

LESAFFRE T-CONTROL 4.10

Lesaffre's solution for refrigerated dough

Refrigerated dough has been increasingly popular since the development of retarded baking process. Yet they also give rise to specific problems, which Lesaffre has addressed by producing LESAFFRE T-CONTROL 4.10 yeast. This particular yeast has some remarkable characteristics and provides a quality solution by controlling fermentation in positive cold conditions.

TEMPERATURE CONTROLLED
YEAST FOR LEAN
REFRIGERATED DOUGH



→ **T-CONTROL 4.10** yeast helps to ensure optimum control over fermentative activity for lean refrigerated dough and improves management of cold chain disruptions.

Freshness at all times, the success of the refrigeration process

Since they first appeared in the 60s, refrigerated products have proved hugely successful across industrialised countries. In the European food-processing industry, refrigerated goods post the biggest growth. Refrigeration processes have also been applied to the baking industry, as an alternative to the traditional continuous production processes, from mixing to baking, that prevailed until the mid-twentieth century. Various technologies were therefore developed as a result, culminating in the 80s in delayed breadmaking processes controlled by negative cold (deep freezing) and positive cold (refrigerated dough).

Meeting expectations

In just a few years, consumers' expectations have also evolved greatly. They not only desire more freedom (being able to eat any time, any place) and independence (back to the «just like home-

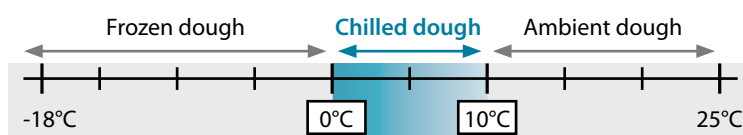
made» ethic), but they are also more eager for freshness and quality (texture and taste). To satisfy those needs, bakers, fast food chains and bake-offs have had to come up with solutions to maintain a constant offering. Industrial bakers, meanwhile, have had to devise fresh and easy-to-bake-off products that can satisfy the demand for optimum dough preservation (from manufacture through to consumption, taking in consideration transport constraints and potential risks of cold chain disruption).

Offering solutions

The main reason of its success is that refrigerated dough has as many advantages for the consumer as it does for the bakery professional. Consumers now have access, whenever they want, to a more extensive choice of fresh products on the shelves. Bakers have shed organisational constraints, and can now optimise their output, simplify transport and logistics, and be more flexible to the demand with quality finished products.

Refrigerated dough, strengths and characteristics

When it comes to baking, every process has its requirements and the refrigerated dough method is no exception. Keeping fermented dough at a temperature of 0 to 10°C means making the kind of adjustments that cannot always be made with conventional yeast.



An efficient solution...

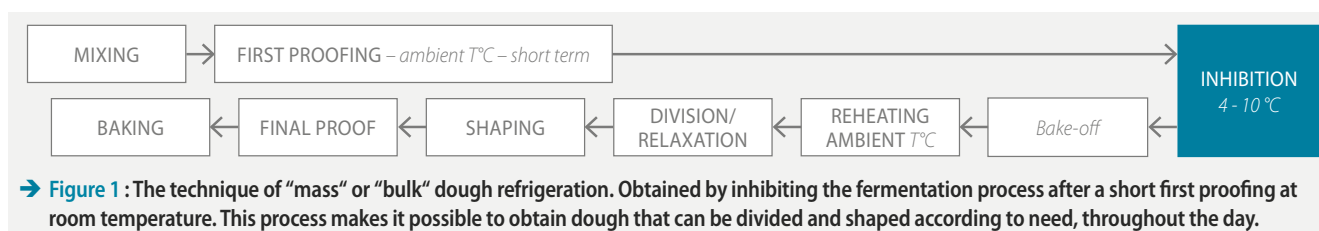
The refrigerated dough technique consists in mixing the dough, then delaying the fermentation process by storing in positive cold temperatures for a few hours or up to several weeks. This technique gives rise to two very different practices (see figs 1 and 2).

