

Is toothpaste basic?

Learning objectives

1. Develop observation skills by comparing the pHs of different toothpastes.
2. Determine which properties are best for neutralising mouth acid and why.

Equipment list

- 3 test tubes
- Distilled water
- 3 brands of toothpaste
- 3 eye droppers / Pasteur pipettes
- 1 spotting tile
- Universal indicator
- 0.1 M ethanoic acid (danger: corrosive and flammable)
- Safety spectacles

Method

3. Take three test tubes and add approximately 1 cm of water to each.
4. Add a pea-sized amount of one of the toothpastes to a test tube and mix. Repeat for the other toothpastes in separate test tubes.
5. Add a drop of one toothpaste solution to a well in the spotting tile and add a drop of universal indicator to the well. Note the colour change in your results table. Repeat for the other toothpaste solutions in empty wells.
6. Add a drop of 0.1 M ethanoic acid to three empty wells and note the colour when a drop of universal indicator is added.
7. Add a drop of the first toothpaste solution to a well with acid. Note any colour change. Repeat for the other two toothpaste solutions.
8. Complete the table with your results and draw your conclusions.

Results

Toothpaste	Solution colour with indicator, approx pH (instruction 3)	Colour change with acid and approx pH (instructions 4 and 5)	Insoluble base, alkali, or neither

Questions

1. What pH is the 0.1 M ethanoic acid?
2. Why are we using ethanoic acid and neutralising it using toothpaste?
3. What other 'food acids' (weak acids) could you use?
4. Why would you want your toothpaste to neutralise mouth acid?
5. Which toothpaste(s) can neutralise mouth acid?
6. Which toothpaste(s) could result in an alkaline mouth cavity?
7. Explain which toothpaste you think would be best for mouth cavity acid neutralisation?
8. How else could you address mouth cavity pH changes?
9. Do you think basic (acid neutralising) toothpastes are better than neutral toothpastes?