sources of catalase as well as information about the effects of H_2O_2 on cells.

Materials:

hydrogen peroxide	water bath
yeast catalase	stop watch or timer
graduated cylinder	water
small beaker	HCl
test tubes	NaOH
filter paper discs	pH paper
forceps	wax marking pencil

Procedure:

Catalase Solution

1. Dissolve 1 tsp active dry yeast in 1 cup warm tap water
2. Mix well.
3. Test activity by placing a few drops of the solution in about 5 mL hydrogen peroxide
4. If the action is too vigorous, dilute the solution; if too weak, make the solution again with less water and/or more yeast!

Observation of Catalase Activity:

1. Pour about 10 mL H_2O_2 into small beaker
2. Soak 1 filter paper disc in catalase solution for 5 seconds and then air dry
3. Drop the catalase-soaked disk in the beaker of H_2O_2
4. Record what happens
5. Repeat if necessary

