



LALLEMAND ANIMAL NUTRITION

FEED UPDATE

JANUARY 2026

**FROM FIELD TO FORK: SMALL INNOVATIONS TO
HELP IMPROVE FARMING SUSTAINABILITY**

Plus : Boosting salmon's first-line defenses • Non-invasive eggshell analysis in hens • Postbiotics supporting pet gut health • Microbial solutions for barn hygiene • Post-weaning toolbox for piglet success





CONTENTS

03 **EDITORIAL**
From field to fork: Small innovations to help improve farming sustainability

05 **SCIENCE IN FOCUS**
Salmon under stress: Strengthening the first line of defense

09 **SCIENCE IN FOCUS**
Non-Invasive eggshell assessment and lactic acid bacteria effects in hen performance

11 **EXPERT CORNER**
Postbiotic bacteria at work: Supporting the hidden world within

15 **EXPERT CORNER**
Rethinking bedding: Preserving barn hygiene with microbial solutions

17 **FIELD NOTES & SUCCESS STORIES**
Managing post-weaning challenge: A comprehensive toolbox for piglet success

Lallemand Animal Nutrition In the Wild

- 📍 International Production & Processing Expo (IPPE) (Atlanta, GA, USA) – Jan. 27-29, 2026
- 📍 Journées de la Recherche Porcine (JRP) (Saint-Malo, France) – Feb. 3-4, 2026
- 📍 National Cattlemen’s Beef Association Cattle Con (NCBA) (Nashville, TN, USA) - Feb. 3-5, 2026
- 📍 Vietshrimp (Ho Chi Minh City, Vietnam) – March 11-13, 2026
- 📍 Pet Food Forum (Kansas City, MI, USA) – April 27-29, 2026
- 📍 Interzoo (Nuremberg, Germany) – May 12-15, 2026



QUICK PULSE



Unlocking ruminant gut health: New educational program from Lallemand Animal Nutrition

Lallemand Animal Nutrition has recently relaunched ruminantdigestivesystem.com as an interactive educational website focused on ruminant digestive welfare. The site serves as the cornerstone of the company's broader educational efforts within Lallemand Animal Nutrition Services, offering nutritionists, farmers, advisers and veterinarians practical, science-based resources on the ruminant digestive tract and its impact on cattle welfare and productivity.

FROM FIELD TO FORK: SMALL INNOVATIONS TO HELP IMPROVE FARMING SUSTAINABILITY

As global agriculture transforms, the question of sustainability is no longer aspirational—it has become essential for operations. As climate variability intensifies and resource constraints tighten, the agricultural sector must fundamentally rethink how it produces food while maintaining environmental balance and economic viability.

The science behind future-ready agriculture

For some, the term ‘sustainability’ may evoke concerns about additional costs and regulatory challenges. Adopting practices that enhance operational sustainability can positively impact both profitability and long-term viability. As input costs fluctuate, particularly for protein sources, farms face mounting pressure to increase efficiency while reducing environmental footprints. The challenge lies in producing more with less: less waste, fewer inputs and reduced emissions.

Forage production is a prime example. When farms optimize silage quality, they create a chain of positive outcomes: reduced dependency on purchased supplements, improved animal welfare, and decreased transportation-related emissions. However, achieving premium forage quality requires precision at every stage of the silage-making process and storage. Key areas include: harvest timing, chop length, packing density, sealing and correct inoculant application.

Using silage inoculants is one of the most effective ways to reduce dry matter losses during storage. They help control fermentation, limiting spoilage and preserving more of the original nutrients. Studies have shown that inoculants can reduce dry matter losses by approximately 13%.¹ To put this into perspective, in a 1,000-ton bunker, that improvement

KEY TAKEAWAYS

- **Sustainability requires systems integration**—optimizing forage preservation, feed efficiency and nutrient cycling delivers compounding benefits.
- **Microbial solutions can reduce dry matter losses by 13% and improve efficiency by up to 7%**, while better manure management cuts ammonia and fertilizer costs.

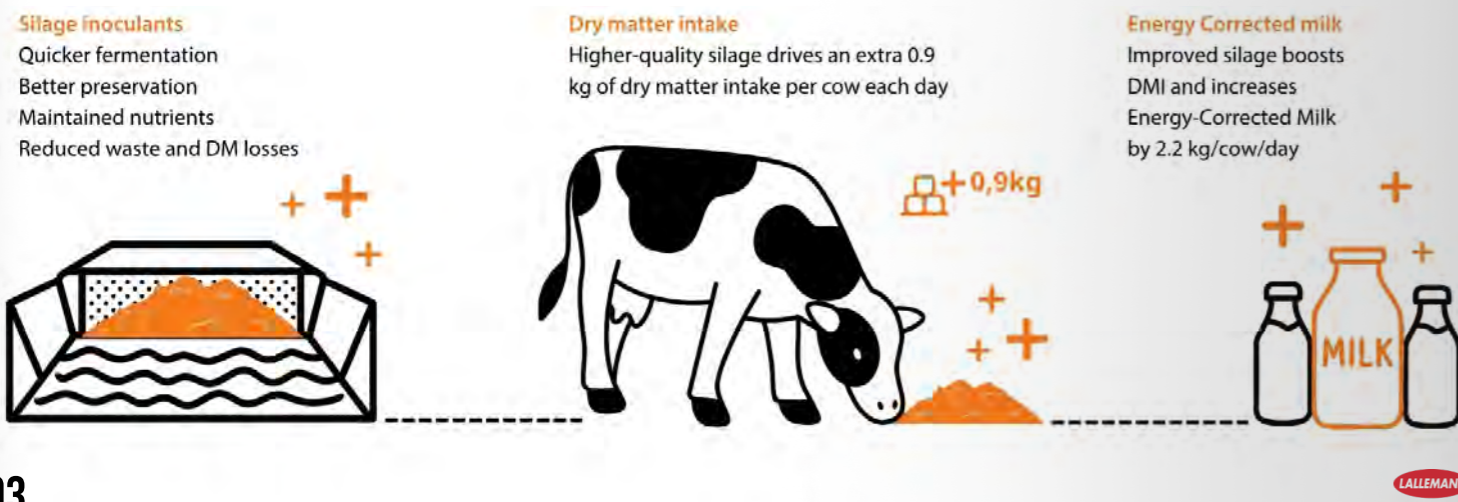
significantly more silage retained—enough to support an additional 138,000 litres of milk.

Nutrition efficiency: A key lever for lower emissions

Beyond forage preservation, the animal nutrition sector is increasingly leveraging microbial science to enhance feed conversion efficiency. Rumen-specific live yeast supplements, for example, have demonstrated the ability to improve feed efficiency by up to 7% through optimization of rumen fermentation patterns.

