

Controlling cheese quality through microbial ecosystem management summary

Technical conference – from consistency to differentiation

This technical conference guided cheese professionals through the science of microbial control as a lever for both production stability and product differentiation. Each topic was illustrated with concrete production scenarios and practical approaches.

For any questions or to discuss your specific situation:

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01 – Cheese as a living ecosystem: Understanding variability

Cheese is not a fixed recipe, it is a dynamic microbial ecosystem that evolves from the vat to the shelf. The conference opened by mapping the successive microbial phases: acidification, draining, salting, and ripening, each governed by pH, temperature, and microbial balance. A key takeaway was that the same recipe can produce very different results depending on culture selection and process control. Understanding this cascade is the first step to mastering it.

02 – Acidification: The primary control lever

Poorly controlled acidification doesn't just affect texture at the early stage; it conditions the different phases such as ripening. Two concrete production defects were examined in detail: post-acidification (chalky core, runny under-rind) and early blowing (swollen or cracked curd). Root causes, diagnostic criteria, and culture-based corrective strategies were discussed.

03 – Microbial competition: Protecting your production

Contaminants are inherent to dairy environments present in milk, water, equipment, air, and even among staff. The conference explored the conditions that enable their development, including factors such as pH, moisture, and temperature, and how these are managed through a combination of rigorous hygiene practices, controlled processing conditions, and the targeted use of protective and bioprotective cultures.

A case study on *Listeria monocytogenes* highlighted why environmental control alone is not sufficient, demonstrating how microbial barriers can strengthen overall protection.

04 – Ripening flora: A lever for differentiation

Surface and ripening cultures are key tools to steer the final profile of a cheese through three main dimensions: aroma, rind texture, and surface colour. Non-starter lactic acid bacteria (NSLAB) such as *Lactobacillus* spp. drive flavour complexity and proteolysis, while *Propionibacteria* contribute to typical aromatic profiles and, in some technologies, to eye formation. *Geotrichum candidum* plays a central role by initiating rind deacidification, enabling the development of secondary flora, and shaping a uniform, supple rind with specific aromatic notes. Finally, red smear bacteria (coryneforms, *Staphylococcus* spp., *Brevibacterium*) define pigmentation, rind typicity, and aromatic intensity. Practical approaches were discussed to reproduce these microbial profiles consistently and adapt them to specific production constraints.

05 – Oxygen management: an underestimated factor

Most surface moulds are strictly aerobic: without oxygen, they cannot develop, even if spores contaminate the product. Oxygen absorbers actively remove residual oxygen from the headspace, dissolved in the product and entering through packaging permeability, down to near anoxia (<0.01%). This inhibits spoilage flora such as moulds or aerobic bacteria, prevents lipid oxidation and aroma drift, and stabilises the product over time without altering its intrinsic composition. Beyond microbial control, this approach enables shelf-life extension without chemical preservatives and can reduce or replace technologies such as modified atmosphere packaging (MAP), freezing, or certain additives, while preserving organoleptic and nutritional quality. It also brings operational benefits such as reduced losses, improved production flexibility, and extended distribution range without modifying the process.

Each topic can be explored further in relation to your specific technology, products, and constraints. Don't hesitate to reach out.

FERMENTATION, INNOVATION, AND DIVERSITY



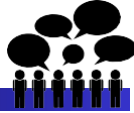
1 Our commitment

Based in Caen, Laboratoires Standa are dedicated to the selection, production, and marketing of cultures, from bacteria to moulds, aimed at optimising the qualities of food products.

In response to the growing consumer demand for minimally processed, natural, and clean-label foods, while ensuring optimal preservation, Laboratoires Standa have specialised in the selection of food microorganisms with specific metabolic activities. These microorganisms offer organoleptic, dietary, nutritional, and bio-protection benefits.

The applications of these solutions are diverse: from dairy to meat products, to fish and plant products (seeds, roots, leaves, fruits, flours, juices, algae etc.).

2 Our expertise



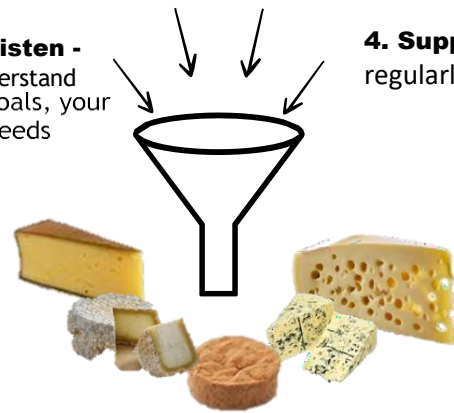
- Select microorganisms capable of fermenting many food products without adding sugar.
- Develop natural antimicrobial activities in fermented products (antifungal, anti-pseudomonas).
- Produce specific aroma molecules.
- Select pigmented microorganisms capable of colouring numerous raw materials of animal and/or plant origin.
- Analyse complex microbial ecosystems through metagenetic analysis.
- Perform reverse engineering of food products.
- Assist clients in choosing fermentation processes for finished products.
- Set up and carry out research and development projects.
- Solve technological/process/analytical problems related to microbiology.

