

## Lallemand: A global leader in probiotics

Lallemand is a global leader in the development, production and marketing of yeast, bacteria and specialty ingredients in over 12 application sectors.

Lallemand uses microbiology, probiotics and knowledge of microbiota to enhance the health & nutrition of humans, animals and plants. Our associates and research laboratories listen to customers, health professionals and research institutes to understand market needs and offer unique solutions.

Today, Lallemand is present worldwide through plants, distribution centers and commercial offices:

- Global leader in microbial fermentation on 4 continents;
- Over 10 research labs;
- Founded in Montreal by Fred. A. Lallemand at the end of the 19<sup>th</sup> century;
- 85 years of probiotic science from various research centers, including Institut Rosell, Montreal, Canada, a pioneering institution in probiotics research and application.



## Lallemand Food Probiotics – a pinch of healthy™

Since 2004, Lallemand has made accessible its flagship clinically proven probiotics to food & beverages solutions answering to current and future market trends.

**Our goal is to be part of the future of food with probiotics, continuously researching their potential benefits in their connectivity to health.**

Lallemand Food Probiotics is dedicated to bringing to its customers the highest quality. From lab to shelf, Lallemand controls the overall manufacturing process of its products. Our probiotic strains are produced in-house in one of our many production facilities with accreditations & licenses including Health Canada (NNHPD), cGMP / Pharma GMP, USP Quality Systems GMP.

## Quality Flagship Strains

Probiotics are defined as « live microorganisms which when administered in adequate amounts confer a health benefit on the host », WHO, 2007. In other words, their activity and efficacy depend on their viability in the gastrointestinal tract of the host.

### Probiotics need to:

- Contain live micro-organism;
- Resist storage conditions;
- Remain alive in the gut;
- Be properly identified;
- Be safe for the consumer;
- Have proven efficacy.

Our portfolio consists of scientifically documented probiotic strains derived primarily from the Lallemand Institut Rosell® collection:

- *B. subtilis* Rosell-179;
- *L. rhamnosus* Rosell-11 ME;
- *L. helveticus* Rosell-52 ME;
- Other – customer and project specific.



## Probiotics Need Protection

From the manufacturer's plant to the consumer's gut, probiotics have to deal with many stresses and production conditions (temperature, pressure), storage conditions and the digestive tract (gastric acidity and bile).

To ensure optimal probiotics survival and efficacy, we apply our Process-Protect™ technology.

### To enhance the strains intrinsic resistance, industrial manufacturing conditions are adapted to each strain:

To reinforce the survival of *Lactocaseibacillus*, *Lactobacilli* and *Bifidobacteria* in drastic processing conditions (gastric acidity, heat shock and compression), we apply our patented probiotic microencapsulation technology. This technology is applied as a second level of protection to our *L. rhamnosus* Rosell-11 ME and *L. helveticus* Rosell-52 ME, among others.

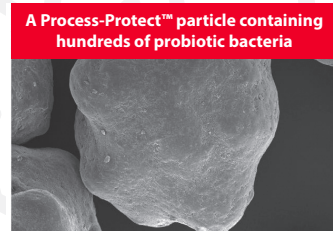
**OPTIMAL SURVIVAL = OPTIMAL EFFICACY!**



## Process-Protect™ Advantage

- ▶ Increased resistance to gastric acidity
- ▶ Increased resistance to compression
- ▶ Increased resistance to heat shock

Particule size: median around 350 µm.

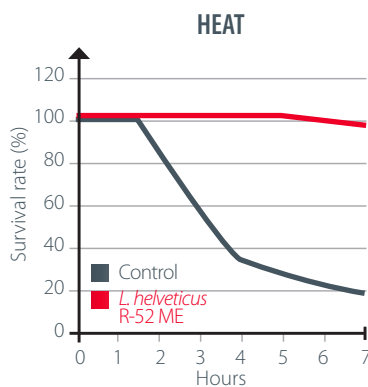


Process-Protect™ outside

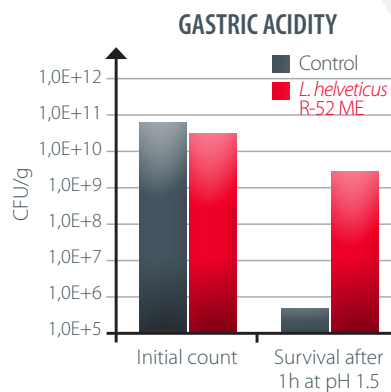
Electron microscopic image of Process-Protect™ particle

## Protection During Industrial and Digestive Processes

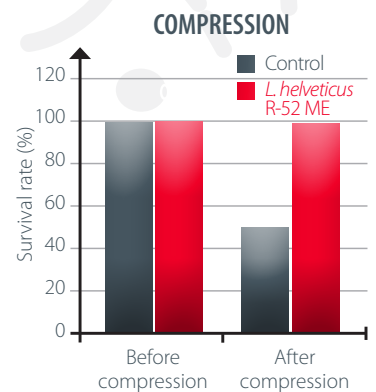
Process-Protect™ technology protects probiotic strains from physical and chemical stresses such as gastric acidity, compression and thermal shock.



▶ **Process-Protect™** allows probiotics to better resist heat shock : close to 100% survival after up to 7 hours at 50°C



▶ **Process-Protect™** increases the resistance of probiotic strains to stomach acidity by more than 1.000 times



▶ **Process-Protect™** increases by 50% the resistance of probiotics to compression (1 tonne)

## Advantages of Spore-Forming Probiotics: Why it Matters

Spore-forming probiotics are naturally capable of surviving:

- Extreme temperatures
- Extreme pH
- High pressure
- Digestive conditions
- Long-term storage
- Cleaning procedures: treat as an allergen

Our flagship probiotics for food can be added to many foodstuffs and withstand a range of industrial processes including those in:



Baked goods  
Breads  
Cookies  
Bars  
Dry mixes



Confectionery  
Chocolate



Beverage  
Kombucha  
Soda  
Juice



Snacks  
Granola  
Other

- ▶ Main examples of applications.
- ▶ Ask us for your specific application and we will be happy to discuss and support you in your project.

Lallemand offers a range of value added ingredients for your consideration in your food applications including: baker's yeast and specialty flavor, aroma yeasts and mixes, functional inactive yeasts with minerals and vitamins, savory yeast extracts and inactive yeasts. Ask us for more information

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