This enhancement in feed utilization means animals extract more energy from each kilogram of feed consumed, potentially increasing milk production by up to 6%. Meta-analyses of multiple trials have documented return-on-investment ratios ranging from 6:1 to 11:1, making these interventions economically compelling while simultaneously reducing the feed required per unit of product.²

Figure 1. Quality silage, boosts intakes and milk yield



Closing the nutrient loop

Maximizing nutrient cycling on the farm is another key factor in improving on-farm sustainability. Organic fertilizers such as manure provide valuable sources of nitrogen, phosphorus and potassium, reducing reliance on synthetic inputs when managed efficiently.

Improving the microbial ecology of manure and bedding can accelerate nutrient stabilization, retain nitrogen and limit ammonia emissions. Advances in microbial biotechnology—using specific beneficial bacteria and enzymes—can enhance manure quality. Encouraging beneficial microbes helps suppress unwanted ammonia-producing species, improving air quality, reducing odor and preserving the agronomic value of manure as a fertilizer—a triple benefit for farm economics and environmental stewardship.

Integrated systems for a resilient future

Improving sustainability cannot be achieved through a single intervention, but through integrated, system-wide thinking. Combining better forage management, efficient nutrition and nutrient recycling creates a compounding effect: higher productivity, reduced emissions and greater resilience to both climatic and market pressures.

The transition to more sustainable agricultural practices is not merely about adopting new products or practices - it requires a fundamental shift in how we conceptualize farm systems. By viewing the farm as an interconnected ecosystem where waste from one process becomes a resource for another, producers can build resilience while reducing environmental impact.

Research continues to demonstrate that sustainability and profitability are not opposing forces but complementary objectives.^{3,4} Across livestock sectors, evidence increasingly shows that practices supporting long-term productivity align naturally with environmental stewardship. The farms that thrive in coming decades will be those that successfully integrate ecological principles with economic realities, using science as their guide.

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SALMON UNDER STRESS: STRENGTHENING THE FIRST LINE OF DEFENSE

In salmon aquaculture, health starts at the surface. Gill, skin and gut form a dynamic mucosal barrier—an interface constantly challenged by the surrounding environment. When these barriers fail, the costs mount quickly. Shifts in water quality, handling stress and exposure to potential pathogens all put pressure on these delicate tissues, often leading to wounds and inflammation, poor performance and increased risk of disease outbreaks.

As the industry advances in developing strategies to safeguard animal health, functional nutrition has become a key driver of resilience. Among the solutions most commonly applied and under continuous scientific development are **yeast cell wall (YCW)-based ingredients** that are documented to help fish maintain stronger mucosal barriers and remain in good health.

Two independent research trials by Lallemand Animal Nutrition recently explored how a novel YCW product influenced salmon facing two very different challenges: Amoebic Gill Disease (AGD) and tenacibaculosis.

Tackling Amoebic Gill Disease (AGD)

Amoebic Gill Disease, caused by *Neoparamoeba perurans*, is one of the most persistent threats to salmon health worldwide. The parasite colonizes gill tissue, causing lesions that impair oxygen uptake and compromise overall fish performance. Current interventions—freshwater or hydrogen peroxide bathing—are operationally intensive, biologically stressful and present practical challenges for producers.

KEY TAKEAWAYS

- **Mucosal surfaces act as salmon's frontline defense** against environmental and pathogenic challenges, making them vital for overall resilience.
- **Yeast cell wall ingredients reinforce natural barriers**, reducing disease severity in aquaculture.

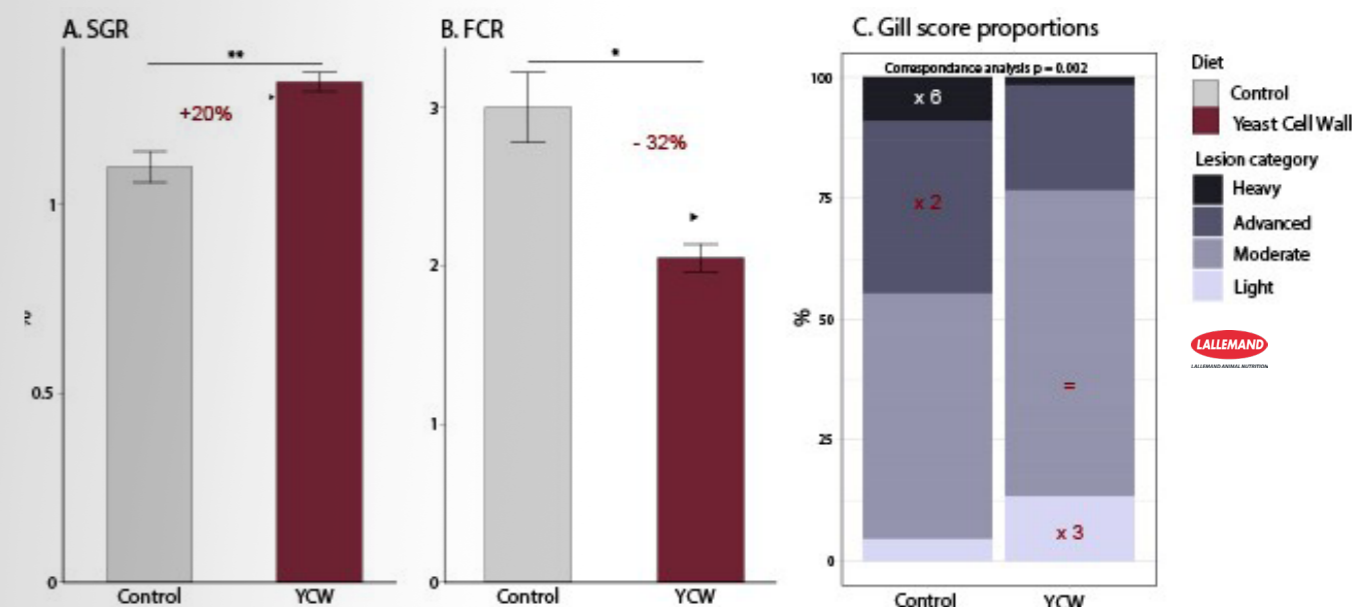
To test whether nutritional intervention could mitigate AGD severity, researchers in Scotland conducted a 10-week trial with post-smolt Atlantic salmon (200-250g) at 13°C and 33 ppt salinity. Fish received either control or YCW-supplemented diets in quadruplicate tanks. After five weeks baseline under optimal conditions, salmon were exposed to standardized *N. perurans* challenge, followed by freshwater treatment, then a second pathogen challenge—a protocol designed to mirror real-world production cycles and stress.

