

# BAKING UPDATE

## Baking with Probiotics

Practical technology from Lallemand Baking supplying bakers yeast to bakers all around the globe.

### WHAT'S THE LINK BETWEEN PROBIOTICS AND GUT HEALTH?

Based on scientific evidence, probiotics are live microorganisms that provide benefits when consumed in sufficient amounts. Probiotics are often used to counteract antibiotic side-effects (diarrhea, constipation, cramping, ulcers, and bloating) due to the good bacteria being killed along with the bad bacteria. They also promote gut health by encouraging the proliferation of beneficial bacteria in the gastrointestinal tract (GIT) and play an integral role in the immune function by preventing the attachment and activity of pathogenic bacteria in the intestinal walls.

The human body contains trillions of microorganisms with the majority being harmless, or beneficial to the optimal functioning of the body. The human GIT is one of the areas of the human body where there is the greatest concentration and variety of living microorganisms. The number and diversity of these microorganisms are what ensure a healthy gut, which helps digestion and metabolism and prevents gastrointestinal problems. The gut microflora also contributes to the body's immune function as well as to the maintenance of cognitive health through the gut-brain axis.

A person's gut bacteria population is affected by his genetics and diet. However, various stresses such as disease, the use of antibiotics or environmental factors can alter the gut's beneficial bacterial population. It is possible however to restore the good bacteria population through diet and consumption of fermented probiotic-rich foods or probiotic supplements. ●

### ADDING PROBIOTICS TO FOODS

According to a *Markets and Markets* report published in January 2019, the probiotics market is growing at an estimated rate of 7% per year and is projected to reach a value of 69.3 billion US by 2023, with the main contributing segment being food and beverage. A *Mordor Intelligence* market study predicts the probiotic market will increase annually by 7.5% reaching a value of 76.85 billion by 2024. This steady increase in the popularity seems linked to an increased awareness among consumers of the importance of diet in health. The mounting evidence on the safety and benefits of probiotics have also increased consumer's faith in their efficacy.

Because most probiotics are sensitive to heat and oxygen, they have traditionally been marketed as supplements or in chilled products, and more specifically in fermented dairy products such as yogurt or kefir. Given the increased demand for a variety of probiotic-fortified foods, especially foods with lower cholesterol and lactose content, new heat-resistant strains are being developed, widening the range of applications for probiotics in foodstuffs.

The trend has already reached the baking industry with the launch of several products with added probiotics. Some bakeries and companies are manufacturing probiotic enriched products such as bread, cookies, pancake mix, muffins and bars, to only name a few. ●

### SYMBIOTIC BENEFITS

In order to optimize their activity in the GIT, probiotics work in collaboration with prebiotics, in what is called a symbiotic relationship. Prebiotics, which are indigestible food components, act as a food source for probiotics, contributing to their growth and proliferation in the GIT. Prebiotics can be found in a variety of ingredients, including wheat, meaning that there are naturally occurring prebiotics in baked products made with wheat flour. Thus, producing baked products with added probiotics would naturally create a symbiotic effect between the added probiotics and the prebiotics already found in the dough.

The addition of probiotics to baked products therefore provides health benefits on different fronts and through various mechanisms. In order to determine if your product will be eligible for certain health claims, check with your country's regulatory body. ●

### BAKING WITH PROBIOTICS

Most probiotics being heat-sensitive, they are often added to baked goods after the baking process, in order to ensure their viability. This is done in two ways:

- Sprayed-on probiotic formulas which can be added to the product at the last step before packaging.
- Integrated into an icing or frosting or filling added at the end of the baking process.

Although these methods are all good ways to add probiotics, there is undoubtedly an advantage in adding the probiotic directly into the product during dough preparation. This would not only eliminated the need for an added step at the end of the process, it would also ensure a more uniform distribution of the microorganisms. In addition, with this method, probiotics can also be added to a greater variety of baked goods, whether sweet or savory.

In order for a probiotic to be successfully integrated into the baking process, certain characteristics and conditions must be met. The strain of microorganism used must be safe, remain stable throughout the production process as well as throughout the product's shelf-life, and not interfere with the inherent qualities of the product. (*Cont'd*)

## LALLEMAND'S *BACILLUS SUBTILIS* PROBIOTIC BACTERIAL STRAIN CAN BE ADDED TO BAKED GOODS BECAUSE IT HAS THESE SPECIFIC CHARACTERISTICS

### 1. Consumer safety

A probiotic must first be considered safe before it can be added to any food product. Probiotics are microorganisms considered "food additives" when added to functional foods. The FDA relies on the opinions of qualified experts and grants generally recognized as safe (GRAS) status to ingredients based on a history of safe use or based on scientific procedures. Certain non-toxicogenic and non-pathogenic strains of *B. subtilis* have a long history of safe use in various food products without harmful effects on the consumer. Lallemand's bacterial strain has therefore been granted a Self-Approved GRAS status and can safely be added to any baked product.

