

FACTSHEET No. 7

HOW BREAD IS MADE

- **INGREDIENTS**
- **LEGISLATION**
- **PRODUCTION METHODS**
- **HOW A PLANT BAKERY WORKS**

INGREDIENTS

The principles of baking bread have been established for thousands of years. The basic ingredients are flour, yeast, salt and water.

Flour

Wheat is grown in many parts of the world. However, flour made from `hard` wheats such as those produced in North America is higher in protein/gluten. Hard and soft wheats in milling terms are equivalent to strong and weak flours in baking. For more information on gluten please refer to Factsheet No. 13.

Wheat flour is the key ingredient in most breads. Flour quality is particularly important in breadmaking as the quality of the flour will have a significant impact on the finished product.

When flour is moistened and stirred, beaten or kneaded, gluten develops to give dough `stretch`. The elastic framework of gluten holds the gas produced by the fermentation action of yeast.

In a year of good harvest a bread grist may consist of 80% or more of home grown wheat. This trend is likely to continue with advances in wheat breeding and technology. However, home grown wheat is not always strong enough to be used in all varieties of bread and baked products and there is no likelihood at the moment of this country being able to do without some imported wheat for breadmaking. Currently about 800,000 – 1,000,000 tonnes of wheat is imported for breadmaking, mostly from North America.

Yeast

Yeast requires moisture, food and warmth for growth. When these requirements are satisfied, the yeast grows. Its function in breadmaking is to:

- produce carbon dioxide gas to enable the dough to rise
- expand the dough's cellular network to form bread crumb
- give bread its characteristic flavour and aroma.

Salt

Salt is an essential ingredient in bread. It is used in very small amounts to give bread flavour. It also helps to strengthen the gluten and help fermentation to produce bread of good volume and texture.

Water

Water is used to produce the dough. It is important that the correct quantity of water is used when making bread because it affects the dispersal of the other ingredients.

Other Ingredients:

- **Fat** - Non-hydrogenated vegetable fat is used in very small quantities. This helps to keep the bread soft over life.
- **Flour Treatment Agents** – Ascorbic acid (E300 otherwise known as Vitamin C) is the most commonly used flour treatment agent in breadmaking. It is used to strengthen the dough and has a beneficial effect on the volume, crumb structure and softness of the bread. Some bakers also use L-cysteine Hydrochloride (E920) exclusively from vegetarian sources.
- **Emulsifiers** – All emulsifiers are based on vegetable oils. They are used to provide dough stability in addition to improving loaf volume and crumb structure, and in maintaining softness:
 - E471: Mono- and di-glycerides of fatty acids
 - E472(e): Mono- and di-acetyltartaric acid esters of mono- and di-glycerides of fatty acids
 - E481: Sodium stearoyl-2 lactylate
 - E482: Calcium stearoyl-2-lactylate
 - E322: Lecithin
- **Enzymes** – Enzymes may be added to the bread dough to supplement the enzymes naturally present in the flour and minimize variations caused by environmental factors such as climate and soil quality. Enzymes are destroyed by heat. They are therefore regarded as processing aids and, in accordance with EU legislation, are not required to be labelled in the list of ingredients.
- **Preservatives** – Preservatives, such as acetic acid (vinegar), are often used in commercial baking to ensure the freshness of the product.
- **Soya Flour** – Soya flour is milled from un-cooked soya beans. It works with the oxygen in the air to strengthen the dough, to provide support and structure to the loaf during baking. It also helps provide a creamy, 'breadly' flavour.

Often, some of these ingredients are combined into so-called 'bread improvers'; these are easily dispensable blends of key minor functional ingredients (such as fat, flour treatment agents, emulsifiers, enzymes, soya) required to enhance ("improve") the flour. Each bread improver is designed to match a flour with a process, and is product specific.

LEGISLATION

Bread Weights

Until 2008 all bread sold in the UK could weigh anything up to 300g, or 400g and multiples thereof.

We are now seeing different sizes of loaf offering consumers greater choice and convenience. However many loaves are still sold in 800g (large) or 400g (small) weights.

Breads and rolls weighing less than 300g can currently be sold by number or weight.

UK Bread and Flour Regulations

The Bread and Flour Regulations require that flour should contain not less than 0.24 mg. thiamin (vitamin B₁), 1.60mg nicotinic acid (vitamin B₃) and 1.65mg of iron per 100g of flour. These amounts are found naturally in wholemeal flour. White and brown flours must be fortified to restore their nutritional value to the required level.

In addition calcium carbonate, at a level of not less than 235mg and not more than 390mg per 100g of flour, is added to all flours except wholemeal and certain self-raising varieties.

This ensures the nutritional value of all bread, whether it is white, brown or wholemeal.

PRODUCTION METHODS

Bread dough needs a developed gluten network to support the gas bubbles through proving and the early stages of baking (when the starch gelatinises to form the crumb). Simply blending the ingredients is not enough to start gluten development; the dough needs to be worked to provide the type of network required. All bread making processes rely on four key steps:

1. Mixing
2. Proving/Fermenting
3. Baking
4. Cooling

Most modern commercial breadmaking processes differ mainly in their dough making stages; dividing, moulding, proving, baking and cooling are similar throughout.