The study employed gill scoring adapted from Gjerde et al. (2019), evaluating each gill side for a more complete representation of lesion development and disease severity.¹

The results were encouraging. Salmon receiving the functional diet grew faster and converted feed more efficiently—showing a **20% improvement in specific growth rate (Figure 1A)** and a 32% better feed conversion ratio (**Figure 1B**). Even more striking was the difference in gill health: the YCW-fed group showed **far fewer advanced lesions**, with up to six times more fish retaining only mild signs of infection (**Figure 1C**).

The findings suggest that nutritional support targeting mucosal function could help improve resilience of fish vis-à-vis external stressor and reduce the severity of AGD. This helps fish maintain normal performance even under challenge.

Figure 1. A) Specific growth rate (SGR), B) Feed conversion ratio (FCR) and C) Proportion of gill score lesion's category at the end of the trial



Tenacibaculosis challenge in Canada

A second study in Canada focused on *Tenacibaculum maritimum*, a filamentous bacterium known to cause severe skin and fin lesions in marine species. This condition, tenacibaculosis, represents a significant health challenge in aquaculture and requires proactive strategies to reduce its impact on fish welfare and production.

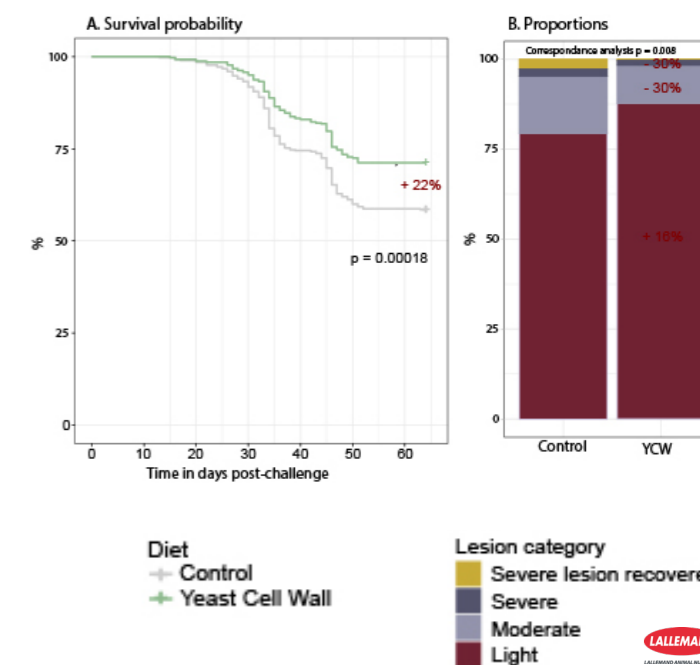
A parallel 15-week trial in Canada examined whether similar mucosal health benefits could be observed against bacterial pathogens. Juvenile Atlantic salmon (initial body weight 40g) at 12°C received control or YCW-supplemented diets in quadruplicate, fed to visual appetite over the trial's duration. Fish were reared in ideal conditions for five weeks then subjected to a standardized *T. maritimum* challenge by immersion.

The trial continued for nine weeks post-challenge, during which survival and the development of gross pathological lesions on external mucosal surfaces were monitored at frequent intervals.

Here again, diet made a difference. Fish fed the YCW-supplemented diet had a **71% survival rate**, compared to 58% in controls (**Figure 2A**). The prevalence of moderate to

severe skin lesions dropped by **around 30%**, suggesting the ingredient helped fish maintain stronger mucosal integrity and resist secondary damage (**Figure 2B**).

Figure 2. A) Survival probability and B) Skin score lesions at the end of the second trial (15 weeks)



Building resilience from within

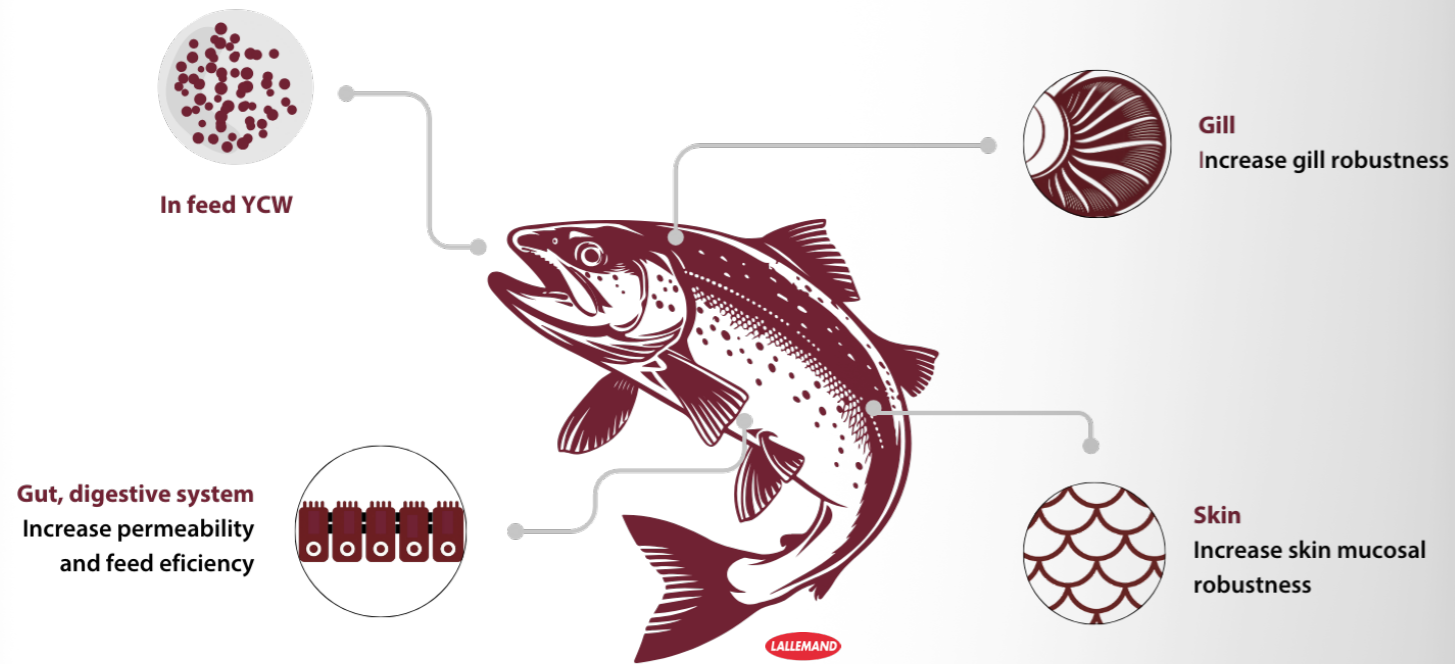
Together, these studies highlight the potential of yeast-based functional nutrition to support animal health by maintaining mucosal integrity in seawater salmon.