### 2. Survival throughout production process

The greatest challenge to adding probiotics to baked goods is the fact that most of them cannot survive the production process. For a successful incorporation to baked goods, the chosen probiotic must be able to survive the conditions at each step of the process, including preparation and high temperature baking.

Active dried bacteria are said to be in a vegetative state; when provided with adequate nutritional and environmental conditions, they should be able to grow and multiply. While certain microorganisms are unable to withstand drastic changes in their environment, others are able to remain viable in harsh conditions through the formation of spores. Spores are dormant forms of the microorganism and, due to their thick protein coating, are able to withstand high temperatures, low pH levels and high compression. Under favorable conditions, the spores will germinate and regain their active functions. These perfect conditions are found in the human intestinal tract, which makes them the ideal host for the germination of the spores. Lallemand's *B. subtilis* is a bacterial strain able to form spores and can therefore be added in a freeze-dried form to many baked goods. It will survive the baking process and return to its active state in the human digestive tract, more specifically in the stomach, and is therefore able to exert its beneficial effects throughout the GIT.

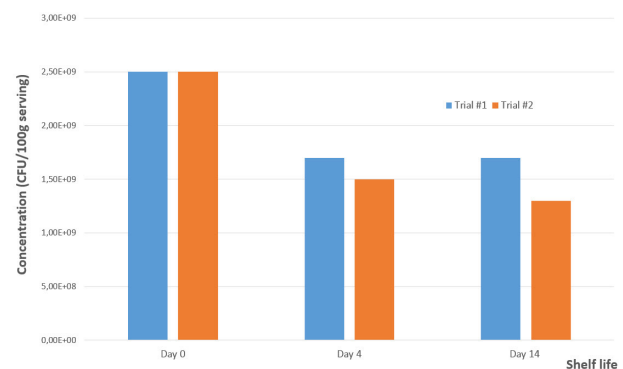
### 3. Shelf-life Stability

According to various studies, probiotics exert their beneficial effects when taken in minimum amounts of  $1 \times 10^9$  colony forming units (CFU). Therefore, in order for probiotic containing-foods to have a considered added benefit, they should contain a minimum amount of  $1 \times 10^9$  CFU per portion consumed. These products also need to maintain this minimum concentration throughout their shelf-life. Lallemand's *B. subtilis* has been proven to be viable in adequate concentrations over the shelf-life of a healthy bread formulation containing a mixture of flours, xanthan gum, water, yeast and salt (Figure 1). In this application, even with high temperature baking, the probiotic dose remained above  $1 \times 10^9$  CFU per 100g serving. The shelf-life stability of this probiotic strain was also demonstrated in other baked goods applications. Bakers should consider working closely with the probiotic manufacturers in order to determine the amount that must be added in the baking process to ensure appropriate amounts at consumption time.

### 4. Organoleptics

Although added health benefits may increase a product's value, it should not hinder its appearance, taste, smell, texture or other characteristics. Tests done with the Lallemand *B. subtilis* have shown that it does not affect the organoleptic characteristics when added to bread. Quality is therefore maintained with the addition of our probiotic. ●

Figure 1: Shelf-life stability of Lallemand probiotic *B. subtilis* Rosell-179 in a healthy bread formulation



## LALLEMAND FOOD PROBIOTIC IN BAKING

**A**s a pioneer in the probiotic industry and a specialist in bacteria production since 1934, Lallemand has nine (9) bacteria production facilities around the world. We have the expertise to supply various active freeze-dried bacteria for use in baking, each one grown differently and with unique characteristics, guaranteeing its performance in specific applications.

Lallemand's *B. subtilis* Rosell-179 meets all the requirements for a successful incorporation into your formulation. It is safe and maintains its benefits throughout the baking process and the product's shelf-life (application and process dependent). We can help you produce baked goods that will meet your quality standards and keep you ahead in the baking industry, **Raising Baking Standards.** ●

## LALLEMAND BAKING UPDATE

Lallemand Baking Update is produced by Lallemand to provide bakers with a source of practical information and technology for solving problems. If you would like to be on our mailing list to receive future copies, or if you have questions or comments, please contact us at:

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