... but a demanding technique

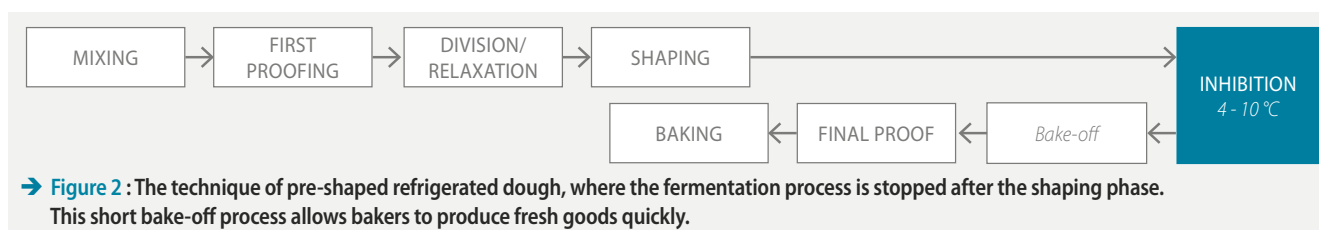
Baker's yeast, a living product, is sensitive to its environment. As a result, its fermentative activity depends on numerous factors (yeast dosage, pH, dough hydration, quantity and type of sugar, temperature, etc...), which often interact with one another. In the refrigerated dough technique, temperature is a constraint and trickier to handle when using a conventional yeast. Within the 0 to 10°C bracket, there is an insufficient slowdown of fermentative

activity in a conventional yeast. Under such conditions, the longer the inhibition, the higher the consumption of sugars available for fermentation. Similarly, the higher the temperature, the faster the sugars are consumed.

Result: for applications requiring a resumption in fermentation following inhibition under positive cold conditions (first proofing and/or final proofing) and storage times exceeding 72h, conventional yeast stops producing carbon dioxide, due to the lack of available sugars. Finally, excessive fermentation impacts upon the dough's texture: when it becomes sticky or crumbly, it is difficult, if not impossible, to shape and bake off.



→ **Figure 1 :** The technique of “mass” or “bulk” dough refrigeration. Obtained by inhibiting the fermentation process after a short first proofing at room temperature. This process makes it possible to obtain dough that can be divided and shaped according to need, throughout the day.



→ **Figure 2 :** The technique of pre-shaped refrigerated dough, where the fermentation process is stopped after the shaping phase. This short bake-off process allows bakers to produce fresh goods quickly.

LESAFFRE T-CONTROL 4.10 yeast, adapted by nature

In order to optimise the performance of the refrigerated dough technique, a solution capable of dealing precisely with the constraints of cold temperature control was required. As a fermentation expert, Lesaffre has brought all its skills together to bear in developing T-CONTROL 4.10. This particular yeast strain features a far slower activity in positive cold temperatures. It gives identical performances to those obtained when using a conventional yeast and baking off at an ambient temperature.



→ **Didier COLAVIZZA**, manager of the Lesaffre Biotech Center

« Lesaffre T-CONTROL 4.10 is a baker's yeast of the species *Saccharomyces cerevisiae*. It is the result of a long research and selection process carried out by the R&D teams at Lesaffre. It is characterised by a metabolic pathway attributable to the CSF1 gene, whose action regulates its growth and fermentation capacity at low temperatures. In a controlled temperature environment of 10°C, T-CONTROL 4.10 has a significantly slower fermentative activity of around 54%. After a temperature increase under classic baking conditions (25-30°C), fermentative activity resumes in the same way as with conventional yeast. »

