

## Elephants Toothpaste

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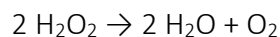
### - 1 - Introduction

Welcome to the exciting "Elephant's Toothpaste" experiment! In this fun and bubbly activity, we'll create a foamy reaction that looks like toothpaste big enough for an elephant! This experiment is a great way to learn about chemical reactions and the role of catalysts.

In this experiment, we will observe a rapid decomposition reaction known as the "Elephant's Toothpaste" experiment. This demonstration vividly showcases the decomposition of hydrogen peroxide ( $\text{H}_2\text{O}_2$ ) into water ( $\text{H}_2\text{O}$ ) and oxygen gas ( $\text{O}_2$ ), catalyzed by potassium iodide (KI) or yeast. The released oxygen gas gets trapped in a soapy solution, creating a large amount of foam that resembles toothpaste large enough for an elephant!

#### Chemical Reaction:

The primary reaction involved is the decomposition of hydrogen peroxide:



When a catalyst such as potassium iodide (KI) or yeast is added, it speeds up the reaction without being consumed in the process. This rapid decomposition releases oxygen gas, which, when combined with liquid soap, forms a large volume of foam. Without catalyst, the reaction would be very slow and would take several days. But the bubbles would not remain several days, so this experiment only works with a catalyst.

#### Catalyst Role:

Potassium Iodide (KI): Acts as a chemical catalyst by providing iodide ions ( $\text{I}^-$ ) that facilitate the breakdown of hydrogen peroxide into water and oxygen gas.

Yeast: Contains the enzyme catalase, which similarly catalyzes the decomposition of hydrogen peroxide with a biological enzyme.

Let's get started and have some fun with science!

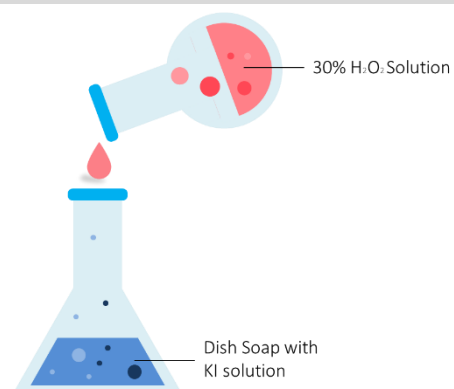
## - 2 - Materials

### Material

100 ml Beaker (Becherglas)	Optional: Food Coloring (Lebensmittelfarbe)
Graduated Cylinder (Standzylinder)	Safety Goggles
Measuring Cylinder (Messzylinder)	Gloves
<b>Chemicals:</b>	
Potassium Iodide (Kalium-Iodid)	7.5 g
A. dest	7.5 ml
Dishwashing Liquid (Geschirrspülmittel)	5 ml
H <sub>2</sub> O <sub>2</sub> (30%)	35 ml

## - 3 - Experiment

- Add 5 ml dish soap in a tall graduated cylinder
- Solve 7.5 g potassium iodide in 7.5 ml of distilled water in the graduated cylinder with the dish soap
- Mix the dish soap thoroughly with the potassium iodide solution
- Add 35 ml hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) in one of the beakers
- Quickly pour the hydrogen peroxide into the tall graduated cylinder with the dish soap



After a very short time, a vigorous foam formation will begin, and a cylindrical column of foam will rise in the graduated cylinder.

For a better effect, you may add food coloring to the potassium iodide Solution.

## - 4 - Additional Information & Safety Instructions

All individuals conducting the experiments outlined in this protocol must thoroughly review and adhere to all safety instructions and guidelines. It is imperative that each person reads the Material Safety Data Sheets (MSDS) for every chemical involved prior to commencing any experiment. Failure to follow proper safety procedures can result in serious injury or harm. The responsibility for ensuring a safe working environment lies with each individual participant. The author and distributor of this protocol assume no liability for accidents, injuries or damages resulting from the misuse of the information provided.

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