



24. Mysterious Catalase

Tom Divehall
New Zealand



Problem

- An enzyme called catalase influences on the rate of decomposition of hydrogen peroxide. Make tests to identify catalase-positive and catalase-negative organisms and materials.



outline

- Theory
 - enzymes
 - catalysts
- Testing
- conclusions



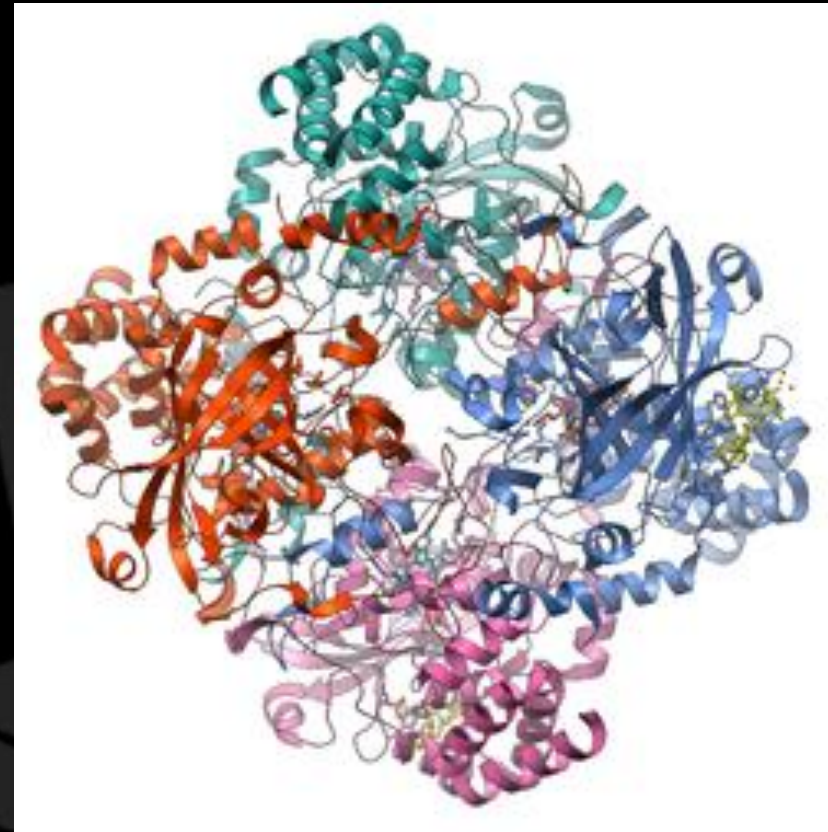
Catalase

- Catalase is a common enzyme found in nearly all living organisms exposed to oxygen. It catalyzes the decomposition of hydrogen peroxide to water and oxygen.



Enzymes

- Enzymes are biological catalysts





Catalysts



- This reaction is **catabolic**



Hydrogen Peroxide

reactant

Catalase

enzyme



H_2

O_2

Catalase



Ways of measuring oxygen

- Dishwashing liquid (measuring the height of the bubbles)
- Balloon (measuring how much it expands)
- Watching for bubbles



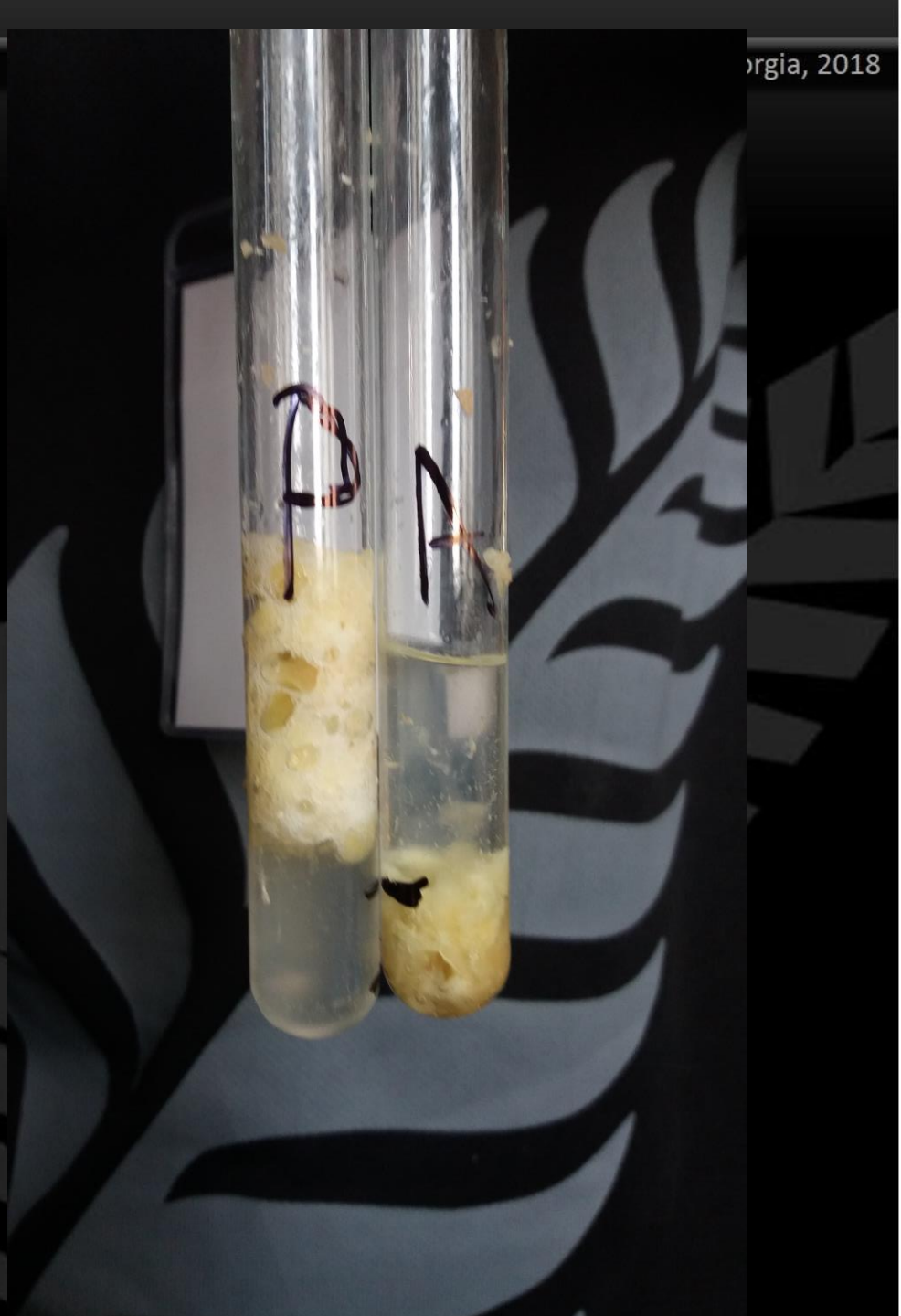
Testing

- Measure out 1cm of material pulp in to the bottom of a test tube
- Measure out 5mL of Hydrogen Peroxide into a syringe
- Add the hydrogen peroxide into the test tube
- Quickly place a finger of a latex glove over the top of the test tube and seal with tape
- Wait for 5 minutes and record how much the balloon inflates
- Compare results between materials



Materials used:

- Apple
- Onion
- potato





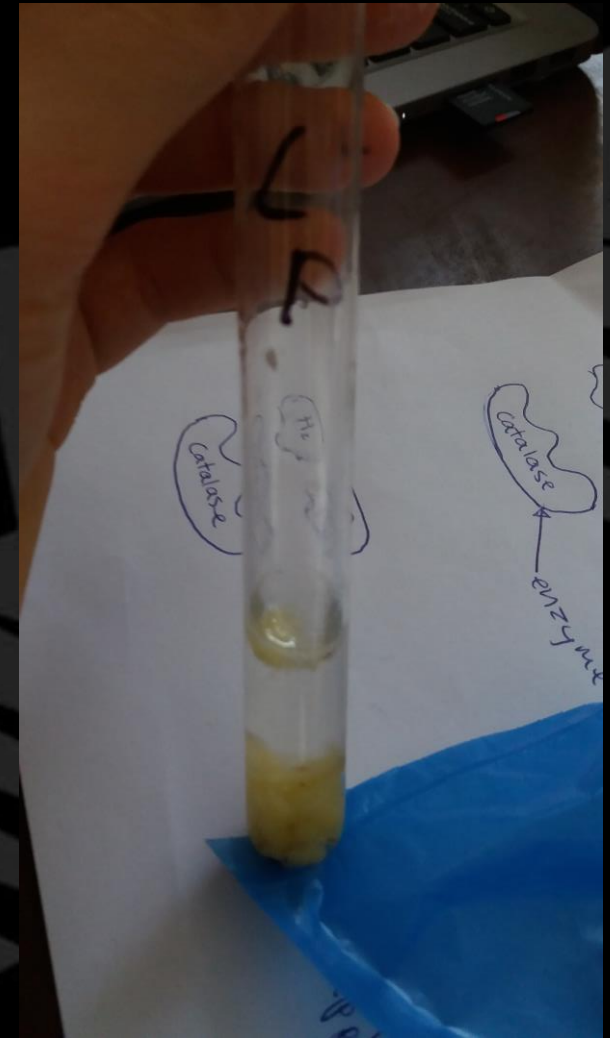
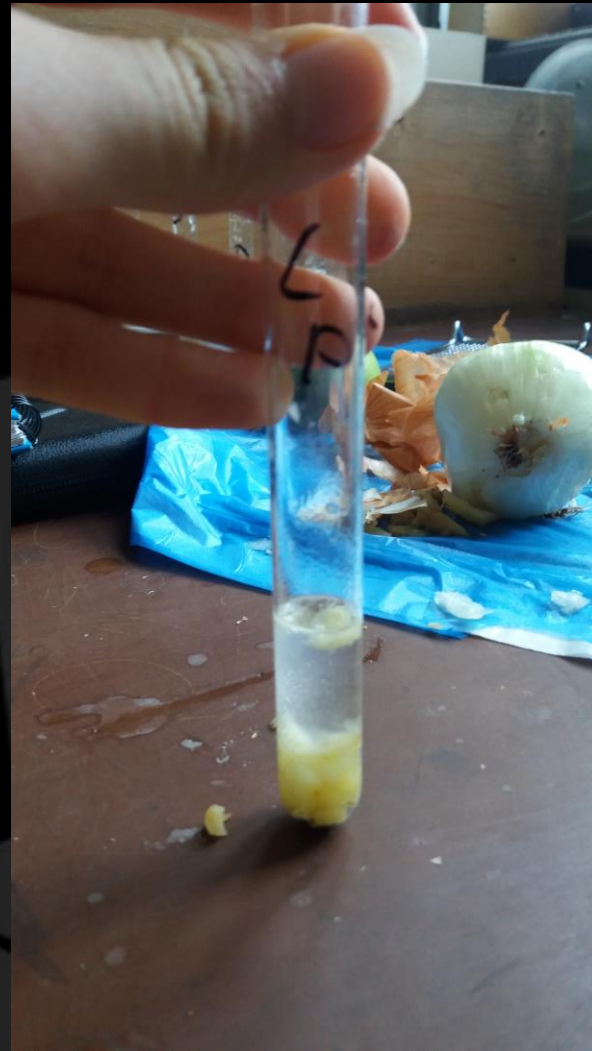
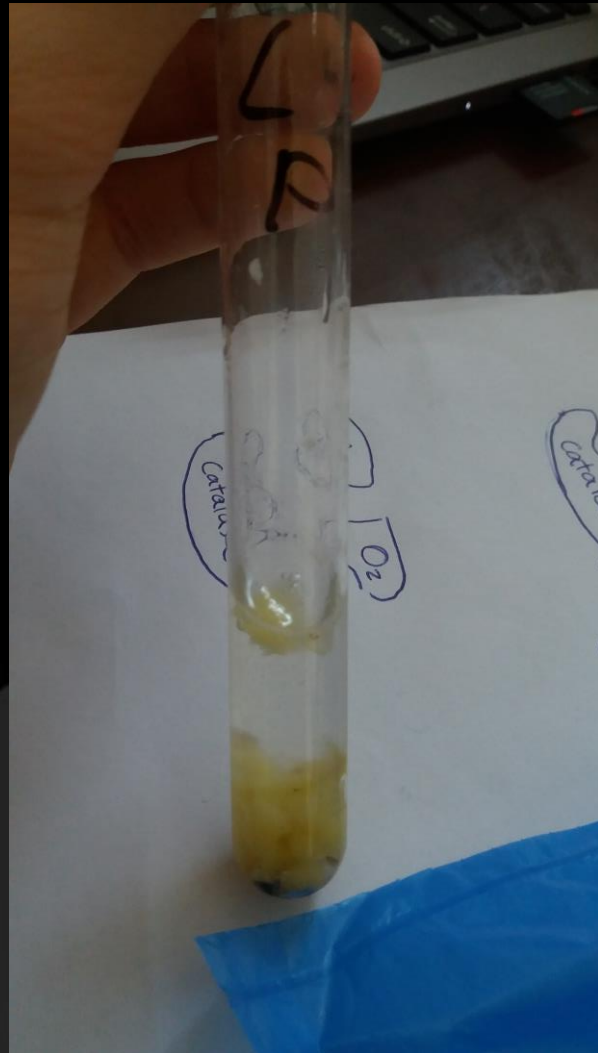
Denature

What causes enzymes to denature?

- High temperature
- High or low pH



High temperature





Conclusion

Material	Oxygen produced?	Catalase positive?
Potato	Yes	Yes
Cooked potato	no	Denatured catalase so no
apples	Verry little	Very little
Onion	no	no