

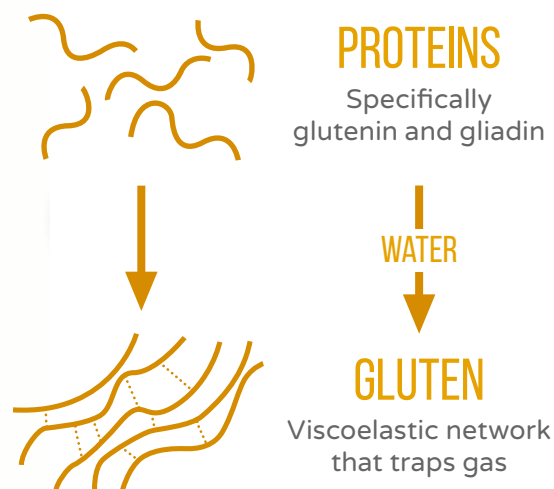
THE CHEMISTRY OF BREAD-MAKING

Baking bread may seem like a very simple process. It's a combination of only four different ingredients: flour, water, yeast, and salt. However, there's a lot of science in how these four ingredients interact, and how varying them varies the bread's characteristics.



1 MIX INGREDIENTS

FLOUR, WATER & SALT



Flour contains high levels of glutenin and gliadin proteins. These classes of proteins are collectively referred to as gluten. When water is added, these proteins form a network held together by hydrogen bonds & disulfide cross-links. Kneading uncoils gluten proteins, strengthening the network and the dough.

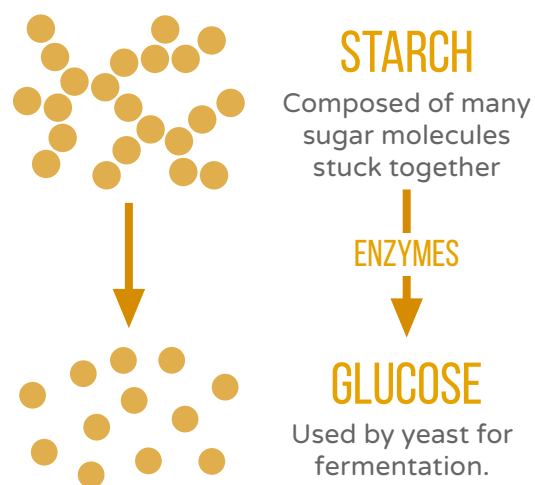


THE ROLE OF SALT

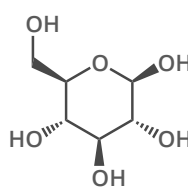
ADDS FLAVOUR TO BREAD
SLOWS DOUGH FERMENTATION
STRENGTHENS GLUTEN STRUCTURE
MAKES DOUGH MORE ELASTIC

2 KNEAD THE DOUGH

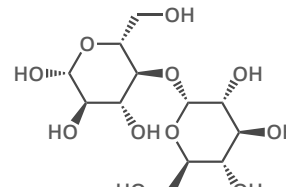
STARCH & SUGAR



Flour contains starch, long chains of connected sugar molecules. Amylase converts starch to maltose; maltase in yeast converts this to glucose. Along with other sugars, this can be used by the yeast for fermentation, and is also involved in the flavour-forming browning reactions that help to form the bread's crust.



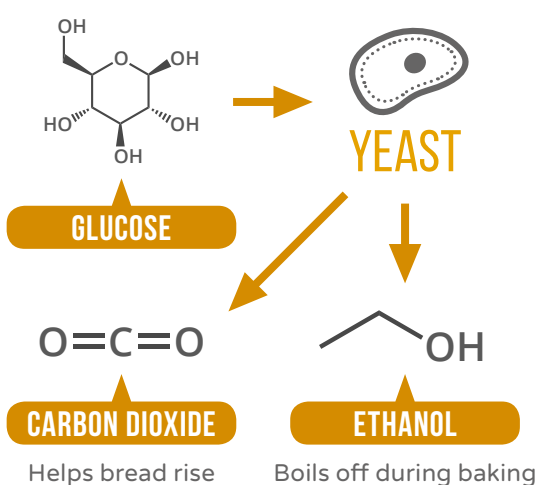
GLUCOSE



MALTOSE

3 LEAVE TO FERMENT

YEAST & FERMENTATION

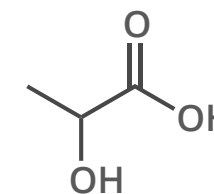


Yeast are single-celled fungi that help convert sugars in the bread mix into carbon dioxide. The bubbles of carbon dioxide formed cause the bread to rise; kneading makes their size more uniform. Sour dough breads contain both bacteria and wild yeasts. The lactic acid produced by bacteria can sometimes give a sour taste.

SOUR DOUGH

100:1
BACTERIA:YEAST

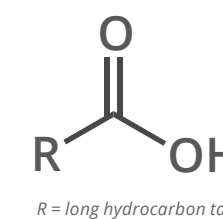
Both feed on sugars; yeasts in sour dough can't break down maltose, bacteria can.



LACTIC ACID

4 BAKE THE BREAD

OTHER INGREDIENTS



FATS

Weaken the gluten network, giving a softer bread. Also stabilise gas bubbles, increasing loaf volume.



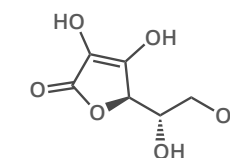
BAKING SODA

Sodium bicarbonate. Combined with moisture and acidity, produces carbon dioxide, which can help bread rise. Can cause bitterness.



BAKING POWDER

Also sodium bicarbonate, but with cream of tartar (potassium bitartrate), an acid ingredient that activates the bicarbonate.



ASCORBIC ACID

More commonly known as vitamin C, it helps to strengthen the dough's gluten network.

A POLYSACCHARIDE THAT IS PRODUCED BY THE BACTERIUM *XANTHOMONAS CAMPESTRIS*

XANTHAN GUM

Used in the production of gluten-free breads.

