

Feed Additive

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INTERNATIONAL MAGAZINE FOR
ANIMAL FEED & ADDITIVES INDUSTRY

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Issue Focus:

Innovative Trends
in Animal Nutrition

Country Profile:

CHINA:
Livestock and Feed
Market Analysis



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From stress to success:
Feed strategies for critical periods



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Navigating corn and soybean
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The importance of biosecurity
on beef and dairy farms

EDITOR

Derya Gulsoy Yildiz



As we enter a new year, the Feed & Additive team wishes all our readers, business partners, and stakeholders a Happy New Year; we hope that 2026 brings health, stability, and sustainable growth to everyone.

This year holds great significance for us, as Feed & Additive completes its fifth year in publication, marked by the impact we have made and the momentum we have gained in the sector. We are undoubtedly aware that the foundation of this momentum lies in the strong support provided by our industry. This shared journey has transformed Feed & Additive from being just a publication into one of the most valuable information platforms in the global animal nutrition ecosystem. We sincerely thank our readers who have followed us since day one, the industry professionals who reference our content, and our advertisers who contribute by trusting our publishing.

As we step into 2026, the animal production indus-

Making Informed Decisions in an Era of Uncertainty

try is being reshaped around core elements such as efficiency pressure, sustainability goals, raw material volatility, and digitalization. The topics we cover in this issue bear the marks of exactly this transformation. In our Issue Focus section, we concentrate on innovative approaches in animal nutrition and performance-oriented additive solutions; in our Technology section, we explore how big data and artificial intelligence have turned into strategic decision-support tools in feed formulations. In our Country Profile section, we examine China, a critical country in terms of global feed and livestock balances.

For the animal production industry, which is navigating an era where opportunities and uncertainties are intertwined, we know that informed decisions have become more critical than ever. Therefore, as the Feed & Additive team, we will continue to keep our finger on the pulse of the sector, bridge global trends with field realities, and convey the change in the right context throughout 2026.

May the new year lead to wonderful beginnings for us all...

Feed Additive

Publisher

Muhammed Akatay
akatay@feedandadditive.com

Editor-in-Chief

Derya Gülsöy Yıldız
derya@feedandadditive.com

Editor

Editorial Team
editor@feedandadditive.com

Advertising Coordinator

Özlem Akatay
ozlem@feedandadditive.com

Sales & Marketing

Berfin Onğulu
berfin@feedandadditive.com

SM Marketing

Lisa Atakul
marketing@feedandadditive.com

Art Director

Burak Varol
graphic@feedandadditive.com

Circulation & Data Responsible

Amine Şengün
info@threeplusmedia.com

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Three Plus
Media Ltd.

Ataturk St. Metropol Istanbul Ste.
Block C1, No:376 Atasehir,
Istanbul/TURKEY

Phone: +90 850 220 5064
E-Mail: info@feedandadditive.com
Web: www.feedandadditive.com

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From Novelty to Nutritional Tool: **INSECT INGREDIENTS IN NORTH AMERICAN FEED SYSTEMS**

Aaron Hobbs

Executive Director

The North American Coalition for Insect Agriculture (NACIA)

HOW INSECT AGRICULTURE IS ADVANCING IN NORTH AMERICA

Over the past decade, insect-based ingredients have moved from the margins of animal nutrition into serious commercial and regulatory consideration. While early global enthusiasm for insect agriculture often focused on future food narratives, the North American market has taken a more pragmatic path—one centered on animal nutrition, regulatory clarity, and fit-for-purpose applications.

Today, insect-derived ingredients are no longer experimental in North America. They are approved, commercialized, and increasingly integrated into feed and pet food formulations. This progress reflects not only technological advances, but also a regulatory framework that has enabled responsible innovation while maintaining safety, transparency, and confidence across the value chain.

A NORTH AMERICAN MODEL BUILT ON PRACTICAL APPLICATION

One of the defining features of insect agriculture in North America is its application-driven development. Rather than attempting to introduce insects broadly across all food systems at once, producers and regulators have focused on where insects make the most immediate sense: animal feed, pet food, and complementary agricultural inputs.

This approach has allowed the industry to mature steadily, guided by market demand and regulatory alignment rather than speculative scale. As a result, North America has seen meaningful commercial adoption across black soldier fly (BSF), mealworms, and crickets.

REGULATORY PROGRESS AS A FOUNDATION FOR GROWTH

Regulatory clarity has been central to this progress. In North America, insect ingredients have advanced through established feed approval pathways which included review by US Food and Drug Administration (FDA) and the Association of American Feed Control Officials (AAFCO).

By working within existing regulatory structures the insect agriculture sector has built approvals that are durable, science-based, and broadly accepted by regulators, customers, and downstream users.

Black soldier fly has seen the most extensive regulatory success to date. BSF ingredients are approved for use across a wide range of animal species, including poultry, aquaculture species, swine, and multiple pet food applications. These approvals reflect a growing body of safety data, nutritional research, and real-world feeding experience.

Mealworms and crickets have also made important regulatory advances, particularly in the pet food sector. Recent approvals for these species mark a significant milestone, opening the door for broader use in companion animal nutrition and reinforcing confidence in insect-derived ingredients beyond production animals.

This regulatory progress stands in contrast to other regions where market development has sometimes outpaced regulatory or commercial readiness. In North America, approvals have followed demonstrated need, performance data, and transparent review—resulting in a more stable foundation for growth.

Regulatory Approval for Insect Products						
Approved for use in animal feed for	Dried BSFL	BSFL Oil	BSFL Meal	Dried Yellow Mealworm	Dried Crickets	Cricket meal
Chicken	✓	✓	✓	✗	✗	✗
Dog	✓	✓	✓	✓	✓	✓
Cat	✓	✓	✓	✗	✓	✓
Fish	✓	✓	✓	✗	✗	✗
Pig	✓	✓	✓	✗	✗	✗
Birds	✓	✗	✗	✓	✓	✗

NUTRITIONAL VALUE BEYOND NOVELTY

From a nutritional perspective, insect ingredients offer compelling functional benefits. They provide high-quality protein, favorable amino acid profiles, and, in many cases, functional components such as lipids and bioactive compounds that support animal health.

Importantly, insect ingredients are not positioned as universal replacements for conventional feedstuffs. Instead, they are increasingly used as targeted inputs—addressing specific nutritional, functional, or formulation needs where they add measurable value.

This positioning has helped insect-based ingredients integrate into existing feed systems rather than compete directly with established commodities. It also aligns with how nutritionists and formulators evaluate ingredients: based on performance, consistency, and suitability for a given application.

A MEASURED ROLE FOR CIRCULARITY AND CO-PRODUCTS

While insect agriculture is often associated with circular economy concepts, North American producers have taken a practical, application-driven view of circularity. Insects can convert certain underutilized nutrient streams into higher-value outputs when feedstock availability, logistics, and location are aligned.

Co-products such as frass—the residual material from insect production—are increasingly recognized as valuable inputs for soil and agricultural applications. In North America, frass is not treated as a by-product afterthought, but as an integrated output that can strengthen overall system economics and nutrient efficiency. While animal nutrition remains the primary market driver for most producers, the

responsible utilization of co-products reflects a broader, more resilient approach to agricultural resource use.

LEARNING FROM EXPERIENCE, NOT HYPE

Like many emerging sectors, insect agriculture has experienced periods of heightened expectations. Some highly visible international projects pursued rapid scale and capital-intensive models that proved difficult to sustain. In North America, the industry's evolution has been more incremental, informed by early lessons and grounded in operational realities.

Today's progress reflects that learning curve. Companies are focused on operational efficiency, customer relationships, and regulatory alignment—rather than broad claims or one-size-fits-all solutions.

As Chris Warburton, President of the North American Coalition for Insect Agriculture (NACIA) and Chief Scientific Officer of Entosystem, notes: "What we're seeing in North America is not hype—it's steady progress. Regulatory approvals, commercial adoption, and real customer demand are moving together, which is exactly how a new ingredient category should mature."

LOOKING AHEAD: A DURABLE ROLE IN ANIMAL NUTRITION

Insect-based ingredients are now firmly part of the animal nutrition conversation in North America. Their role is defined not by novelty, but by performance, safety, and suitability within established feed systems.

As regulatory frameworks continue to evolve and additional data becomes available, insect ingredients are well positioned to expand responsibly into new applications—particularly in pet food and specialized animal nutrition markets.