There are two main methods of making bread:

- Bulk Fermentation Process (BFP)
- Chorleywood Bread Process (CBP)

BFP – is a traditional method. Ingredients are mixed together to form a dough and left to ferment for up to three hours. During fermentation the dough changes from a short dense mass into an elastic dough. The time taken to reach this state largely depends on the amount of yeast and the dough temperature.

CBP – The modern commercial process used in large bakeries is known as the **Chorleywood Bread Process** and was developed in 1961 by the British Baking Industry Research Association (BBIRA) at Chorleywood. CBP uses mechanical energy in the form of high speed mixing to develop the dough for proving and baking. It is essentially a rapid form of kneading helping to develop the gluten (protein) structure within the dough (this means that the lengthy bulk fermentation of traditional processes is not needed). To achieve this, a flour treatment agent (ascorbic acid) and a little fat or emulsifier need to be added; these are usually combined in a bread improver (see above). Other than mixing and bulk fermentation, all other parts of the bread making process – dough dividing, proving, baking, cooling and slicing are the same as any other way of making bread. The CBP does not develop the acidic flavours associated with BFP and S&D, but can give very fine, soft texture we associate with UK bread.

Other methods of bread making include:

- Activated Dough Development (ADD)
- Straight Dough Method
- Delayed Salt Method
- Sponge and Dough Process (S&D)
- Ferment Dough Process

Activated Dough Development (ADD) – a special improver is added to the other ingredients in order to develop the dough in a shorter time.

Straight Dough Method – this is a variant of the BFP which consists of only one step; combine all the ingredients together at the same time, immediately knead the dough until the gluten is properly formed, let it rise until doubled, shape it, let it double in size again, then bake it.

Delayed Salt Method - this is a slight variation of the straight dough method, where all the ingredients are mixed except salt and fat. As salt has a controlling action on the yeast function, the speed of fermentation of a salt-free dough will be faster and a reduction in the fermentation time is affected. The salt is then added at the knock-back stage.

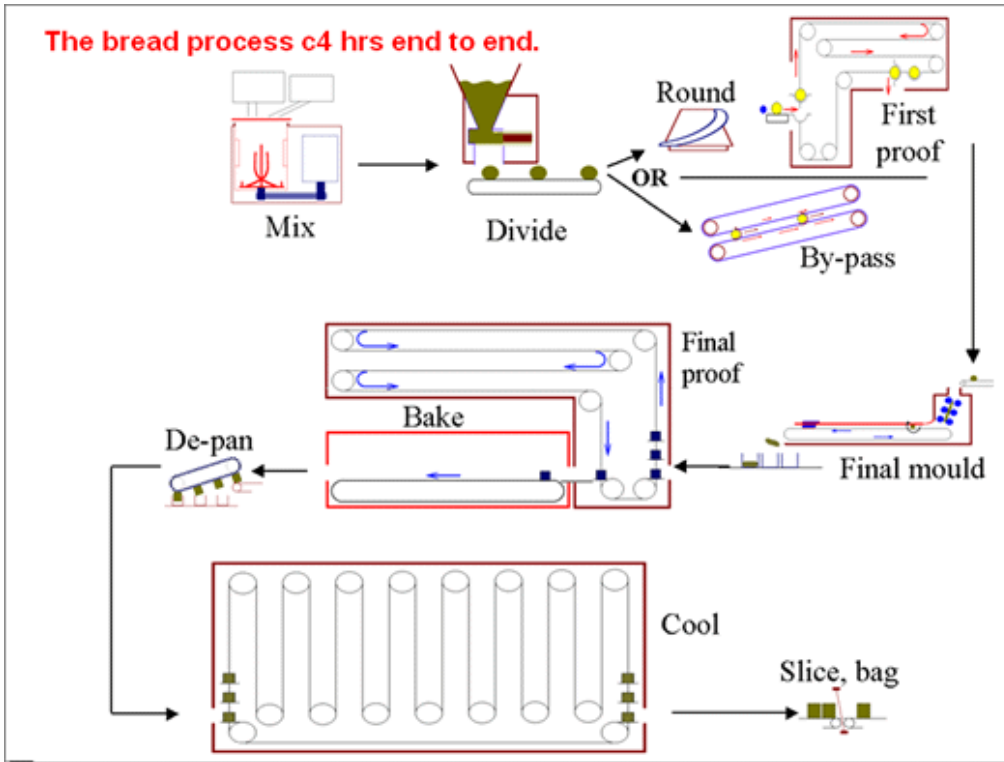
Sponge and Dough Process – this is a two-step bread making process; in the first step a sponge is made and allowed to ferment for a period of time, and in the second step the sponge is added to the rest of the ingredients to produce the final dough.

Ferment Dough Process – this process is a variation of the sponge and dough method and is used mainly for the manufacture of enriched doughs for small baked goods. Rich doughs which contain milk, eggs, substantial amounts of fat and sugar, have a retarding effect on yeast activity and this method allows the yeast to begin actively fermenting before it is mixed into a sugar enriched dough.

HOW A PLANT BAKERY WORKS

The following schematics show the different stages of the baking process in a plant bakery.

The Bread Process:



Day in the Life of a Loaf:

