



Lesson: Decomposition Reaction

Name:

Teacher:

Date:

The Science Behind Foamy Fun: How Yeast and Hydrogen Peroxide Work Together – Free Article – STEM Scholars Hub

Have you ever seen foam overflow from a bottle and wondered how it happens? This exciting experiment combines two surprising ingredients: **hydrogen peroxide** and **yeast**. Together, they create a foamy reaction that's not only fun to watch but also teaches us important science concepts.

What is Hydrogen Peroxide?

Hydrogen peroxide (H_2O_2) is a clear liquid similar to water but with an extra oxygen molecule. This extra oxygen gives it the ability to kill germs and participate in chemical reactions. When hydrogen peroxide breaks down, it turns into **water** (H_2O) and releases **oxygen gas** (O_2). This decomposition releases energy, making it an **exothermic reaction**.

Key terms:

- **Hydrogen Peroxide:** A chemical compound made of two hydrogen atoms and two oxygen atoms, often used as a disinfectant.
- **Oxygen Gas (O_2):** A gas essential for life that plants produce and animals use to breathe.
- **Exothermic Reaction:** A chemical reaction that releases energy, usually in the form of heat.

How Does Yeast Help?

Yeast is a tiny living organism used to make bread rise. It contains **enzymes**, which are biological molecules that speed up chemical reactions. The enzyme in yeast responsible for breaking down hydrogen peroxide is called **catalase**.

When yeast is added to hydrogen peroxide, catalase rapidly breaks it down into water and oxygen gas. The oxygen gas forms bubbles, and when **dish soap** is added, it traps the gas, creating a tower of foam—often called **elephant toothpaste** because of its appearance.

Key terms:

- **Yeast:** A living microorganism that can ferment sugars and produce carbon dioxide and enzymes.



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- **Enzyme:** A protein that accelerates chemical reactions without being consumed.
- **Catalase:** An enzyme that breaks down hydrogen peroxide into water and oxygen.
- **Elephant Toothpaste:** A popular nickname for the foamy reaction created in this experiment.

What's Happening in the Reaction?

This reaction demonstrates **energy changes during chemical reactions**. Hydrogen peroxide decomposition releases energy as heat, which you can feel if you touch the bottle. The reaction is therefore **exothermic**. The rapid formation of oxygen bubbles, trapped by soap, produces the dramatic foam that makes this experiment so visually engaging.

Why Is This Important?

Reactions like this are not just for fun—they happen in nature and in your body. Human cells produce hydrogen peroxide, and **catalase** protects cells by breaking it down safely. Without catalase, harmful hydrogen peroxide could accumulate, damaging cells. This experiment provides a hands-on way to understand how enzymes protect living organisms and make chemical reactions safe and efficient.

Fun Fact

The bubbles in the foam are pure oxygen—the same gas that keeps us breathing! This visually spectacular reaction has earned the nickname “**elephant toothpaste**” because the foam looks like toothpaste for a giant elephant.

Conclusion

The combination of yeast and hydrogen peroxide shows how chemistry can transform everyday substances into something extraordinary. From the smallest enzymes in our cells to the foamy spectacle in a bottle, this experiment highlights the role of enzymes, chemical reactions, and energy changes in the world around us.

References

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