The North American experience demonstrates that innovation in animal nutrition does not require disruption for its own sake. Instead, progress is achieved through alignment: between science and regulation, between producers and customers, and between innovation and practicality.

In that context, insect agriculture represents not a revolution, but a meaningful addition to the animal nutrition toolbox—one that continues to earn its place through results.

Adisseo's Reboost secures dual recognition

Reboost, Adisseo's large-scale transformation program dedicated to boosting operational excellence across its European industrial platform, received the Jury's Special Mention in the "Leadership HRD" category at the Victoires du Capital Humain, held on November 27, 2025. The honor recognized the commitment of project teams and managers in transforming the company's managerial culture to drive operational excellence and industrial performance.

Additionally, at the Syntec Grand Prix, held November 24, Reboost was awarded the Gold Medal in the "Organizational Transformation" category, celebrating the success

of an ambitious transformation initiative serving the performance and competitiveness of the company's European industrial platform.

By reshaping managerial culture, empowering teams, and deploying innovative performance routines, Reboost aims to deliver safer operations, stronger collaboration, and measurable gains in competitiveness and industrial performance. This ambitious and collective approach positions Adisseo as one of the leaders in sustainable and efficient industrial management.

As part of the EuRise program, launched at the end of 2023, the European industrial platform structured a dynamic approach to all actions aimed at improving costs.



The Reboost project brings together operational excellence initiatives; it aims to improve the safety of employees and facilities, implement cost-reduction measures, and enhance material yields and asset utilization. Establishing a project management culture and organization, along with co-constructing and deploying a shared managerial framework, were the key enablers for the project's success.

[Read more>>](#)

Innovad Group receives first industrial load of sustainable fatty acids

ChainCraft and Innovad Group are taking another important step in their collaboration: the inaugural industrial-scale delivery of sustainable fatty acids for gut health solutions. The arrival of this first truckload clearly demonstrates the practicality of using circular approaches for animal health products at scale, marking an important milestone for both companies.

ChainCraft produces high-quality fatty acids from agri-food residues through advanced fermentation processes. Innovad Group integrates these ingredients into innovative branded feed applications that support gut health and improve animal performance. The partners note that the first full-scale delivery demonstrates the stability and reliability of this circular value chain.

"This first industrial-scale delivery is a powerful confirmation of our collaboration," says Marc den Hartog, CEO of ChainCraft. "It demonstrates that circular fatty acids, produced from agri-food residues, are not only technologically viable but now



ready for supply at industrial scale. Together, we are building a future-proof supply chain in which sustainable animal health plays a central role."

"We are proud of this milestone," says Ben Letor, CEO of Innovad Group. "It enables us to integrate increasing amounts of upcycled, sustainable ingredients into our solutions, moving away from chemicals. This strengthens both animal health and the sustainability ambitions of our sector. This first industrial-scale delivery confirms that our shared vision is becoming reality."

[Read more>>](#)

dsm-firmenich expands Hy-D® EU approval to aquaculture

dsm-firmenich Animal Nutrition & Health announced that Hy-D®, 25-hydroxycholecalciferol (25-OH-D₃) produced from *Saccharomyces cerevisiae* CBS 146008, has received new European Union authorization for use in salmonids, other fish species, and all other animal species. Hy-D® has been authorized in the EU for pigs, poultry and ruminants since 2024.

Emrah Mazi, Head of Special Nutrients at dsm-firmenich Animal Nutrition & Health said, “This new EU authorization for

Hy-D® is a significant milestone, underscoring its global relevance and reliability as a source of vitamin D for aquaculture and all animal species. We are thrilled about the opportunities this brings for our customers across Europe and beyond, empowering them to advance animal health and performance with confidence.”

Dr. Benedict Standen, Head of Marketing for Aquaculture at dsm-firmenich Animal Nutrition & Health stated, “EU authorization for Hy-D® represents a first-of-its-kind opportunity to bring real

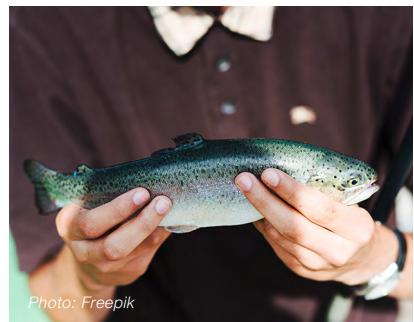


Photo: Freepik

benefits to European aquaculture, which have already been seen in commercial aquaculture operations around the world. These include improvements in growth, immunity and enhanced product quality.”

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Nutreco joins FAO's LEAP Partnership to drive livestock sustainability

Nutreco announced its participation in the Livestock Environmental Assessment and Performance (LEAP) Partnership, a global initiative hosted by the Food and Agriculture Organization of the United Nations (FAO), which develops science-based tools to measure and reduce the environmental impact of livestock production.

For at least five years, Nutreco's business lines — Trouw Nutrition for livestock and pets, and Skretting for aquaculture—have followed the PEFCR Feed Standard, which builds on FAO's LEAP guidelines - recognised standards for assessing and reducing environmental footprints. Through its involvement with the International Feed Industry Federation (IFIF), a founding member of LEAP, Nutreco states that it has contributed to shaping these standards and ensuring the feed industry's perspective is represented globally. Participation in LEAP is expected to help further align sustainability practices across the feed and animal nutrition sectors, enabling farmers and feed producers to adopt solutions that improve efficiency and reduce emissions.

Nutreco highlights that joining LEAP gives it the



Photo: Nutreco

opportunity to engage, contribute, and collaborate within a global network focused on improving the environmental performance of livestock systems. The company will participate in LEAP technical working groups and the Steering Committee, support harmonised approaches to measuring environmental impact, and bring innovation in feed and circular ingredient solutions to global discussions. This ensures that Nutreco's science-based approach is represented and allows it to apply consistent methodologies to build capabilities and track progress toward its sustainability goals, according to the statement.

[Read more>>](#)

New study validates bioactive peptides in Bioiberica's Palbio

Bioiberica, a global life science company, announced the publication of a scientific paper in the International Journal of Molecular Sciences confirming the presence of bioactive peptides in Palbio® — a hydrolysed porcine intestinal mucosa protein for improved animal nutrition. Building on previous evidence of the ingredients' benefits for animal health and performance, the newly commissioned research validates the hypothesis that Palbio® bioactive peptides have specific biological functions — such as antimicrobial, antioxidant, cytokine/growth factor-like, and immunomodulatory activities. The new research sets Palbio® apart as a science-backed, high-protein functional feed ingredient with tangible benefits for key growth markers, helping pet food, livestock and aquaculture feed producers better support animal health and nutrition.

"This milestone is the culmination of decades of research and trials investigating the potential of Palbio® to show why it can be trusted to deliver re-



sults for our customers," comments Xavier Garcia, Business Unit Director Animal and Plant Health at Bioiberica. "Palbio® is not just a high-performance functional feed ingredient with a long-standing reputation for quality — it is now scientifically validated as a source of free amino acids and bioactive peptides that support animal health. Research like this exemplifies how we have approached innovation at Bioiberica for over 50 years; with scientific rigor, complete transparency, and an insatiable curiosity."

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Suntaq positions Türkiye as MEA regional headquarters

Suntaq International Limited, a global bioengineering company specializing in enzyme solutions, announced that Türkiye has been established as the center of its Middle East and Africa (MEA) operations in response to growing demand for animal feed enzymes. Ahmet Gürgün, Regional Director for Türkiye and MEA at Suntaq, emphasized that this strategic step marks an important milestone in delivering localized expertise and a more secure supply structure to producers in the region.

"Establishing Suntaq Turkey as our regional headquarters in June 2025 reflects our strong commit-

ment to supporting MEA producers with localized expertise, reliable supply, and innovative enzyme technologies. As the animal feed industry in the MEA region accelerates, the demand for high-efficiency enzyme solutions is growing faster than ever," said Gürgün.

He added, "Our priority is to complete the regulatory approval processes, establish market balance on the supply side, and create genuine added value for the sector."

Affirming confidence in the region's long-term growth, Gürgün shared details about the company's strategic investments: "We firmly believe in the size and growth



potential of the MEA region. This is why we have already begun strengthening our teams in the main markets including Saudi Arabia, Egypt, Türkiye, and Pakistan."

With its new regional headquarters in Türkiye, Suntaq aims to offer faster, more consistent, and more direct support to producers across the MEA region.