Mucosal health sits at the crossroads of nutrition, immunity and welfare. Supporting these natural barriers through targeted dietary strategies could not only reduce disease losses but also minimize dependence on chemical interventions and associated side effects. While more work is needed to unravel the precise biological mechanisms—how YCW compounds interact with the gut and skin immune system and overall barrier function—the findings are clear: feeding the mucosa is a definite contributor to fish health and welfare (Figure 3).

These trials document the benefits of a novel yeast-based functional ingredient at mitigating the severity and associated mortalities, of distinct mucosal diseases in seawater Atlantic salmon. This was associated with stronger skin and gill barriers under optimal conditions (data not shown), and notably, improvements in growth and feed efficiency were also observed.

These promising results indicate that this functional ingredient can enhance fish resilience against mucosal diseases in the Atlantic salmon industry.

Figure 3. Salmons' first line of defense: How nutrition strengthens mucosal health



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NON-INVASIVE EGGSHELL ASSESSMENT AND LACTIC ACID BACTERIA EFFECTS IN HEN PERFORMANCE

As global demand for eggs continues to rise, producers are extending laying cycles up to 100 weeks to meet both productivity and animal welfare goals. However, longer cycles bring new challenges and particularly in maintaining eggshell quality. Aging hens tend to produce larger eggs, but calcium deposition remains constant. This results in thinner, more fragile shells and a higher rate of downgraded eggs, leading to economic losses.

Measuring eggshell quality the simple way

To address this, a non-invasive device was developed to assess eggshell quality in commercial settings using a method based on specific gravity, measuring the egg's density compared to water. Since eggshell density primarily determines overall egg **specific gravity**, this parameter correlates strongly with shell thickness and mechanical strength. Eggs with specific gravity values above 1.08 are considered high quality, while lower values suggest weaker shells. This method allows producers to classify eggs and monitor changes over time.

Because this test doesn't damage the eggs, it can be used regularly throughout the laying cycle to track changes in shell quality over time. Microscopic studies confirm that higher specific gravity values correspond to thicker, more uniform shell structures—clear evidence that specific gravity is a good indicator of overall eggshell strength.

How probiotics can help

A 2025 meta-analysis¹ examined 990 brown eggs collected over several trials to evaluate the effects of *Pediococcus acidilactici* CNCM I-4622 supplementation at the commercial dose (10¹² CFU per ton of feed) on eggshell parameters. This study compared hens fed a standard diet with those given the probiotic. The results were striking:

- Eggshell specific gravity improved significantly, with only 9.9% of eggs falling below the quality threshold, compared to over 30% in the control group.

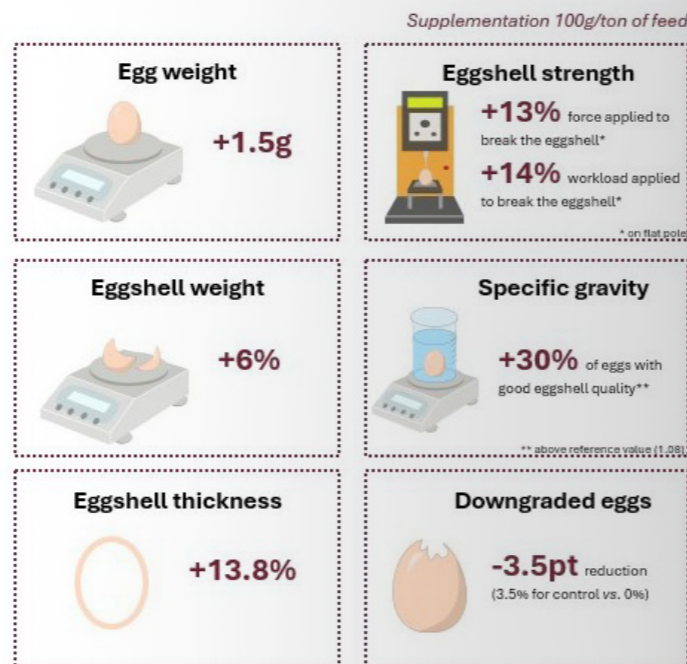
KEY TAKEAWAYS

- Egg specific gravity provides a **quick, non-invasive assessment** of shell strength and thickness.
- *Pediococcus acidilactici* CNCM I-4622 supplementation **improves eggshell quality** and supports **calcium metabolism** in laying hens.

- Eggshell thickness increased by 15% indicating stronger structural integrity.
- Downgraded eggs dropped to zero in the supplemented group, versus 3.5% in the control.
- Egg weight increased by 1.5g without compromising shell quality.

These findings demonstrate that *Pediococcus acidilactici* CNCM I-4622 not only improves shell quality but also enhances overall egg mass—supporting both productivity and product quality (Figure 1).

Figure 1. Benefits of *Pediococcus acidilactici* CNCM I-4622 for egg quality



Data from Schiavone et al., 2026, submitted to IPPE/IPSF 2026, n=990



Why it works

So how does a gut probiotic affect an eggshell? One of the main connections lies in **mineral metabolism**. Recent research shows that *Pediococcus acidilactici* CNCM I-4622 increases levels of **calcitriol** and **osteocalcin**, two key hormones involved in calcium and phosphorus metabolism.² This leads to higher circulating mineral levels, better assimilation and improved shell mineralization throughout the laying cycle.

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²Shanmugam, S., Barbé, F., Park, J.H., et al. "Supplemental Effect of *Pediococcus acidilactici* CNCM I-4622 Probiotic on the Laying Characteristics and Calcium and Phosphorus Metabolism in Laying Hens." *Scientific Reports* 14 (2024): 12489. <https://doi.org/10.1038/s41598-024-62779-5>.

Supporting hens for the long term

Extending laying cycles brings clear productivity benefits—but maintaining shell quality is essential for long-term success. Measuring specific gravity provides a simple, non-invasive way to monitor shell strength. Meanwhile, nutritional tools such as *Pediococcus acidilactici* CNCM I-4622 offer promising support, helping hens make the most of dietary minerals and sustain good eggshell quality throughout their productive life.



POSTBIOTIC BACTERIA AT WORK: SUPPORTING THE HIDDEN WORLD WITHIN

Every person and animal hosts a vast internal ecosystem—trillions of microorganisms collectively known as the **gut microbiome**. This living network, made up of bacteria, fungi, viruses and other microbes, plays essential roles in digestion, nutrient synthesis, immune modulation and even mood regulation. This microbial ecosystem responds dynamically to dietary inputs, making nutritional interventions a practical approach to supporting gut health in companion animals. If a balanced gut microbiome helps keep us healthy, it is important to remember that what we (and our pets) eat impacts the ability of our microbiome to do its job.

