

The chemistry of baking bread

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.

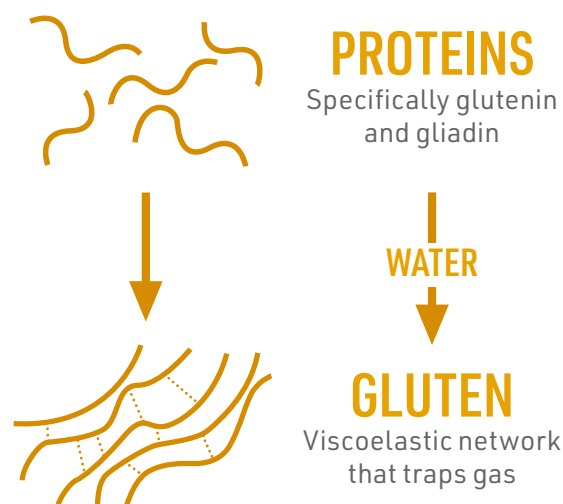


KEY

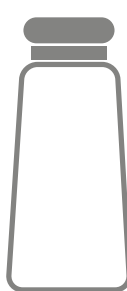
- Carbon
- Oxygen
- Hydrogen

1 Mix ingredients

Flour, water and 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 crosslinks. Kneading uncoils gluten proteins, strengthening the network and the dough.

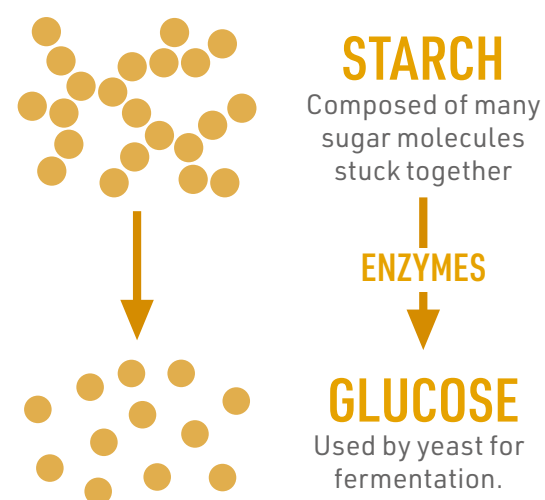


THE ROLE OF SALT

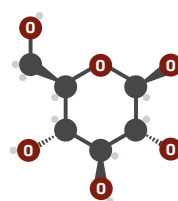
- ADDS FLAVOUR TO BREAD
- SLOWS DOUGH FERMENTATION
- STRENGTHENS GLUTEN STRUCTURE
- MAKES DOUGH MORE ELASTIC

2 Knead the dough

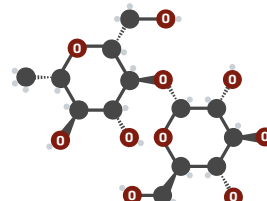
Starch and sugar



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.



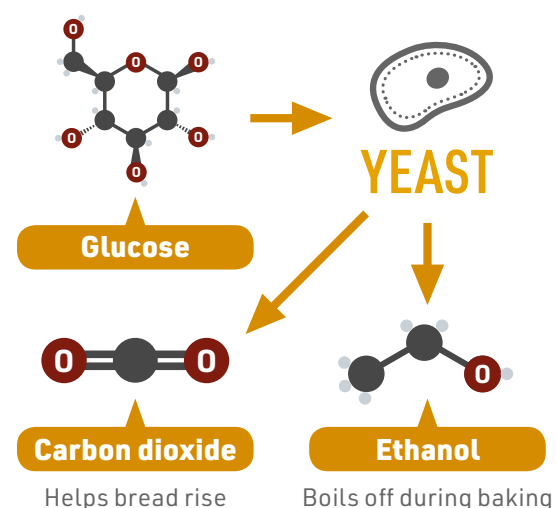
Glucose



Maltose

3 Leave to ferment

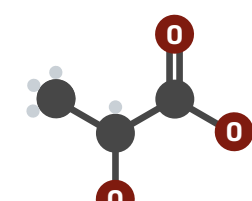
Yeast and fermentation



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 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