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MiAlgae's new facility to meet demand for fish-free omega-3 oils

MiAlgae broke ground on a major new scale-up facility in Grangemouth, Scotland. The new site will dramatically increase the supply of high-quality, fish-free omega-3 oils for the global pet food industry, meeting rapidly rising demand for clean-label, sustainable, and functional ingredients.

Douglas Martin, Founder and CEO of MiAlgae, said: "Breaking ground at Grangemouth marks an exciting new chapter for MiAlgae. Our mission has always been to make a meaningful impact, tackling overfishing, reducing waste, and creating sustainable value from industrial by-products. This new facility is a huge step towards delivering that mission at scale, bringing new, high-quality green jobs to the local area, and helping Scotland lead the way in this exciting new biotech industry."

The large-scale facility, going live in early Q2 2026, will increase MiAlgae's pet nutrition omega-3 output more than tenfold, enabling manufacturers to incorporate premium DHA into dry, wet, and



supplement formats without relying on wild-caught fish oil.

Backed by a joint investment of up to £3 million by the UK and Scottish governments, the new facility is designed with modular scalability, allowing MiAlgae to meet growing demand from pet food and aquaculture brands alike. Located close to both key raw material suppliers and major customers, the site will support a low-carbon supply chain for pet nutrition manufacturers across the UK, EU, and U.S.

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PAI Partners to acquire Innovad Group

PAI Partners, a pre-eminent private equity firm, entered into a definitive agreement to acquire Innovad Group, a global specialty animal feed additives player, from IK Partners, a European private equity firm. PAI is acquiring its stake from the IK IX Fund. The Innovad Group management team, led by Ben Letor, will reinvest as part of the transaction.

Innovad Group is one of the leading suppliers of animal health and nutrition solutions, offering a wide range of specialty additives, which mainly focus on the poultry, ruminant, and swine species. The group has developed a diversified, well-positioned portfolio of products, fo-

cusing on high-value applications that support a range of health outcomes, such as gut health, mycotoxin management, and immunity.

Ben Letor, CEO of Innovad Group, said, "Our journey alongside IK and the entire Innovad Group team has been a notable navigation, culminating in achievements we are very proud of. We are excited to continue building on our solid fundamentals, progressive company culture and care for our clients' needs and challenges. We feel very honoured to have earned the trust of PAI and we believe that this new partnership, with its fresh perspective and skills, will enrich and support our ambition and im-



pactful projects moving forward."

Headquartered in Antwerp, Belgium, Innovad Group serves a diverse range of 900 customers across 75 countries. It operates six production facilities, supported by a combination of in-house manufacturing in Belgium, Brazil and Italy, as well as tolling partners in Switzerland and Italy.

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IFFO reports growth in global fishmeal and fish oil production in 2025

In Peru, the second fishing season in the North-Centre region is ongoing, with two-thirds of the 1.63 million metric ton quota completed so far. "This is a positive sign which leads us at IFFO to project a production of 5.4 million tons for fishmeal and 1.2 million tons for fish oil in 2025," commented Dr. Enrico Bachis, IFFO's Market Research Director.

Based on the market reports which IFFO shares with its members, by October 2025 the total cumulative annual fishmeal production* rose by approximately 7% compared to the same period in 2024. This increase was driven

by higher output in most regions, except for the Iceland and North Atlantic area, which reported a year-on-year decline.

Similarly, cumulative fish oil output through October 2025* showed a year-on-year increase of around 5%. Most countries recorded positive trends compared to January–October 2024, with the exception of Peru, where lower oil yields in 2025 played a significant role in the decline.

In China, domestic production of marine ingredients has been limited during the last quarter of 2025. IFFO does not expect production for the year to surpass the



2024 level which was estimated at 570,000 metric tons. According to IFFO's report, cumulative fishmeal consumption in aquaculture is estimated to have exceeded last year's levels so far, even though demand over the past two months has been lower on a year-on-year basis.

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BETA RAVEN



Choline chloride producers welcome EU anti-dumping decision

As producers of choline chloride in the EU, Eastman and Balchem announced that they welcome the European Union's decision, published on December 19, 2025, to adopt anti-dumping duties of between 90.0% and 115.9% on choline chloride imports from the People's Republic of China. This decision, which will be effective for five years with the possibility of renewal, confirms Europe's determination to ensure the continuation of an important part of the EU food and feed supply chain in the face of unfair trade practices from producers in China.

The companies state that defending fair trade in choline

chloride is essential to preserving European jobs, encouraging industrial innovation, and supporting a strong and sustainable supply chain for EU food and feed.

Representatives of the EU producers express their companies' gratitude to the European Commission, and in particular to the Directorate-General for Trade (DG TRADE), for its rigorous work, independence, and ongoing commitment to fair trade.

The EU industry, which has sufficient production capacity in place to accommodate the full EU market demand and growth for the foreseeable future, sees these measures as essential for assuring their ability to continue

their investments in EU production, employment, and innovation, according to the statement.

More generally, EU producers note that these measures allow the EU supply chain and EU consumers to have a healthy domestic choline chloride industry in the EU, which can ensure supply stability and compliance with the highest health and safety standards. The statement reports that, especially in a time of geopolitical instability, the EU cannot afford to allow unfairly traded imports from China to make the EU food and feed industries wholly dependent on Chinese suppliers.

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UBM Group to build feed and premix plants

Deputy Minister of Foreign Affairs of the Republic of Kazakhstan Alibek Kuantyrov and Deputy Chairman of the Board of JSC NC KAZAKH INVEST Madiyar Sultanbek held a working meeting with the management of the Hungarian company UBM Group, headed by Chairman of the Board of Directors Ákos Varga.

During the meeting, UBM Group presented updates on the implementation of its investment projects in Kazakhstan, which include the construction of a premix plant in Almaty Region and a feed mill in Kostanay Region. The investors reported on progress in negotiations with partners, details of establishing joint ventures, preparatory work, and next steps within the agreed implementation schedule of the first phase.

Under the first phase, the company plans to invest over USD 58 million in the construction of two plants. The production capacity will total 48,000 tonnes of premixes and 200,000 tonnes of com-



Photo: Kazakh Invest

pound feed per year. The project is oriented toward the markets of Kazakhstan, the EAEU, and China.

The company has already signed a joint venture agreement with AsiaAgroFood JSC (KazFoodProducts Group) for premix production and is finalizing negotiations with Eco Broiler Ltd on the construction of the feed mill in Kostanay Region. Discussions are also underway to conclude an Investment Agreement with the Ministry of Agriculture of Kazakhstan.

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FOR MORE INFORMATION, CONTACT:

BALCHEM ITALIA Srl
Via del Porto snc
28040 – Marano Ticino (NO)
Italy

Phone +39 0321 9791
E-mail anh.marketing@balchem.com
Web balchem.com



VetosEurope awarded for methane reduction initiatives

World Finance announced that VetosEurope was named 'Best Company for Decarbonisation in the Beef Industry' in the World Finance Carbon Awards 2025. The recognition highlights the company's position in advancing sustainable livestock agriculture through its pioneering initiatives in methane mitigation and carbon credit development.

VetosEurope was adjudged the winner for demonstrating outstanding leadership in decarbonisation within one of the world's most emissions-intensive industries. World Finance praised the company's combination of scientific rigour, proven impact, commercial traction, and next-generation innovation, making VetosEurope a benchmark for methane reduction in livestock systems.

Central to the award decision was VetosEurope's flagship solution, Anavrin, which has reportedly delivered measurable and verifiable methane reduction. Peer-reviewed trials confirmed that Anavrin achieved a 13 percent decrease in methane yield in ewes and in dairy



cows, and up to 17 percent in beef cattle, compared to control diets. This result was applauded by the panel for its significance and real-world applicability.

VetosEurope also earned recognition for its partnership with Rete Clima and Climit, strengthening industry-wide efforts to reduce greenhouse gas emissions across the livestock supply chain. According to the announcement, the collaboration demonstrates the company's commitment to both scientific excellence and sustainable impact.

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Dr. Kirkland: Right rumen-protected fat offer new opportunities for dairy farmers

Environmental variables, global trade volatility and changing consumer preferences have made forecasting future dairy production a fast-moving target. According to Dr. Richard Kirkland, Global Technical Manager for Volac Wilmar Feed Ingredients, rumen-protected fat supplements, which have long been included in lactation rations as an energy source, are a valuable tool when fed strategically for dairy producers needing to remain agile to hit individual milk contract premiums.

"This all comes down to the fatty acid composition and the effect an individual fatty acid has on a specific area of cow performance based on where she is in the lacta-

tion cycle," Dr. Kirkland explains. "Unlike other feed ingredients, rumen-protected fat supplements are not a one-and-done nutrient – they are multi-purpose and can realise a significant return on investment."