Feeding the “good guys”: Prebiotics and probiotics

Nutritionists recommend a high-fiber diet for many reasons, but for the microbiome the crucial one is the introduction of prebiotics. Prebiotics nourish beneficial gut bacteria, helping them thrive and in turn, these microbes support overall health from within.

Another aspect of our gut microbiome is the balance of “good” and “bad” bacteria. This balance can be disrupted by factors such as dietary changes, infections, antibiotics, or a weakened immune system. When it becomes disturbed, the result may include diarrhoea (acute or chronic), vomiting, or loss of appetite, which can impair digestion and reduce nutrient absorption.

Probiotics are live microorganisms, either yeast or bacteria, that help restore a healthy gut microbiota and support digestive function. Beyond this, they offer complex benefits, including immune modulation, competitive exclusion and facilitating host-microbiome interactions—often called ‘cross-talk’ that help strengthen the intestinal barrier.

The rise of postbiotics

Postbiotics have become one of the most talked-about biotics in recent years—and for good reason. In a fast-evolving industry like pet nutrition, where innovation and differentiation are essential, postbiotics present a unique opportunity to deliver both.

The International Scientific Association of Prebiotics and Probiotics (ISAPP) formally defined these compounds only a few years ago as preparations containing inanimate microorganisms and/or their components that provide a health benefit to the host.¹ Similar to probiotics, postbiotics can originate from either bacteria or yeast.

KEY TAKEAWAYS

- **Postbiotics** are shelf- and heat-stable, compatible with pet food manufacturing, making them practical for dry, wet foods and supplements.
- Studies show selected postbiotic bacteria help **support microbiota resilience, immune balance and overall pet health.**

In recent years, researchers at Lallemand Animal Nutrition have focused on three selected postbiotic bacterial strains—*Lactobacillus helveticus* HA-122, *L. paracasei* HA-108 and *L. plantarum* HA-119, produced through strain-specific gentle heat treatment. This process inactivates the microorganisms while preserving their structure, maintaining the integrity of bacterial membranes and key bioactive compounds to ensure functionality (Figure 1 and 2).

While all three strains underwent this careful preparation, the following studies zoom in on *L. helveticus* HA-122 and *L. plantarum* HA-119 to demonstrate the postbiotic approach in-depth.

Building on this, a dedicated research program was launched to move from strain characterization to proof of concept. The first objective was to confirm that inactivated cells could still deliver the functional benefits of these postbiotic strains, particularly in supporting immune response and strengthening gut barrier integrity.

Figure 1. Immune support: Cross-communication with the immune system

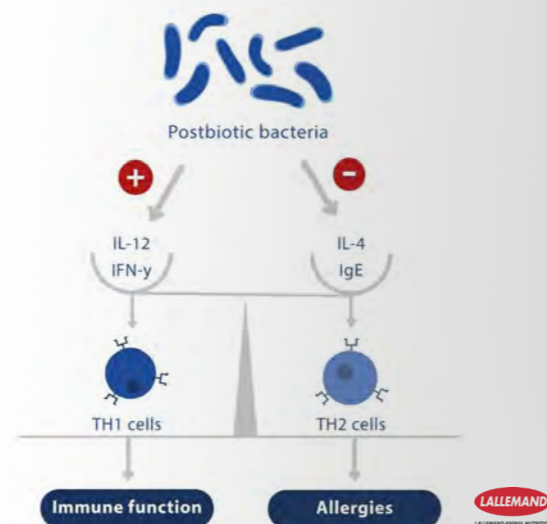
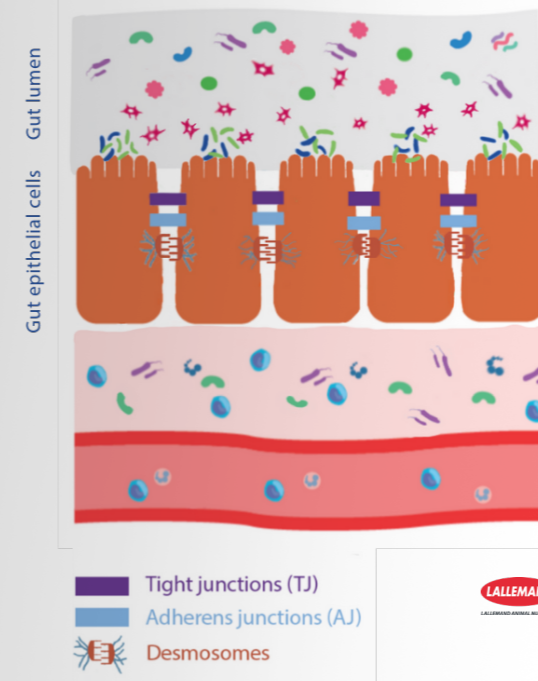


Figure 2. Digestive care: Adhesion to epithelial cells and protective barrier properties



Zebrafish: A small model with big insights

To evaluate postbiotics’ mode of action, researchers first turned to the zebrafish—a well-recognized model for studying mammalian gut and immune biology. Despite being a small freshwater species, zebrafish share significant genetic and physiological similarities with mammals, especially in immune and digestive function. They also offer ethical and logistical advantages: rapid breeding, transparent embryos for easy observation and low maintenance.

In controlled trials, zebrafish were fed diets containing either live or heat-treated *L. helveticus* HA-122 or *L. plantarum* HA-119. Over several weeks, those receiving live and heat-treated bacteria demonstrated enhanced gut barrier integrity and stronger immune responses compared with controls.² In viral challenge tests, fish supplemented with heat-treated *L. plantarum* showed increased immune gene expression and higher survival rates, clear indicators of improved clear indicator of greater resilience.³

From fish tank to pet bowl: Testing in dogs

Lallemand’s researchers encouraged by these results, extended the postbiotic evaluation to companion animals by performing *in-vitro* and *in-vivo* studies.

A first *in-vitro* study evaluated the effect of *L. helveticus* HA-122 supplementation on antibiotic-induced dysbiosis using Canine Mucosal Artificial colon model.⁴ The results showed that the heat-treated *L. helveticus* HA-122 accelerated the re-establishment of microbial balance compared with controls.

The second *in-vivo* study involved 40 healthy adult dogs and examined another common digestive stressor: dietary transitions. Whether upgrading nutrition or managing sensitivities, food changes can challenge gut stability. Dogs received either their standard diet or the same food supplemented with the postbiotic. All dogs then transitioned to a high-protein formula to assess digestive adaptation.

