



LOVE FOOD
love
SCIENCE

03 ENZYMES AT WORK

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What you need:

- a slice of white bread
- a mouth to put it in

What to do:

Take half of the slice of bread and chew it, chew it some more, keep on chewing it! Chew it until it becomes disgusting mush – don't swallow or you'll spoil the experiment • Note how the flavour of the bread changes as you're chewing it • Once you think you have the answer, you can spit out the bread (or swallow it, whatever you prefer!)

What you may notice:

As you chew the bread, it tastes sweeter

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The science behind it all:

Bread is mostly made up of starch, a molecule made up of long chains of glucose (sugar). Plants use starch to store energy.

Digestion is the chemical process of breaking down large molecules into smaller ones that can be used by the cells. Before starch can be of use to cells, it must be

digested. Your saliva contains an enzyme called amylase which cuts up starch into smaller pieces.

Starch doesn't taste sweet but the small pieces broken down from it do. These small sugar molecules (glucose and maltose) are responsible for that sweet taste.



Beyond the science:

Enzymes are commonly used for industrial purposes, in anything from laundry detergent to contact lens solutions to food production – they are even used to clean up oil spills! Amylase is one

of the most commonly used industrial enzymes. Scientists use the bacterium *Bacillus licheniformis* to produce amylase on an industrial scale. Alpha (α)-amylase is used in the production of

high-fructose corn syrup, a popular ingredient that can be found in many products, particularly fizzy drinks and fruit drinks. The production of high fructose corn syrup begins with corn (surprise!)

to produce corn starch. α -amylase is then added to break down the corn starch into smaller chains of glucose. It is the first of three enzymes used to produce high-fructose corn syrup.