While there are five main fatty acids commonly found in ruminant diets, C16:0 (palmitic acid) and C18:1 (oleic acid) typically have the highest inclusion rate in rumen-protected fat supplements, with varying ratios of each one to target specific effects in the dairy cow.

C16:0 induces insulin resistance to increase the partitioning of nutrients to milk, which in turn improves milk and milk fat production, says Dr. Kirkland. This makes



it ideal for mid to late lactation. In contrast, C18:1 increases insulin, which increases the partitioning of nutrients to improve body condition. C18:1 also improves the digestibility of total diet fat, which increases energy supply and feed efficiency. This fatty acid has also been proven to boost fertility by promoting egg and embryo development, making it beneficial in early lactation, says Dr. Kirkland.

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Avian influenza outbreaks expected to continue in Europe until late winter

In the closing months of 2025, Europe has witnessed a marked increase in cases of highly pathogenic avian influenza (HPAI) among wild birds, leading to widespread outbreaks in poultry farms and a rise in detections among carnivorous mammals. Despite the ongoing spread within animal populations, the risk to the general public remains low.

Between 6 September and 28 November 2025, 442 outbreaks of HPAI were reported in domestic birds and 2,454 outbreaks in wild birds across 29 European countries, according to the latest quarterly report by the European Food Safety

Authority (EFSA), the European Centre for Disease Prevention and Control (ECDC), and the EU reference laboratory (EURL).

The widespread outbreaks on farms across Europe have primarily resulted from introductions by wild birds, mainly through indirect contact. In particular, turkeys have been affected, and there has been an increase in detections among vaccinated ducks. Factors contributing to the rise in cases include transmission from wild birds, infection pressure from highly contaminated environments near poultry establishments, and certain weather conditions such as humidity.

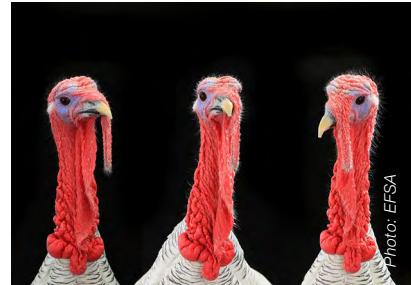


Photo: EFSA

Experts strongly recommend housing domestic birds in areas where HPAI virus is circulating in wild birds or where wild bird mass mortality events have been reported. Strict biosecurity and enhanced surveillance are essential to detect new outbreaks early and reduce risks to animal health.

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Skretting and Longyang Fresh partner for sustainable trout farming

Skretting and Longyang Fresh, one of China's largest trout producers, officially signed an upgraded strategic cooperation agreement. Skretting highlights the goals of the enhanced partnership as delivering precision nutrition, creating supply chain synergies, and advancing sustainable aquaculture practices for trout farmed on the Qinghai-Tibet Plateau. The three-year agreement is expected to inject new momentum into the development of China's plateau cold-water fish industry.

Skretting and Longyang Fresh have established a productive, long-standing collaboration in feed innovation, nutritional management, and farming practices for trout farming on the plateau. Over the years, the two companies have accumulated extensive experience on plateau aquatic ecosystems, trout physiology, and farming efficiency—laying a strong foundation for this strategic upgrade.

With a shared commitment to the development of China's plateau trout industry, the renewed partnership aims to build a closer, mutually beneficial partnership.

The unique plateau environment in Qinghai Prov-



ince—characterised by low temperatures, high dissolved oxygen, and low pathogen pressure—offers natural advantages for trout farming. Leveraging these ecological traits, the two companies will jointly develop a precision nutrition system optimised for high-altitude farming conditions. Key initiatives include:

- Developing nutrition models adapted to high-altitude water ecosystems, addressing the specific physiological needs of trout in unique environments.
- Utilising global databases to optimise growth performance, health indicators, and feed efficiency, enabling more scientific and efficient farming.

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Rumin8 acquires Roam to advance cattle methane reduction

Rumin8 acquired Roam Agricultural, a spin-out of Loam Bio Pty Ltd focused on the development of solutions for methane abatement in cattle.

Rumin8 CEO David Messina said the acquisition of Roam complemented Rumin8's development plans for its own methane and productivity solution.

"Roam has focused on the same active ingredient as Rumin8 and has developed delivery formats that expand our portfolio to reach production systems that can benefit from an extended-re-

lease profile," he remarked.

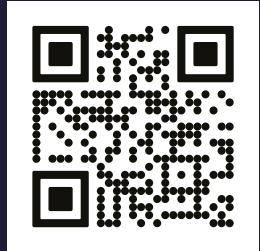
"While early in their development stage, Roam's products can be accelerated into regulatory studies and commercialisation by leveraging Rumin8's capabilities and learnings to provide an additional methane abatement solution to the world's cattle farmers and ranchers," Messina continued.

Messina noted that Roam had initially focused on a fungi-based technology approach to producing tribromomethane, or TBM, which is recognized as the most



effective methane reducing active in livestock and then progressed to delivering synthesized TBM. The technology acquired by Rumin8 from Roam also includes alternative processes for manufacturing and delivering TBM.

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Nanovet forms strategic partnership with Nu.ance Biotechnology

Nanovet Nutrition announced a strategic partnership with Switzerland based Nu.ance Biotechnology to deliver advanced feed quality solutions across the Indian subcontinent.

This collaboration reportedly enhances Nanovet's portfolio by integrating Nuance's proven technologies to address chemical toxicity, mycotoxins, and ammonia chal-

lenges in poultry and dairy feeds.

Key benefits for producers have been explained as:

- Mitigation of chemical toxicity for safer animal health,
- Improved nutrient efficiency in tropical climates,
- Scalable solutions for feed mills and integrators across India.

This alliance aims to advance sustainable livestock production,



Photo: Freepik

driving profitability and environmental responsibility for global agriculture stakeholders.

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Mowi strengthens salmon farming performance through Skretting feed partnership

Mowi ASA, one of the world's leading seafood companies, entered into a strategic and industrial partnership agreement with Skretting, the aquaculture feed business line of Nutreco Group. Under the agreement, Mowi will produce feed based on Skretting's feed formulations, making Mowi an even better salmon farming company.

The partnership builds on Mowi and Skretting's long-standing commercial relationship, with Skretting making available its proprietary know-how, R&D capacity, data and procurement capabilities. According to the statement, Mowi Feed will continue to produce feed, and feed production will now be based on Skretting's feed formulation. The strategic partnership is expected to deliver more than NOK 650 million (EUR 55 million) in annualised net cost savings through improvements in feed formulation and recipes, procurement and logistics.

"Mowi and Skretting are a great match for each other, and the partnership with Skretting is our preferred outcome from the strategic review process. I am confident that teaming up with them will make Mowi into an even better salmon farming company. With this agreement, Mowi Farming secures the best performing feed in the coming years at the low-



Photo: Mowi

est cost in the industry. The partnership will deliver improved feed formulation and recipes for our European salmon farming operations which will drive significant cost improvements whilst ensuring top quality feed performance in the years to come," says Ivan Vindheim, Mowi CEO.

"We know the Skretting team extremely well and have enjoyed an excellent working relationship with them for decades. Now we are taking this cooperation to another level and formalising how we can drive innovations and cost improvements. This partnership model presents a low-risk solution for Mowi while ensuring cost savings from day one on improved feed formulation and optimised procurement and logistics," Vindheim expresses.

[Read more>>](#)

Saudi producer invests in state-of-the-art hatchery facility

Addoha Poultry Company, a leading Saudi manufacturer and distributor of fresh and chilled chicken products, has invested in a new, state-of-the-art hatchery from Royal Pas Reform. The company's expansion plans will see annual production capacity rise from 55 million day-old chicks currently to 75 million in 2027 – and reach 125 million birds annually by 2030.

Addoha's new facility, featuring advanced single-stage incubation, automation and climate-control systems, has been operational since August 2025. According to a press release from Royal Pas Reform, the hatchery is equipped with an egg setting line, a fumigation set for egg disinfection, 72 x SmartSet-

Pro™ 6 setters (including AMF™ and ESM™), an egg candling and transfer line, 72 x SmartHatchPro™ hatchers (including SmartWatch™) and 24 SmartStore™ chick storage systems. It also features a chick take-off line, a chick sexing and vaccination line, a chick counting and boxing line, washing machines and a waste collection and storage system. It is further fitted with heat exchangers, booster sets, egg room coolers, air handling units, air distribution system, ventilation systems, and process water chillers.

Commenting on the expansion plans, the CEO of APC, Eng. Abdullah S. Alhumaidan, says: "As a leading Saudi company in the field of poultry, we have been commit-



ted since our inception to provide our clients with the highest quality products. We are excited to strengthen our market presence and shape the future of the poultry industry in Saudi Arabia and beyond. The doubling of Addoha's production capacity by 2030 also aligns with 'Saudi Vision 2030' goals of economic diversification and ensuring a sustainable supply of high-quality halal poultry."

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Biochem secures EU approval for BetaTrace® Cu

Biochem announced the EU approval of BetaTrace® Cu, which completes the company's advanced range of organic trace minerals. According to the company, with this approval, the BetaTrace® portfolio offers a complete selection of the essential minerals, zinc, copper, manganese, and iron, solidifying BetaTrace® as a unique, patented solution for modern livestock farming.

"With EU approval secured, BetaTrace® Cu completes our next generation premium mineral portfolio—setting a new standard for excellence," said Dr. Susanne Rothstein, Product Manager of Organic

Minerals at Biochem. "Now we can offer our partners a complete range of organic trace minerals, all of which are bound to the metabolic powerhouse, betaine. This is the final piece that we have been eager to provide to the market."

According to the information shared by Biochem, both betaine and trace minerals play vital roles in physiological metabolic processes. Betaine is an excellent methyl group donor, which is particularly crucial in protein and lipid metabolism. Trace minerals, on the other hand, serve as essential components or cofactors for numerous enzymes, vitamins,



and hormones. Compared to conventional inorganic sources, such as oxides and sulfates, BetaTrace® significantly improves absorption by binding trace minerals to betaine. Moreover, BetaTrace® is able to bypass rumen degradation, making it an excellent source of betaine for ruminants.

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Pow.Bio and Bühler partner for next-gen precision fermentation

Pow.Bio, a pioneer in AI-enabled continuous fermentation technology, and Bühler Group, a global solution provider for food, feed, and advanced materials, are teaming up to bring an integrated continuous precision fermentation platform to market. The collaboration aims to advance industrial biomanufacturing by accelerating process development, reducing unit production costs thanks to a continuous process, and improving operational performance. Bühler and Pow.Bio highlighted that they are now ready to begin onboarding customers.

Unlike traditional fermentation approaches that rely on batch or fed-batch processes – stop-and-start methods that require the tank to be emptied and cleaned between runs – the companies now offer an ultra-efficient and streamlined solution. The offering brings together Pow.Bio's proprietary continuous fermentation technology with Bühler's 165 years of engineering, delivery, installation, and commissioning services – all supported by advanced model-driven control software, according to the partners. The result is a platform that



allows customers to establish precision fermentation capacity faster, with predictable performance, lower unit costs, and a direct path to scale.

The platform is designed for companies commercializing fermentation-derived products that are currently produced in fed-batch systems but constrained by cost, scalability, or inconsistent output. From established ingredients such as enzymes and organic acids to categories like functional proteins, specialty lipids, and bioactive compounds, the Pow.Bio-Bühler solution is expected to offer a continuous, more efficient production pathway.

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IFEEDER's latest report examines risks in vitamin and amino acid supply chains

The Institute for Feed Education and Research (IFEEDER) published a new report, "Strategic Assessment on the Impact of Vitamin and Amino Acid Supply Chain Disruptions on U.S. Food Security," which explores America's dependence on China for critical inputs that impact food security for both animals and humans, as well as the on-farm production and animal welfare impacts that could arise should these ingredients be in short supply.

The research, conducted for IFEEDER in collaboration with Decision Innovation Solutions and Lobo Consulting, assessed publicly available data on global vitamin and amino acid production, U.S.

import and export quantities, and utilization rates in domestic livestock diets. The researchers applied diet modification strategies to evaluate whether alternative feed ingredients could partially compensate for limited vitamin and amino acid supplementation. While the report showed that, in some instances, farmers and ranchers could modify animal diets to mitigate the impacts of reduced vitamins or amino acids, it would not fully resolve the negative consequences for animal health, welfare and production efficiency.

"IFEEDER plays a critical role in identifying key questions and delivering independent, science-based research to inform U.S. feed and pet food industry leaders," says IFEED-



ER Executive Director Lara Moody. "Proactively addressing potential supply chain threats is one of the industry's most pressing concerns. The extent of the U.S. reliance on China for vitamins and amino acids was more significant than many anticipated—underscoring the need for objective, reliable data to guide effective policy decisions before these risks escalate."

[Read more>>](#)

Low Carbon Agriculture Consortium highlights solutions for hyperprolific sows

The Low Carbon Agriculture Consortium hosted a dedicated webinar on November 27, 2025, exploring how modern hyperprolific sow genetics can be managed sustainably to reduce the environmental footprint of pig production. The programme examined the full reproductive cycle—from gestation to lactation and longevity—offering practical solutions to help producers balance prolificacy, welfare, and efficiency.

"This webinar showed that sustainable pig production is within reach when genetics, nutrition, welfare and technology are aligned. The solutions presented today highlight the power of collaboration in helping producers move toward more efficient and low-carbon farming systems," noted Olivia Garcia of Low Carbon Agriculture Consortium.

Today's genetic advancements have led to significantly larger litters, increasing the need for



adapted management to maintain welfare and environmental balance. Insights on how genetic progress can contribute to more resilient and sustainable production were provided by Nucleus.

[Read more>>](#)

VF Care feed additive holds promise for combating FMD

Headquartered in Austria and recognized as one of the pioneers in agricultural innovation, Agrovet Animal Health Austria GmbH announced the development of VF Care—a product capable of effectively treating FMD in cows and other ruminants while preventing its spread. Described by the company as a revolutionary breakthrough, this product promises to significantly enhance animal health and welfare by resolving a critical issue for farmers worldwide.

Commenting on the new product, Omid Samadijavan, CEO of Agrovet Animal Health Austria GmbH, stated: “We are excited to introduce this innovative product to the livestock industry. Our

commitment to improving animal health and supporting farmers lies at the heart of our mission. This feed additive we have developed represents a significant step forward in managing FMD and ensuring the sustainability of livestock farming.

FMD is a highly contagious viral infection that affects cloven-hoofed animals and causes severe economic losses in the livestock sector. According to Agrovet, annual global losses from FMD are estimated to range between \$1.5 billion and \$21 billion, depending on the region and the severity of outbreaks. Currently, there is no specific treatment or antiviral therapy available for FMD in cows or other susceptible livestock.



As reported by Agrovet, clinical trials demonstrate that ruminants achieve full recovery from FMD just three days after starting VF Care. The company further emphasizes that by boosting the animals' immune systems, this innovative feed additive excels in combating various viral and bacterial conditions—such as Rinderpest, Peste des Petits Ruminants (PPR), mastitis, and Bluetongue—while reducing the risk of transmission within the herd.

[Read more>>](#)

Study confirms BSFL-derived palatant boosts shrimp feed intake by 7.56%

Innovafeed released a new white paper, developed in collaboration with SPAROS, a leading European R&D center in aquaculture nutrition, with experimental trials conducted by RIASE-ARCH, on shrimp (*Penaeus vannamei*) palatability and performance.

Reduced feed intake is commonly associated with shrimp diets high in plant protein. To alleviate this, certain marine ingredients such as squid, fish, or krill are included in formulations as attractants and palatants, but they are prone to unstable supply and price volatility.

This study evaluated how Innovafeed's BSFL-derived palatant (Hilucia™) could be integrated into shrimp diets as an alternative, and found that it was a powerful feed effector.

According to the white paper, the BSFL-derived palatant displays a strong phago-stimulatory effect,



increasing relative feed intake by 7.56% compared to the control feed, demonstrating a palatant or attractant effect comparable to that of squid meal.

Dr. Jorge Dias, General Manager at SPAROS, said: “Shrimp fed diets with the BSF-derived palatant showed improved appetite, confirming its value as a natural, sustainable solution for boosting feed attractiveness and performance.”