2. Analyse - Integrate your expertise, your constraints

3. Propose an exclusive and adapted solution

1. Listen - Understand your goals, your needs

4. Support regularly and



3 Our Diversity



The search for specific characteristics in the final food product has led Laboratories Standa to customise ferment offerings by selecting a multitude of natural strains to achieve the greatest diversity of metabolic profiles.

- **Mesophilic, thermophilic, or mixed** acidification ferments, in direct inoculation or starter cultures.
- **Ripening flora** for cheeses.
 - *Propionibacterium* (>80 strains).
 - NSLAB and *Lactobacilli* (>100 strains).
- **Surface ripening flora** (rind).
 - *Geotrichum candidum* (>200 strains).
 - Coryneform bacteria (>100 strains): *Brevi-/Brachy-/Micro-/Coryne-bacterium*.
 - *Staphylococcus*.
- **Bioprotection** cultures (antifungal, anti-pseudomonas, combat against butyric bacteria).
- **Cultures for sparkling** beverages (ecosystems of yeasts and bacteria).
- **Probiotics** (*Propionibacterium*).

4 Advantages

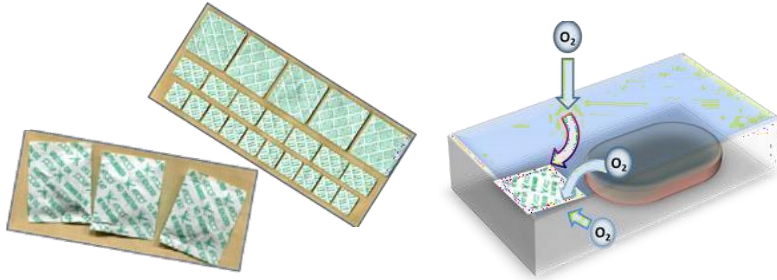


- **Mastery** of strain combinations for the creation of specific/personalised *consortia*.
- **Packaging adapted** to the specific needs of each client.
- **Custom production** of your own strains for maximum personalisation.
- **Nutritional and organoleptic qualities** worked on for high-quality products.
- **Quality and reproducibility** ensured for optimal client satisfaction.
- **Specificity and authenticity** maintained to stand out in the market.
- **Potential revenue gain** through upgrading and loss reduction.
- **Numerous VEG ferments** ranging from acidification to maturation, free of animal-derived ingredients.

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LABORATOIRES STANDA offers you the suitable solution with its range of ATCO oxygen absorbers.

The concept:



The ATCO oxygen absorber eliminates oxygen:

- ***Around** the packaged product.
- ***Dissolved** or **included** in the product.
- ***Entering through packaging permeability.**

This, until achieving **anoxia**, with a **residual oxygen level of < 0,01%**.

Advantages:

- Fast:** Action in a few hours.
- Durable** until the package is opened.
- Economical:** A simple sealer is enough.
- Compatible** with gas technology under MAP.
- Versatile:** Solid and liquid (with overpackaging).
- Environmentally friendly:** (EN 13432).
- Compliant** with food and pharmaceutical regulations.
- Organic and clean label.**

The preservation of your products for significant benefits



PRODUCT

- **Preservation** of organoleptic and nutritional qualities.
- **Extension** of the shelf life.
- **Reduction** or **elimination** of food additives.
- **Safety** (preventing oxidation and stopping the development of aerobic organisms).
- Universal solution for all types of packaging.



YOU

- **Safety** (compliance with current regulations).
- **Distinction, innovation** (clean label, organic).
- **Financial gains** (lower investments, possible postponement, avoiding freezing, maritime transport).
- **Social responsibility** (made in Normandy).
- **Environmental responsibility** (mineral, natural, non-biocidal, anti-waste, reduced packaging, less CO2).



CUSTOMER

- **Safety** (antioxidant action, antifungal action, and fight against spoilage flora).
- **Health** (fewer additives, preservatives, less intolerance).
- **Quality** (optimised over time).
- **Freshness.**
- Clean Label, organic, terroir.

APPLICATIONS:

Pharmaceutical industry: Preservation of parenteral bags for patients and infants, liquid pharmaceutical active ingredients, medical devices, and more.

Agriculture: Seeds, grains, flours, oilseeds, legumes, and more.

Food industry: Intermediate and finished products, specifically chocolates, pastries, meat, prepared dishes/catering, bread, seafood and shellfish, herbs and spices, fats, oils, baby powders, milk powder, pet food, and more.

Chemical industry: Paint, electronics, rubber, and more.