The results demonstrated consistent benefits compared to control animals:

- **Improved digestive function:** Stool quality normalized more rapidly in supplemented dogs, indicating quicker resolution of dietary stress.
- **Enhanced gut barrier support:** Measurements of fecal calprotectin and secretory IgA revealed beneficial trends, suggesting the postbiotic helped reinforce intestinal defenses during periods of stress.
- **Better tolerance of dietary changes:** During food transitions, dogs receiving supplementation demonstrated smoother adaptation and more stable fecal consistency.
- **Improved skin and coat health:** Dogs showed measurable enhancements in skin condition and in microbiota composition and diversity, supporting the gut-skin axis hypothesis.



Why this matters for pet well-being

For the pet food and veterinary nutrition sectors, postbiotics represent an emerging microbiome support, following prebiotics and probiotics. From a formulation perspective, postbiotics are shelf-stable, heat-stable and compatible with extrusion and other manufacturing processes used in the pet food industry. This makes them practical and reliable for use in both dry and wet pet foods, as well as supplements.

Expert advice: Integrating postbiotics responsibly

For researchers: Widely recognized in mammalian research, the zebrafish model is a valuable tool for preliminary screening of new candidate strains and for exploring mechanisms of action, as well as identifying biomarkers of interest. However, species-specific validation remains essential to confirm proven benefits.

For formulators: Consider postbiotics when targeting immune support or digestive resilience in premium products. Their shelf stability eliminates cold chain requirements, simplifying manufacturing and distribution logistics.

For practitioners: When recommending postbiotic supplementation, focus on specific applications—post-antibiotic recovery, dietary transitions, or immune support—rather than general health-standing claims. Strain-specific effects matter; not all inactivated bacteria provide equivalent benefits.

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The future of gut health and beyond

Postbiotic bacteria provide a science-backed solution for maintaining the delicate microbial balance that supports pet health. Their benefits go beyond gut barrier integrity, extending well beyond the digestive tract. Research increasingly shows that the gastrointestinal system influences overall health through its connections with other organs—known as gut-organ axes. These include the well-studied gut-brain axis and emerging links such as gut-skin, gut-liver and gut-immune axes. These pathways highlight the systemic impact of intestinal microbiota on neurological, skin and immune functions, positioning postbiotics as a cornerstone of next-generation nutrition.

Francesca Susca, Global Category Manager For Pet



RETHINKING BEDDING: PRESERVING BARN HYGIENE WITH MICROBIAL SOLUTIONS

Livestock bedding does much more than provide comfort. It acts as a living ecosystem where biological and chemical processes constantly take place. The microbial activity within bedding can affect animal health, air quality and even manure quality.

Traditionally, bedding management has focused on moisture control, cleanliness and regular renewal. Interest is growing in biological solutions that harness natural microbial processes. Applying beneficial bacteria and enzymes helps maintain bedding quality, reduce odors and ammonia emissions, create a healthier environment for animals and workers, and enhance the fertilizing value of manure.

How bacterial bedding solution works

Bacterial bedding solutions use carefully selected bacteria that can be combined with enzymatic compounds. When applied to bedding areas or surfaces, these microorganisms colonize the area and initiate a beneficial environment.

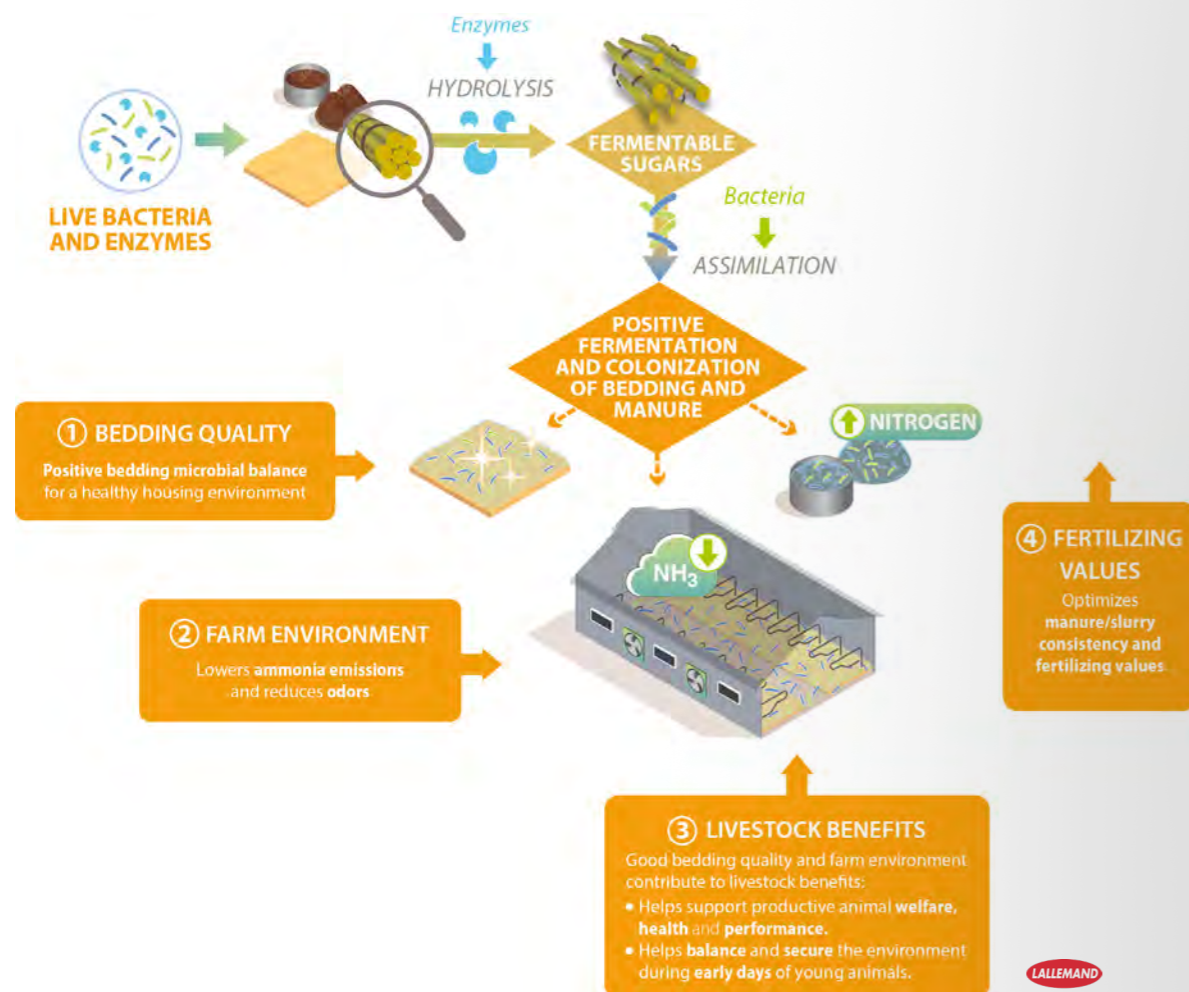
The enzymes—either added directly or produced by the bacteria themselves—break down fibrous organic matter into

simpler fermentable sugars. Then, a highly concentrated blend of bacteria—including lactic acid bacteria and *Bacillus*—uses these fermentable sugars to promote robust bacterial growth and fermentation. The result is a more stable, balanced microbial environment where beneficial bacteria thrive and naturally limit the development of harmful ones (Figure 1).