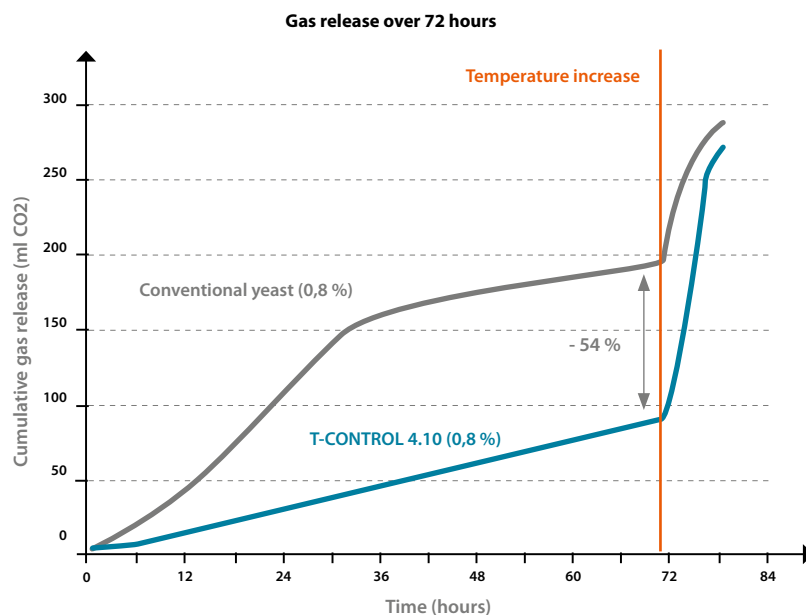
A special yeast

In order to measure the capacities of this cold-controlled yeast, the R&D and Baking Center™ teams analysed its behaviour in application conditions. The test enabled them to compare the gas release of a conventional yeast to that of T-CONTROL 4.10 (see graph 1).

At the end of the test, T-CONTROL 4.10 emerged as an optimum solution for specific applications requiring a fermentation phase following inhibition in positive cold conditions (at a temperature of between 0 and 10°C).

The need for remarkable qualities

A major asset of T-CONTROL 4.10 lies in the ability to obtain stable bakery goods. Unlike traditional yeast, whose fermentative activity resumes after 4°C, T-CONTROL 4.10 is used to drastically reduce the fermentation power between 0 and 10°C. Beyond this threshold, this yeast boasts the same performance as a traditional yeast, with the same advantages and organoleptic properties as a breadmaking ferment: soft texture, volume and the development of typical aromatic notes.



→ Graph 1 : The behaviour of T-CONTROL 4.10 was assessed in a risograph test.*

*This assessment tool is used to measure the release of CO2 in baker's dough, prepared under standardised conditions and having a composition similar to the end application. The gas release was assessed in normal unsweetened dough at a temperature of 10°C over 72 hours, increased to 30°C and measured over 3 hours.

Extended applications, targeted solutions

Maintaining dough quality (during storage at low temperatures and until the dough is baked off) is essential for many bakery professionals, including **bake-offs, bakery chains and industrial bakers**. Regardless of needs or practices, the use of T-CONTROL 4.10 yeast helps to control fermentation in positive cold conditions by improving the performance of the refrigerated dough technique.

→ **Photo 1 :** Lean dough shaped after 5 days of controlled fermentation at 8°C. The dough produced with conventional yeast has over-fermented. The fermentative activity of the dough produced with T-CONTROL 4.10 has remained inhibited.



Before baking

→ **Photo 2 :** Lean dough after 5 days of controlled fermentation after baking. The dough produced with conventional yeast has collapsed. The fermentative activity of the dough produced with T-CONTROL 4.10 has resumed after controlled fermentation and presents an optimum volume.



After baking

For bake-offs and bakery chains

These bakery professionals use fermentation control in positive cold conditions for yeast-based dough. Designed for various applications (baguettes, tin loaves, pizzas, etc.), these types of dough are kept on short processes for around 3 to 5 days, between 0 and 10°C.

T-CONTROL 4.10 is used to control fermentative activity resulting in a longer storage time and the sustained advantages of a refrigerated dough (see photos 1 and 2).



