Elephant Toothpaste

I'm wondering which method people use for an elephants toothpaste demo with 35% H2O2 (or close to it).  Is there a difference in the reaction if you start with potassium iodide solution + detergent in a flask and then add the H2O2 or if you have the H2O2 + detergent in the flask and then add the KI?

Here is our elephant toothpaste with 30% hydrogen peroxide and 1.0 mol/L potassium iodide. Works very well and mess is contained in the tote trays. I only put 20 ml in the dropping bottles so the pupils don’t have to measure it out:

Material (in a blue tote tray)

30% Hydrogen Peroxide 20mL

1.0 mol/L Potassium Iodide 5mL

Food Colouring

250mL Measuring Cylinder

10mL Measuring Cylinder

Dishwashing Liquid

Instructions:

1 Put on the safety goggles and lab coat

2 Place the blue tote tray on the lab bench

3 Place the 250mL measuring cylinder into the blue tote tray

4 Pour the 20mL of 30% Hydrogen peroxide into the measuring cylinder

5 Add a squirt of dishwashing liquid to the measuring cylinder

6 Sprinkle a few drops of food colouring on the inside wall of the cylinder

7 Measuring 5mL of 1.0 mol/L potassium iodide in the 10mL measuring cylinder

8 Add the 5mL to the 250mL measuring cylinder

9 Stand back. Observe the reaction.

Observations:

Common indicators of chemical reaction – Colour change; Increase or decrease in temperature; Gas or bubble production; Precipitation (liquid react to make a solid); Change in properties such as odour, hardness, density after the reaction begins

Which of these five common indicators of a chemical reaction were noticeable during this experiment? It is safe to touch the measuring cylinder to feel any change in temperature. It is even safe to touch the foam because it is soap and water with oxygen bubbles.

How does it work?

The Reaction creates foam that shoots out of the cylinder and pools in the ice cream container. After a minute or so, it begins to come out in a moving stream that looks like toothpaste being squeezed out of a tube. The cylinder will feel warm to the touch because the reaction is exothermic. Chemical potential energy is transformed to thermal energy and the energy of motion.

Hydrogen peroxide naturally decomposes into oxygen gas and water according to this equation.

H2O2(aq)⭢H2O(ag)+O2(g)

Potassium Iodide acts as a catalyst, which makes the peroxide molecule decompose much more quickly than it would naturally.



Hydrogen Peroxide

**Using yeast**

Does anyone have the worksheet for Elephant Toothpaste using yeast. We have a recipe that uses 6% Hydrogen peroxide but the teacher believes this reaction is too slow. I am wondering how concentrated the hydrogen peroxide and the yeast amounts can I give him to get an effective result?? This will be a demo only!!!

* When we did ours we only used 3% and it was fine. Has the teacher tried it at 6% first?
* Very high concentration of H2O2 will kill yeast
* I prepare 3% or 6% H2O2 for the elephant toothpaste experiments. It works just fine.  We use it with active dry **yeast**.  125 mL H2O2, 5-10 drops food colouring, 1 tsp yeast, 3Tbsp warm water, squirt of detergent
* Does the teacher want the big wow effect? Or is it for a reaction rates practical? If they want the big wow, ditch the yeast and do the Elephant Toothpaste with manganese dioxide + detergent.
* We use 30%, and it always works so well.
* You have to use hydrogen peroxide, but you can change the catalyst
* with yeast we found 3% works best.
* We don’t use yeast.  We use 10mL of 2M **potassium iodide** and 50ml of 20% Hydrogen Peroxide with a few drops of food colouring and a squirt of dishwashing liquid. I give the teachers a large measuring cylinder and a clear plastic tub to do it in so the overflow is contained but the students still get a good view of it. We have had great success with this.
* Below is the method we use. I tried the different percentages of H2O2 and found 10% to be the best. Maybe also check to see if your yeast is active enough.

**Into a 250ml conical flask**

2 tsp Yeast

2tbsp warm water

SWIRL to mix

**Into a 500ml conical flask**

125ml 10% peroxide

4-5 drops of food colouring

A big squirt of detergent

SWIRL and place in glass trough

**TIP the YEAST mixture into the PEROXIDE mixture and observe**

Discussed on technician’s list-serve May 2025