KEY TAKEAWAYS

- The combination of beneficial bacteria and enzymes maintains a **balanced microbial equilibrium** within bedding areas.
- A **bacterial bedding solution** influences microbial balance, improving bedding quality, farm conditions, animal performance and manure fertilizing value.

Figure 1. The mechanism of microbial bedding solutions



Bedding quality and animal welfare

The **bedding quality** positively correlates with animal welfare and productivity.¹ Dry, comfortable and microbially balanced bedding supports natural behavior and rest quality.

The impact of bedding quality extends across the entire production cycle. In young animals, stable microbial conditions can help limit early exposure to harmful bacteria and contribute to smoother growth and stronger immune development.

Whether in ruminants, swine or poultry, the same principle applies: when bedding is biologically active in the right way, it helps create a more balanced and resilient microbial environment.

Improving air quality and reducing ammonia

One of measurable outcomes of microbial bedding management is the reduction of ammonia (NH₃) emissions. Ammonia is released when urea and nitrogen-rich organic matter are broken down by undesirable microbial activity. Elevated ammonia can irritate animals' respiratory systems and increase susceptibility to disease.

By fostering beneficial fermentation, inoculated bedding helps prevent the loss through ammonia emission and retain the nitrogen. This means cleaner **farm environment** that supports **livestock benefits** and helps maintain the **fertilizing value of manure**. Nitrogen retained in the bedding solution rather than volatilized as ammonia represents both a healthier farm environment and valuable nutrients preserved for soil application.

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Implementation recommendations

For optimal results, consider these practical approaches:

Integration with management: Microbial solutions complement rather than replace good bedding fundamentals. Adequate bedding quality and quantity, proper ventilation and appropriate stocking density remain essential.

Application timing: Apply solutions early and regularly in the bedding cycle to allow beneficial bacteria to maintain the microbial balance of bedding.

Looking forward

Microbial and enzymatic bedding solutions enhance rather than replace standard routines. Regular cleaning, ventilation and moisture control remain essential.

Farmers adopting this approach often note longer-lasting bedding, fewer odor problems and more consistent conditions throughout the housing period. Ultimately, the combination of biological and practical management helps keep both animal comfort and farm efficiency while improving the long-term livestock systems.

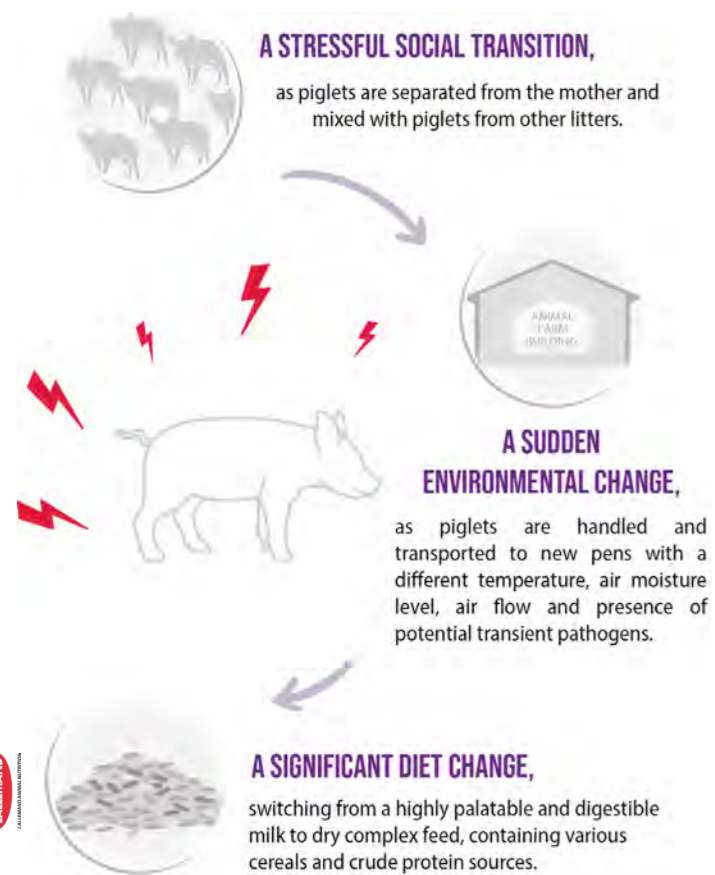
Bastien Frayssinet, Applications Manager For Animal Environment



MANAGING POST-WEANING CHALLENGE: A COMPREHENSIVE TOOLBOX FOR PIGLET SUCCESS

The first week after weaning has long been one of the most critical periods in swine production. Piglets face abrupt changes in diet, microbial exposure and social interactions, while their digestive and immune systems are still immature (Figure 1). Historically, antimicrobial compounds and high doses of zinc oxide helped buffer this transition. With increasing regulatory pressure to reduce pharmacological interventions, producers are exploring natural, evidence-based strategies to support post-weaning performance.

Figure 1. Serial external stresses around weaning



Rethinking hygiene: from clean environment to stable microbial ecosystems

Standard cleaning and disinfection protocols remove pathogens but also eliminate beneficial microbes, creating ecological vacuums that opportunistic bacteria such as *E. coli* and *Clostridium* species can quickly colonize. Swine researchers at Lallemand Animal Nutrition have added a complementary step to hygiene protocols: applying a specific blend of highly concentrated bacteria such as *Bacillus* spp. and lactic acid bacteria to farm surfaces after cleaning and

KEY TAKEAWAYS

- **Environmental microbiomes matter:** Install a positive biofilm on surfaces in farm buildings to help maintain a favorable microbial environment in the nursery.
- **Gut resilience:** This requires supporting microbial balance, immunity and managing oxidative stress to optimize post-weaning performance.

disinfection, promoting the formation of a beneficial biofilm on building surfaces. Once applied, these organisms form a positive biofilm—a thin microbial layer that occupies available surfaces, making it harder for pathogens to attach and multiply.

Field trials have shown that such biofilm approaches contribute to maintaining a safe microbial environment in the farm building, which in turn benefits animal performance and health, reducing mortality during the vulnerable post-weaning period.

Building resilience before weaning

Maternal microbial communities influence offspring gut microbiota, immune development and long-term growth outcomes. Evidence shows that modulating the sow's diet and gut microbiota during gestation and lactation can improve colostrum quality, promote beneficial early microbial colonization¹ and help reduce neonatal diarrheal incidence. Combined with adequate birth weight, optimal weaning age and structured vaccination, these foundational measures help piglets cope with the abrupt transition from milk to solid feed.

