

> INFORMATION SHEET

BREADMAKING STEPS

Ingredient mixing, which combines all the ingredients into a uniform mass which promotes development of a strong gluten network and air cells.

Dough development (MDD) or Bulk Fermentation (BF).

Dividing, where dough is scaled into correctly sized pieces.

Intermediate proof allows the dough to relax and recover after dividing.

Moulding is when the dough is formed into shape, which often involves flattening and rolling.

Final proof, during which the dough is placed in a warm, humid environment and allowed to rise.

Baking enables the final structure of the dough to be set by heat.

Slicing and wrapping prepare the finished product for sale.

BREAD DOUGH PROPERTIES DEFINED

Extensible means the dough will stretch out if pulled. To achieve good bread the dough must be extensible enough to relax and expand as fermentation proceeds.

Elastic means the dough will return to its original size and shape after being stretched. With elasticity the dough has enough strength to hold gas produced by fermentation but is stable enough to hold its shape and cell structure.

Undermature dough is extensible and tends to flow too much as if slack. The loaf produced has a small volume with a flat top, sharp corners and the texture is coarse as the structure does not hold the gas.

Mature dough becomes more elastic and less extensible. The loaf has a fine even crumb.

Overmature dough occurs when the dough has been left too long. The resulting bread will have a rounded appearance, with an uneven crumb texture. In extreme cases the dough may be unstable and tear when handled.

BREAD MAKING PROCESS

In New Zealand large plant bakeries tend to use one of two main methods: Mechanical Dough Development (MDD) or Bulk Fermentation (BF) method. Craft bakeries or smaller plant bakeries tend to use no-time systems or liquid ferment systems.

The traditional method of making bread was the BF method, where the dough was left to ferment in bowls for several hours before moulding and baking. However the MDD method radically changed bread making as the fermentation stage was able to be eliminated, speeding up the process, saving time and money. Rather than a long fermentation period the dough is subjected to intensive mixing in a small chamber called a developer. The dough still ferments but this is in the intermediate proof stage. Nearly 80% of all bread made in plant bakeries in New Zealand is made by MDD.

MIXING

No matter which method is used, a properly mixed dough is essential for the production of good quality bread. Poor mixing can ultimately affect the end product, with the mixing stage the first place to check if a below standard product is produced.

Dough taken from the mixer must:

- contain the correct ingredients in the right proportions
- be of the right temperature
- have the right consistency.

THE BULK FERMENTATION PROCESS

All the dough ingredients are mixed slowly into an even mix. The dough is left to ferment in bowls for a set period of time, usually 2–3 hours.

After mixing, the dough is a rough, dense mass which is not extensible and does not retain gas, but as the dough ferments it transforms into a smooth, extensible dough with good gas retention. The dough is then divided into loaf-sized quantities, given final rising and baked.

Setting up a recipe for BF bread requires the adjustment of four main variables, which are all ultimately linked:

1. Yeast quantity – The size and type of proofer will set an upper limit on proof time. General practice dictates that a minimum yeast level is used with maximum proof time suitable for the bakery conditions. There will be a practical upper limit to proof time and this will vary with the type of bread and processing conditions.

2. Fermentation Time (Dough time) – Timing is usually set based on the plant capabilities, such as number of bowls available and the size of the dough room. Increasing dough fermentation time increases the dough maturity at the divider.

3. Dough temperature – The longer the fermentation period of the dough the cooler it must be. A dough should be 26.5°C at the divider. Yeast fermentation and oxidising agent action are accelerated by heat so hot dough may be sticky and difficult to handle. Increasing dough temperature increases the activity of yeast and oxidising agents which will affect dough maturity and proof time.

4. Oxidising agent – Also called maturing agents, they are added to bread dough to improve the strength of the gluten structure in the dough to allow it to hold more carbon dioxide produced during fermentation. Oxidising agents ensure that well risen, fine, even textured loaves are produced. Varying the level of the oxidising agent is the best way to adjust the maturity of the dough. Increasing the quantity of the oxidising agent increases the dough maturity. Ascorbic acid is an example of an oxidising agent.

THE MECHANICAL DOUGH DEVELOPMENT METHOD

A short or no time bread making process where the dough is mixed at very high speeds and this energy is used to shear the gluten structure and allow reformation. The amount of time the dough needs to rise is reduced from 2 hours to 10 minutes due to the development during mixing.

Dough development is essential for this method to be successful and the developer must perform two functions:

1. Change the dough ingredients from clay-like to a uniform extensible, elastic mass. Dough extensibility depends on the amount of dough development so the amount of work input. If a dough was accidentally given too much work input then dough temperature would be much higher than it should be, which would lead to an increased proof rate and maturity of dough/bread. In New Zealand the amount of work input required may vary from flour to flour, so a baker must be prepared to adjust work input to suit the flour, while other factors such as improver level must be kept constant. This is a major difference from the BF method, where improver levels are varied to suit flour.

The developer should be capable of fully developing the dough in approximately 5 minutes. To achieve this, small developers (100 kg dough) driven by large motors are commonly used. The amount of work expended on the dough causes a very large temperature rise of 1.3°C per watt-hour per kilogram of dough. Water added to the dry ingredients or the dough may be cooled to maintain a finished dough temperature of 32°C.

2. Disperse small air bubbles evenly throughout the dough. How well the developer performs this function depends on the design of the unit rather than its operation. The same dough can produce a uniform cell structure or a coarse open structure purely due to being mixed using different developers. If under vacuum, adjusting the vacuum may alter textures. The loaf texture and general quality of the end loaf depend on how well these two functions are performed.

THE NO TIME DOUGH METHOD

This is a method that falls somewhere between the MDD and BF methods. The dough can be mixed in a conventional BF mixer but for a much longer time, such as 25 minutes. Ascorbic acid (100 ppm) is regularly used as the improver in this method. The finished dough temperature should be in the range of 30–32°C. Immediately after mixing the dough is divided into loaf-sized pieces, allowed to relax for 10 minutes and then moulded, proved and baked. No time dough is ideally suited for the production of buns and rolls but can also produce a satisfactory loaf of bread.

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