LOVE FOOD

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SCIENCE

06 FIZZY YEAST

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06

What you need:

• 1 teaspoon yeast • 3-4 teaspoons sugar • a balloon • 500ml clear plastic bottle • lukewarm water

What to do:

Add the yeast and sugar to your bottle • Fill the bottle ⅓–½ full with warm water • Shake the mixture thoroughly (be careful not to spill) • Stretch the balloon over the top of the bottle (it may help to stretch it out a few times beforehand) • Keep mixture warm for 30-60 minutes or so

What you may notice:

The yeast, sugar and water mixture becomes frothy and after some time, the balloon starts to inflate. If you leave the mixture for a few hours and then shake it, you should find that it froths up like a fizzy drink but it won't taste like one!

The science behind it all:

Yeast is a microscopic unicellular fungus. *Saccharomyces cerevisiae*, the budding yeast, is the species that you are most likely using in this experiment, as it is widely used in baking and brewing. It is also a popular model organism in the laboratory.

Like any living organism that cannot make its own food, yeast must extract energy from food. In the presence of oxygen, yeast feed on sugar (glucose) to produce water, carbon dioxide and all-important energy. This process is called respiration.

However, when there is a lack of oxygen but still sugar, yeast are able to generate energy by breaking down the sugar into alcohol (ethanol) and carbon dioxide in a process called alcoholic fermentation, a form of anaerobic respiration. This is what's happening in the bottle – there is not much oxygen in the bottle and even less in the water so yeast breaks down the sugar into alcohol and CO_2. The extra gas causes the balloon to inflate.

Beyond the science:

Fermentation is essential in a number of food and drink processes, such as brewing beer and making wine and bread. When making bread, the yeast feed on the sugar in the dough, forming little carbon dioxide bubbles and alcohol, causing the bread to rise. The alcohol evaporates when cooked, leaving little air pockets.