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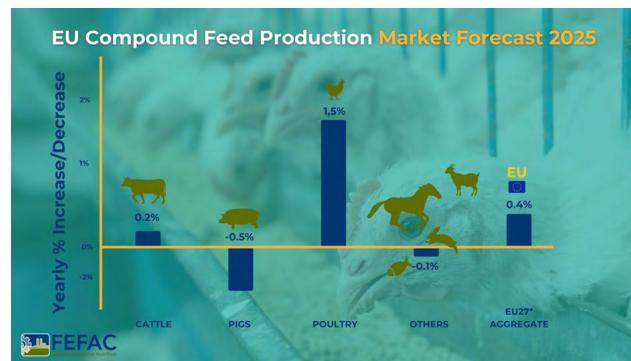
* Germination Optimisation Technology patents: US 9,447,376 & US 9,932,543

FEFAC: EU compound feed production remains stable in 2025

FEFAC market experts forecast continued stability in the EU compound feed production market for 2025. The total industrial compound feed production in the EU27 is expected to reach 147.5 million tonnes, marking a slight increase of 0.40% compared to 2024. This marginal change reflects relative stability across most animal production sectors, despite increasing market uncertainty and varied national market trends. The EU compound feed sector remains resilient in the face of continuing economic, geopolitical, regulatory, environmental, and animal disease-related challenges.

In 2025, EU cattle feed production is forecast at 41.585 million tonnes, almost the same value compared to 2024. Among the major producing countries, Germany is expected to see an increase (+3%), while the Netherlands is projected to experience a significant decline of -5.0%, mainly due to regulatory policies. Spain, the largest cattle feed producer, expects a decrease of -3%. Denmark and Poland, in contrast, are forecast to increase slightly by +4.5% and +3.9%.

Pig feed production in the EU is expected to reach 47.339 million tonnes in 2025, a marginal



decrease of -0.5%. German and French production is down by -1.9% and -1.6% while the Netherlands is forecast to see a sharp decline of -10%. Spain, the largest producer, is set to stabilize at 13.2 million tonnes. Portugal will rise by +1.8% and Poland is expected to grow by +2.7%. Ireland is projected to increase by +3.2%, while Hungary will likely see a decrease of -3.2%.

The poultry feed sector is expected to grow in 2025, despite ongoing pressure from Avian Influenza (AI), with production forecast to increase by + 1.5% to 50.653 million tonnes. Spain and Belgium are set for a robust increase of +5.8% and +5% respectively.

[Read more>>](#)

New research explores plasma's impact on digestibility and gut health in dogs

APC announced the publication of a peer-reviewed study conducted with the University of Illinois Department of Animal Sciences evaluating how spray-dried plasma included in extruded kibble supports canine gut health and key immune indicators in adult canines.

The study, titled "Effects of spray-dried plasma on nutrient

digestibility, fecal metabolites, microbiota, and immune and inflammatory biomarkers in adult dogs," was published in the Journal of Animal Science.

Results showed statistically relevant shifts in fecal metabolite profiles, suggesting a beneficial modulation of the gut microbiota and potential support for overall gut health. These findings add to



the growing body of evidence on plasma's role in supporting gut health and whole-body wellness in dogs.

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Methane Connect Summit spotlights solutions for dairy farms

The mitigation of enteric methane, one of the most significant greenhouse gases from dairy cows, is moving from spreadsheets to the field. The first Methane Connect Summit, held on November 19, 2025 in Paris, showed how the European dairy sector is not only debating methane reduction but already putting in place concrete changes in herd management, advisory services and farm contracts.

More than 120 participants from around 20 countries took part, including farmers, cooperatives, dairies, researchers, technology providers, and financial institutions. Speakers included representatives from Arla, Danone, Nestlé, Bel/APBO, Schreiber Foods, Carbon Maps, BNP Paribas and Glasgow University, among others, alongside farmers and institutes such as IDELE and AFBI.

Morning sessions explored how enteric methane emissions are now linked to day-to-day herd man-



Photo: Valorex

agement as well as to corporate climate strategies.

Farmers and advisers from Belgium, France, and the UK emphasized that the first levers for methane reduction are technical: feed efficiency, forage and grassland quality, herd health, and longevity. Speakers highlighted that methane reduction is not an additional burden but a lever for independence and performance when farmers have the right tools, data, and recognition.

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- From stress to success: Feed strategies for critical periods
Marisabel Caballero, Hamlet Protein
- Functional Phytogenics for Sustainable Animal Nutrition: The role of quillaja saponins
Diego González Morgado, Plantae Labs – Chile
- From discovery to delivery:
Developing phytocomplexes for animal nutrition
Dr. Ellen Hambrecht, Trouw Nutrition
- Predictive quality and process optimization in feed manufacturing
André Magrini, OGI Systems
- Chickens eating kalo leaves? A fowl-tastic superfood
Yunuen Bustamante & Melelani Oshiro, University of Hawai'i
- Feed efficiency starts with the right protein source
Dr. Essi Evans, E+E Technical Advisory Services
- Precision technology in piglet nutrition:
Dual microencapsulation for targeted gut health
Dr. Stephanie Ladirat, Nuqo Feed Additives
- Silkworm pupae and the future of bio-circular feed systems
Ankit Alok Bagaria, Loopworm Private Limited



FROM STRESS TO SUCCESS: FEED STRATEGIES FOR CRITICAL PERIODS

Marisabel Caballero

*Category Manager Monogastrics
Hamlet Protein*

In this article, I draw on my experience in animal nutrition to explain why critical periods in young animals matter. I also share practical feed strategies to support growth, immunity, and resilience in young animals during these challenging phases.

Everyone who has worked with production animals knows that certain stages in the life cycle of production animals are more critical than others. Universal examples include brooding in poultry, weaning in piglets, and transition periods such as early gestation, farrowing, and onset of laying. Location-specific or operation-specific challenges, such as seasonal challenges, disease outbreaks and management events also demand attention. In my experience, we must address these critical periods from multiple angles, including biosecurity, health, management, and nutrition.

WHAT DEFINES A CRITICAL PERIOD?

A critical period occurs when biological, environmental, and management factors combine to influence performance, health, and profitability.

Characteristics defining critical periods are high physiological demands, abrupt transitions, and limited adaptability. Critical periods are not defined by age alone, but by the interaction between biology and management. When physiology is changing rapidly and coping capacity is low, health, nutrition, and management interventions become crucial for long-term productivity. For

poultry and swine, these periods include:

- Early growth stages
- Transition phases
- Reproductive stages
- Stress events

During these times, feed must provide not only energy and protein but also essential vitamins, minerals, and functional additives that support immunity, gut health, and overall resilience.

In this article, I share insights from my years working with feed formulation and animal nutrition. My goal is to provide practical strategies that help farms anticipate critical periods and improve performance and resilience. These ideas come from years of observing farms and feed mills where solutions are tested and refined every day.

BASIC FEED FORMULATION PRINCIPLES FOR CRITICAL PERIODS

Feed formulation goes beyond meeting basic nutritional needs; it's about strategically supporting animals, especially during their most vulnerable stages, as this can influence growth rates, reproductive performance, and overall health in the short

and long term. Understanding these periods and adjusting feed accordingly can make a difference in productivity and profitability.

Formulating feed for critical periods also requires a balance between science and practical experience, considering the next principles:

- **Adjust nutrients density:** During critical periods animals often cannot consume enough feed to meet their nutrient requirements. High-quality and easily digestible protein, together with clean energy-dense ingredients, and the right balance of essential amino acids, are crucial, adjusting for a minor feed intake.
- **Increase digestibility:** Young and stressed animals have immature or compromised digestive systems. Ingredients should be highly digestible, and enzymes such as phytase and xylanase, among others should be included.
- **Support gut health:** The gut is especially vulnerable during early life and stress events. Support gut health with the use of highly and fast digestible protein sources, minimizing anti-nutritional factors. Include feed enzymes to improve nutrient availability and use functional additives such as probiotics, prebiotics, and organic acids.
- **Ensure feed intake:** Palatability is crucial during periods of low appetite, such as post-weaning or early laying, thus palatable ingredients and the right feed

form should be in the checklist for feed formulations during critical periods.

