

Beyond the barcode

Discovering chemistry through ingredients labels

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The products you use every day, from fizzy drinks to toothpaste and shampoo, are full of chemicals carefully chosen for their properties. By looking closely at ingredients labels, you can uncover the chemistry hidden in plain sight.

Ingredients labels are useful

Every bottle, packet or tube you pick up tells a chemical story. Ingredient lists are not just boring fine print – they are full of compounds that link directly to what you learn in class: bonding, functional groups, acids and bases, redox reactions and more. Once you start looking, you will see chemistry everywhere. For example, many cleaning products contain sodium hydroxide, a powerful alkali that removes grease through saponification, converting fats or oils (long-chain esters) into soap (water-soluble fatty acid salts) and glycerol.

Real-world examples

Here are some everyday ingredients and the chemistry behind them:

- **Buffers and acids** – citric acid (E330) and sodium citrate (E331) in fizzy drinks keep the flavour balanced.
- **Equilibria** – carbonic acid in soft drinks provides the fizz (until the bottle is opened).
- **Hydrogen bonding** – hyaluronic acid in moisturisers traps water, keeping skin hydrated.
- **Ionic bonding** – sodium fluoride in toothpaste strengthens enamel.
- **Organic compounds** – vitamin C (E300) is used in juices as an antioxidant, and lactic acid (E270) is added to yoghurt as a pH regulator.
- **Polymers** – polyethylene glycol (E1521) in creams and gels makes smooth, stable mixtures.
- **Redox chemistry** – hydrogen peroxide in stain removers acts as an oxidising agent, and antioxidants in tea prevent oxidation (Figure 1).
- **Surfactants** – sodium lauryl sulfate in shampoos is a surfactant that traps oil and dirt in the hair, allowing them to be washed away with water.

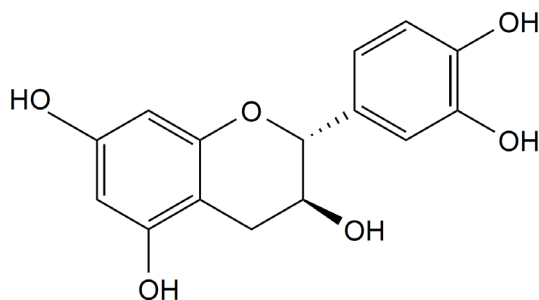


Figure 1 Antioxidants in tea, such as (+)-catechin, work by reacting with free radicals that would otherwise damage biomolecules. By donating a hydrogen atom to the radical, catechin stops the destructive chain reaction

Try it yourself

Pick up a product, such as a chocolate bar, toothpaste or shower gel. Check the label for any acids, bases, salts, preservatives, colourings or surfactants, and consider how they relate to what you have learnt in class. You may be surprised by how much A-level chemistry is hidden in everyday bathroom and kitchen products. For example, shower gels contain surfactants with a hydrophobic tail and a hydrophilic head. These form micelles in water, trapping grease inside so it can be rinsed away.

Why this matters

Looking at ingredients labels connects classroom chemistry to the real world: you will gain confidence with chemical names, spot patterns between structure and function, and understand why chemistry is essential for designing safe, effective products. Instead of just memorising, you will start thinking like a chemist: asking questions, spotting connections and challenging assumptions. Ingredients labels are not just lists; they are your gateway to seeing chemistry everywhere.

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