→ Sara AUTTON, technical manager of the Fermex Baking Center™ facility (UK)

« This practical solution helps simplify logistics and supply problems facing retail outlets by providing dough that can be put into 2nd fermentation after cold temperature inhibition. It also helps address the problem of unsold goods at the end of the day, which can account for up to 30% of wasted products. In order to cope with demand for fresh goods throughout the day, some bake-offs actually buy some of their products from bakeries in the form of loose refrigerated dough or pre-shaped dough balls. »

For Industrial bakers

Manufacturers of refrigerated home-made type dough aim to satisfy consumers in search of fresh, easy-to-bake-off products. As a result, fermentation is controlled in positive cold conditions over cycles of around 3 weeks and therefore offers users longer use-by dates.

In the field of fermented dough (used in the manufacture of Viennese pastries, tortillas and ready-to-use pizza dough), manufacturers can choose between chemical raising agents (baking powder) and living fermentative agents to encourage their dough to rise. Baking powder has certain disadvantages on an organoleptic, nutritional and regulatory level: producing unpleasant aromatic notes, causing the dough to turn brown, the appearance of darker patches during baking, or a «cardboard-like» texture and compacted mouth-feel, or an added salty flavour, requiring the addition of a specific label relating to food additives. However, the use of conventional yeast, employed in some pizza dough, also has its limitations (see photo 3) : inadequate inhibition of fermentative activity in positive cold storage conditions, resumption of fermentation and swelling inside the pack, resulting from the break in the cold chain upon purchase etc.. For the consumer, these phenomena result in the form of a sticky, fragile dough, or one that can crumble on rolling out.

The fermentative activity of yeast causes the dough to swell. The consumer may have problems when unrolling the refrigerated dough. In some cases, it becomes sticky and can tear. Manufacturers can sometimes try to resolve problems relating to fermentation control by under-dosing the amount of water added to the dough. Yeast activity is, in effect, strongly linked to the issue of hydration. However, under-hydration can result in the brittle dough phenomenon experienced during rolling out.

These are all good reasons to choose T-CONTROL 4.10 for all the qualities it offers (see photo 4) and its origins: T-CONTROL 4.10, an authentic yeast, simplifies the labelling of finished products (for the consumer, it means no “E” numbers).

→ Alexandre DEPOID, head of yeast products



«T-CONTROL 4.10 yeast is used to monitor fermentative activity during cold chain management and offers added flexibility in the production process. In the case of the refrigerated dough sold in supermarkets, it guarantees the quality of the finished product, from the manufacturing phase through to baking in the consumer’s home.»

LESAFFRE T-CONTROL 4.10 yeast corrects problems generally observed after several weeks of storage in ready-to-roll-out pizza dough.



→ Photo 3
With T-CONTROL 4.10, the dough does not ferment*.



→ Photo 4
With T-CONTROL 4.10, the dough remains smooth and easy to roll out*. It stretches easily without sticking or tearing.

* Tests carried out on pizza dough stored at 8°C for 15 days.

→ FACT REMINDERS

The use of T-CONTROL 4.10 yeast for refrigerated dough helps obtain stable products, while offering the benefits of yeast-based fermentation:

- Secures dough preservation by minimising the risks of excessive fermentation
- Increases the flexibility of the production process and improves cold chain management
- Has the advantage to replace frozen products with fresh products
- Helps to obtain products of good organoleptic quality: soft texture, volume and development of aromatic notes typical of the leavening process
- Simplifies the labelling of finished products: T-CONTROL 4.10 is not an additive unlike baking powder.

ABOUT LESAFFRE

Lesaffre sets the global standard for yeast and other fermentation products. The company designs, manufactures and markets solutions that promote baking, nutrition, health and the protection of living organisms. In close collaboration with its clients and partners, Lesaffre innovates with confidence, in order to feed and protect the planet more effectively.

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