WEANING IN PIGLETS IS A CRITICAL PERIOD

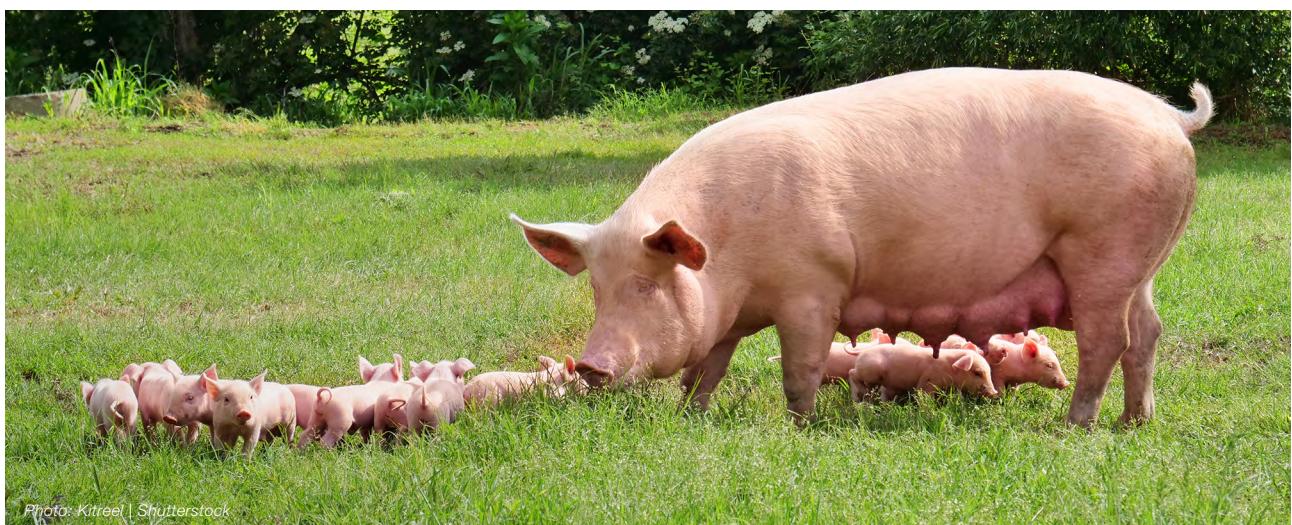
Why is it critical? During weaning, piglets undergo a set of rapid and profound physiological changes driven by the abrupt separation from the sow, transition from milk to solid feed, and exposure to a new environment.

FORMULATION STRATEGIES FOR PIGLETS

- **Support early growth:** At weaning, piglets transition from milk proteins that are biologically matched to their immature digestive systems to plant proteins that demand digestive and enzymatic capacities that are not yet fully developed.

The inclusion of high-quality protein sources, providing fast-digestible protein, quickly converted into peptides and amino acids, compensates for the low digestive capacity of piglets while stimulating gut development and avoiding free protein in the hindgut.

We know that the use of spray-dried blood plasma (SDP) is a well-established nutritional strategy to mitigate weaning stress, however due to different circumstances (e.g. inconsistency, regulations, price, sustainability) many operations have started to look for alternatives. From my experience, enzyme-treated soybean meal, such as HP 300 from Hamlet Protein, can effectively replace spray-dried plasma. Its low an-



ti-nutritional factor load and high digestibility support piglet performance during weaning. Trials show comparable results between these options (Figure 1).

Organic acids in piglet feed also support protein digestion. At weaning, gastric acid production is insufficient, and the stomach pH is often higher than 4.5. Including blends of organic acids best matches piglets' physiological needs, compensating for low gastric acid production and high pathogen pressure.

The use of enzymes, matching anti-nutritional factors in feed ingredients, is a proven nutritional strategy to enhance nutrient utilization and improve post-weaning performance. They also compensate for the immature digestive system of the piglet, which quickly needs to transition to grain-based feeds.

• Support the immunity gap: The immunity gap in piglets refers to a transitional period of high susceptibility that occurs when passive immunity from the sow declines before the piglet's own immune system is fully functional. This gap is a biological challenge around weaning and has major implications for health and performance. In my experience, two strategies work together: on one hand, functional ingredients, such as pro- and prebiotics, organic acids, phytogenics, and immunoglobulins, help to lower the pathogenic pressure; on the other hand,

functional proteins (e.g. HP ESBM), vitamins (e.g. vit A and vit E), and minerals (e.g. Cu, Se, Zn) help to build the immune system in the young piglet.

- Support gut health:** Besides improving digestibility and supporting immunity, it is critical to stabilize the gut microbiota. The use of probiotics, prebiotics, and enzymes shapes microbial composition, activity, and stability by introducing beneficial live microorganisms, providing substrate and the right environment for their growth.

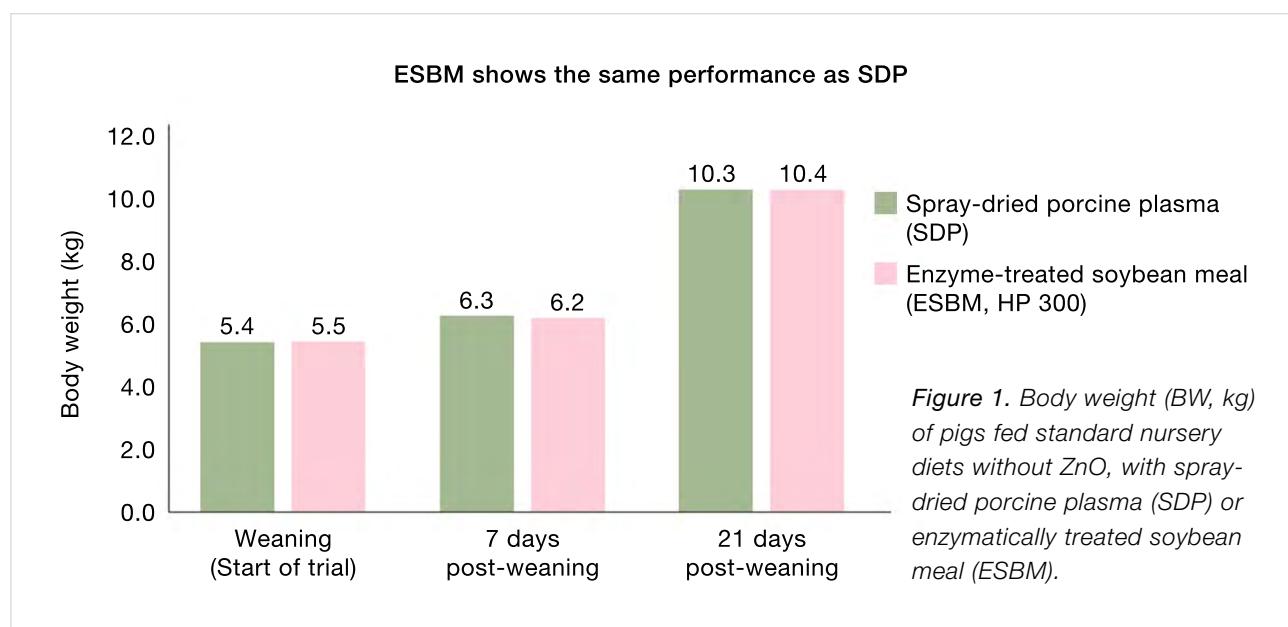
EXPECTED OUTCOMES

Based on my experience, when we prioritize nutrient availability, protein digestion, immunity, and gut health, we can expect:

- Improved growth performance
- Lower incidence of post-weaning diarrhea
- Better feed efficiency and health in later stages

BROODING IN POULTRY IS A CRITICAL PERIOD

Why is it critical? Newly hatched poultry has high nutritional demands for organ growth, especially the gastrointestinal tract, which is developing in terms of size, structure, immune response, and microbial population. Additionally, a transition from yolk-based to feed-based nutrition is occurring, immunity is developing, and thermoregulation is absent.



FORMULATION STRATEGIES FOR POULTRY

- **Support early growth:** The use of high-quality protein sources, providing fast-absorbable peptides and amino acids to compensate for the low digestion capacity, and to avoid free protein in the hindgut -as it can favor the growth of potential pathogens-, supports the important nutritional demands of this critical period.

Early protein nutrition affects muscle fiber number and organ development, which are the basis of future growth, and support the development of immunity in young animals. For instance, enzyme-treated soybean meal (ESBM), fed to broilers at a 5% inclusion during the starter period, has demonstrated better performance both after the feeding phase and at the end of the cycle, in high and low-performing flocks (Figure 2) in comparison with SBM alone.

- **Support immunity:** Nutrition plays a central role in supporting both innate and adaptive immunity. Proteins provide the blocks for antibodies, immune cells, and enzymes involved in immune responses. Amino acids like lysine, methionine, threonine, and arginine are especially critical as they support mucin production, antibody synthesis, and overall immune competence.

In my experience, the use of high-quality, digestible protein sources supplemented with crystalline amino acids to meet precise requirements is fundamental for the development of the immune function; additionally, essential vitamins and minerals as vitamins A, E, D and the B complex, Cu, Zn and Se should be included in bioavailable sources for better absorption and immune efficacy.