Early exposure to solid feed before weaning—commonly referred to as creep feeding—encourages voluntary intake and facilitates adaptation to post-weaning diets.² This pre-weaning preparation reduces the temporary anorexia that often exacerbates digestive stress immediately after weaning.



A Belgian study integrating gut health support

One of the most consistent challenges during weaning is controlling intestinal inflammation. In a recent Belgian trial (May-June 2025), involving 447 piglets over 49 days, researchers tested the approach on microbial strategies that support gut health and performance with promising results.

Piglets supplemented with the well-documented probiotic yeast strain *Saccharomyces cerevisiae* var. *boulardii* CNCM I-1079 reduced levels of fecal calprotectin and salivary haptoglobin, two key inflammation biomarkers. These results indicated lowered intestinal inflammation and improved gut barrier function. The trial also reported significant improvements in feed conversion ratio, final body weight and average daily gain, with a double-digit return on investment.

The mechanism involves supporting intestinal structure and microbial balance during critical growth phases. As regulations tighten and consumers demand safer, more sustainable food, strategies that work with natural microbiota offer a practical way forward: supporting animal health, improving performance and meeting market expectations. As a science-proven result, it is positive that nutrition can help piglets thrive and remain more resilient against post-weaning dysbiosis.

Precision nutrition: matching feed to digestive capacity

During weaning, the piglet's digestive system is still developing. Stomach acid production is inconsistent, small intestine enzymatic activity is suboptimal and the gut barrier remains fragile. When undigested proteins reach the hindgut, they may fuel undesirable fermentation and pathogen growth.

Precision matters here. Hydrolyzed yeast-based ingredients rich in small peptides and highly digestible amino acids offer nutrients in forms that immature digestive systems can absorb more efficiently. Recent trials have also shown that such ingredients can increase feed intake by 17%

during the first critical week of post-weaning.³

Fermentable fibers play an essential role in shaping hindgut microbial ecosystems. When balanced correctly, these fibers encourage growth of fibrolytic bacteria and stimulate production of short-chain fatty acids (SCFAs) like butyrate and acetate. These metabolites fuel intestinal cells, reinforce barrier integrity and support immune homeostasis—creating conditions that favor beneficial microbes over pathogens.

Managing oxidative stress

Beyond digestive challenges, weaning triggers physiological stress responses. Viral infections and social disruption can trigger oxidative stress—an imbalance between free radicals and antioxidant defenses—that weakens immunity, increases inflammation and slows recovery.

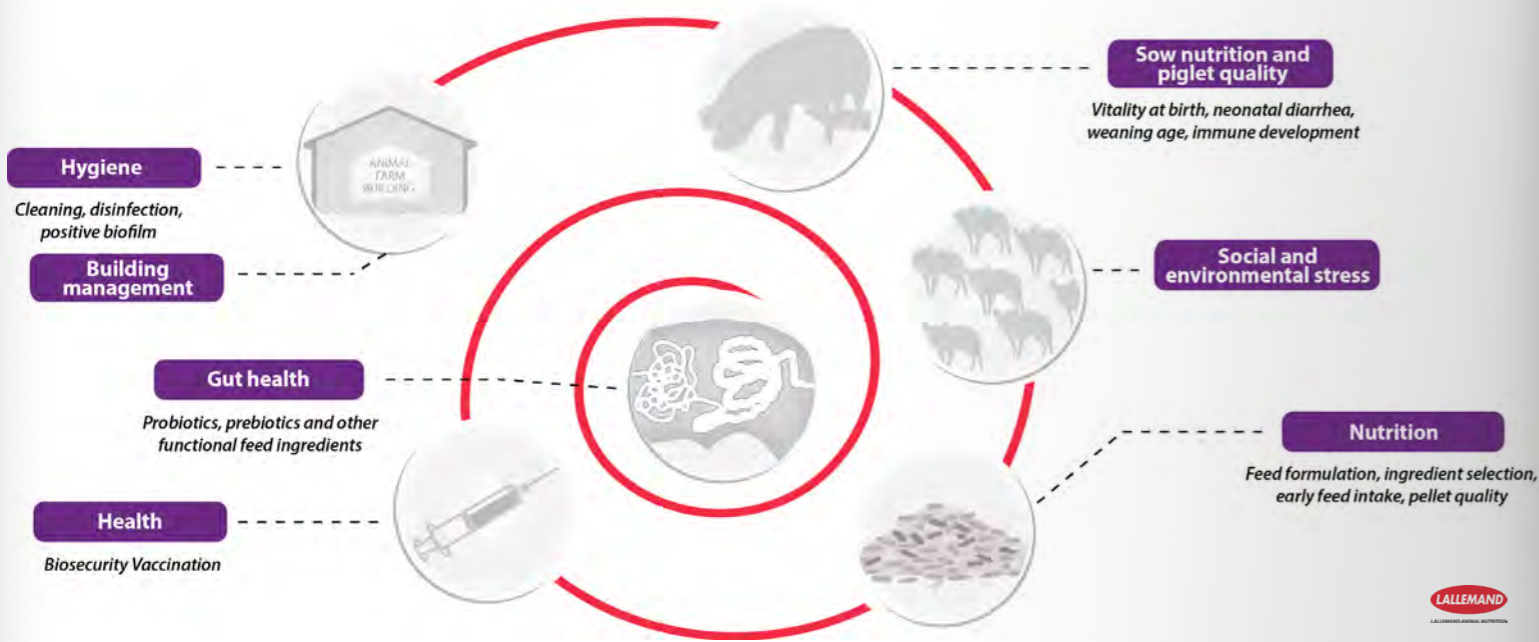
Selenium-enriched yeast and natural sources of superoxide dismutase (SOD), a key antioxidant enzyme, can help buffer these critical periods. Research has demonstrated reduction in mortality and better zootechnical performance in trials conducted under heat stress challenge and viral pressure, helping piglets when they are most vulnerable.³



An integrated toolbox approach

The latest advances in swine production suggest a holistic approach to address the multifactorial challenge of post-weaning (Figure 2). Lallemand's solutions contribute to improving the environment, gut health, and nutrition of piglets after weaning.

Figure 2. A holistic approach to address the multifactorial challenge of post-weaning



This holistic approach reflects a broader paradigm shift in livestock production, moving from chemical reliance toward strategies that leverage natural microbiota and physiological processes. Producers are now focusing on vaccination, stronger biosecurity and nutrition strategies that work with natural gut microbiota. By building resilience through science-based approaches, farms can keep piglets healthy, improve performance and meet both regulatory and market expectations.

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