

Why do fizzy sweets fizz on your tongue?

From the sweeties.net wiki

Tip a little sherbet on your tongue and it starts to fizz straight away. That fizz is a real chemical reaction, and it is the same one that makes a cake rise. What is more surprising is how your tongue feels it.

The reaction

Fizzy sweets contain two powders that stay quiet as long as they are dry: an edible acid and a base. In sherbet, the acid may be tartaric, citric or malic acid, and the base is usually sodium bicarbonate, better known as bicarbonate of soda, or another carbonate.

When they meet moisture, such as saliva or fruit juice, the acid and the bicarbonate react. The reaction makes water, a salt and carbon dioxide gas. That gas is the fizz. It is the same reaction that makes a cake rise when bicarbonate of soda is mixed with an acidic ingredient, and the same gas that puts the bubbles in fizzy drinks: see [what is sherbet made of?](#)

Because the reaction needs water, sherbet keeps its fizz in the packet and only comes alive in your mouth. In 1816, when sherbet was sold as a drink powder, the acid and the bicarbonate were even packed in separate paper bags so they could not react too soon.

How your tongue feels it

For a long time, scientists assumed the feeling of fizz came from bubbles bursting on the tongue. Research published in the journal *Science* in 2009 showed that is not the main story.

The researchers, including Charles Zuker and Nick Ryba, found that carbon dioxide is tasted by the same taste cells that detect sourness. Those cells carry an enzyme called carbonic anhydrase 4, which splits carbon dioxide into bicarbonate and free protons, and the protons, which are what make things acidic, stimulate the sour cells. The work was done in mice, and when the enzyme was removed or blocked, their sense of carbon dioxide was sharply reduced.

Bubbles are not needed for the taste. Fizzy drinks still taste fizzy when they are drunk in a pressure chamber where the bubbles cannot burst. The tingle has another part too: the trigeminal nerve, which responds to irritants such as pepper and mint, also reacts, adding a prickle to the taste.

There is a curious side effect. Mountain climbers who take a medicine for altitude sickness that blocks this kind of enzyme can find that fizzy drinks taste flat, a problem known as the champagne blues.

Sour and fizzy together

Sherbet's acid is sour in its own right, and the carbon dioxide it makes is sensed by the same sour cells, so sourness and fizz go hand in hand: see [why do sour sweets make your mouth pucker?](#)

Fizz without the reaction

Popping candy fizzes in a different way. It contains no acid and bicarbonate reaction at all. Instead, carbon dioxide is forced into the hot candy under high pressure when it is made, and the trapped bubbles burst as the candy dissolves: see [how does popping candy pop?](#)

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