• **Support gut health:** One of my mentors firmly believes that nothing supports gut health better than proper nutrition; however, he adds, nutrition is never proper: expect always variability in raw materials, pressure from antinutritional factors, contaminants, etc. Add to this, environmental and management pressures, and you make the perfect storm for gut health imbalances. For this, feed additives can certainly contribute to preventing these issues. One of my favorites, in young animals, is the use of probiotics, which introduce beneficial bacteria that compete with pathogens for nutrients and adhesion sites, improving health, nutrient utilization, immunity, and resilience.

The use of exogenous enzymes improves digestibility and reduces the effects of anti-nutritional factors,

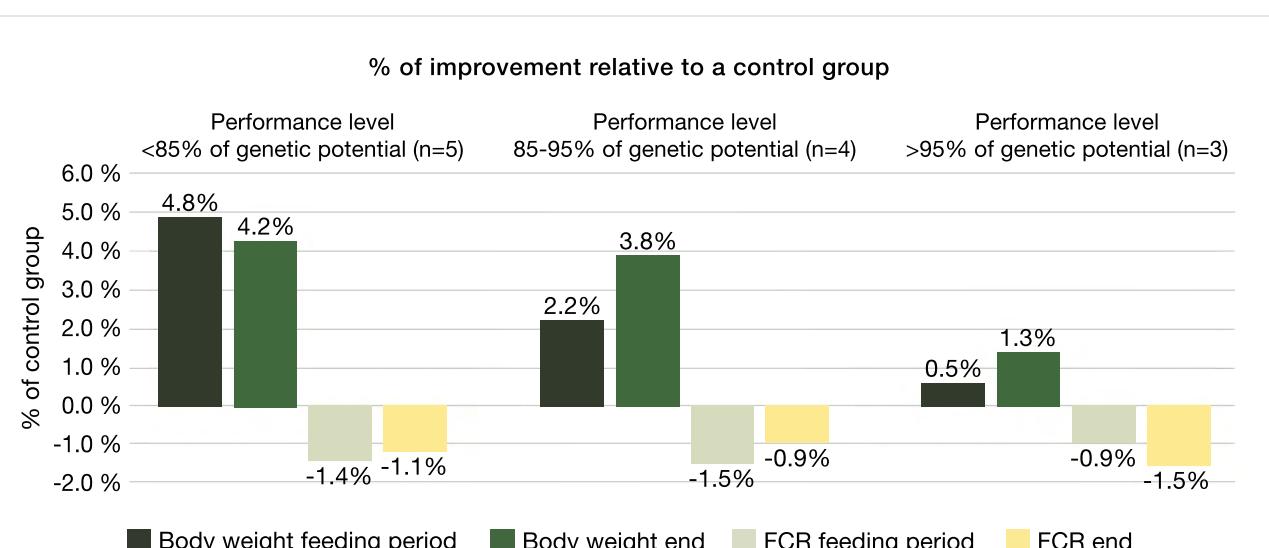


Figure 2. Percentage difference in performance of broilers fed standard starting diets with 5% of enzymatically treated soybean meal (ESBM) partially substituting SBM, having standard diets with full SBM as the base of the comparison. Grower and Finisher diets are the same for both groups. Starter phase from 0 to 14 days. Data from 2018 to 2024.

also supporting gut health. It is important to consider xylanases, which break down arabinoxylans, non-starch polysaccharides (NSPs) abundant in cereals such as wheat, rye, and barley. NSPs increase digesta viscosity, impairing nutrient absorption and promoting pathogenic bacterial growth in the gut.

EXPECTED OUTCOMES

Higher nutrient availability, protein digestion, immune and gut health lead to better growth performance with lower inputs, improving not only body weight gain, but also feed conversion rate. The performance improvements when formulating for critical periods occur in different types of operations, improving performance and profitability.

FEED FORMULATION FOR STRESS MANAGEMENT IN YOUNG ANIMALS

During early life stages, animals may experience stress due to management events such as vaccination, transport, or disease outbreaks. If performance declines, a thorough field investigation is essential. In the meantime, immediate action can include supplementing feed with rapidly digestible proteins, antioxidants, or functional additives to help reduce physiological stress.

We know that good feed formulation cannot eliminate stress entirely, but it can help young animals cope better, recover faster, and maintain performance. Nutrition remains one of the most practical and effective strategies for managing stress during critical periods, helping animals recover faster and maintain optimal performance.

ADDITIONAL FORMULATION STRATEGIES

In addition to the strategies already discussed, I believe it is important to consider a few more approaches for managing periods of increased challenges:

- **Prevention is better than a cure:** By anticipating stress events and tailoring nutrition, we can avoid drops in growth performance, support immune function, and reduce mortality and morbidity. Strategic nutrition not only helps animals cope with immediate stress but also improves long-term resilience, growth, and productivity.

- **Provide building blocks:** Higher protein of fast absorption and key amino acids support growth and immunity. Including functional proteins like enzyme-treated soybean meal or hydrolyzed animal proteins to increase digestibility and reduce gut stress. Additionally, highly bioavailable minerals and an additional boost of functional vitamins aid the immune response.

- **Feed additives add:** Feed additives are valuable tools that help young animals cope with stress, maintain gut health, and recover more quickly. Using combinations of additives, selected based on the type of stress and production system will give the best results.

THE BOTTOM LINE

Proper feed formulation helps minimize stress-related challenges during critical periods by aligning nutrient delivery with actual animal needs. When we anticipate physiological constraints and stress in our formulations, feed becomes a powerful preventive management tool, protecting performance and economic returns.

By identifying your farm's critical periods and tailoring strategies to your unique needs, we can boost productivity, profitability, and animal health and welfare throughout the life cycle. It is important to continue the discussion, make the changes, test strategies, and find the best formulations for your critical periods.

About Marisabel Caballero

With over two decades of experience in animal production, Marisabel Caballero specializes in broiler breeder management, monogastric nutrition, and the strategic application of feed additives. Her academic background in agriculture and postgraduate studies in animal welfare, production, and business reinforces her commitment to improving productivity and health in monogastric species. With an evidence-based approach, she uses Hamlet Protein's soy-based specialty proteins to improve gut health and efficiency during critical production phases.



Turn stress into success during critical periods

Weaning and brooding are critical periods which can make or break animal performance and health.

The right feed strategy during these periods can make the difference between stress and success – both in the short and long term.

Hamlet Protein's specialty soy protein solutions, like HP 300, are designed for these challenges. Low in anti-nutritional factors, highly digestible, and rapidly absorbed, they help animals thrive when it matters most.

Use Hamlet Protein during critical periods to optimize gut health, improve nutrient absorption, and help your animals recover faster from stress.

 *Better*
GROWTH PERFORMANCE

 *Optimal*
GUT HEALTH

 *Improved*
PROFITABILITY



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Functional Phytogenics for Sustainable Animal Nutrition: **THE ROLE OF QUILLAJA SAPONINS**

Diego González Morgado
Regional Business Manager
Plantae Labs – Chile

Rising costs, antibiotic restrictions, and environmental pressures are reshaping production, highlighting the need for nutritional strategies where functional phytogenics for sustainable animal nutrition play a measurable role. Standardized *Quillaja saponins* support health, immune balance, and efficiency, helping producers achieve stability, resilience, and sustainability under real farm conditions.

Rising costs, antibiotic restrictions, and environmental pressures are reshaping the animal production industry. Phytogenic ingredients like *Quillaja saponins* are emerging as standardized, science-based tools to support animal health, efficiency, and sustainability in feed formulations.

EVOLVING CHALLENGES IN SUSTAINABLE PRODUCTION

Animal production today faces a difficult balance between productivity, health, and cost efficiency. Feed variability, fluctuating raw-material prices, and stricter regulations on antibiotic use have intensified the need for nutritional strategies that help animals remain resilient and efficient under farm conditions.

DEFINING QUALITY IN PHYTOGENIC INGREDIENTS

Phytogenic ingredients have gained attention as one of the main strategies to achieve this balance. Yet, their effectiveness relies on controlled production and clear identification of their active ingredients and modes of action.

The origin of the material, the production process, and the precision in defining active ingredients determine whether a phytogenic can truly be considered functional. Within this framework, *Quillaja saponaria* is among the most well-characterized sources used in animal nutrition, supported by extensive scientific evidence and a renewable origin.

The triterpenic saponins of *Quillaja saponaria* have been widely studied for their biological activity. Highly purified fractions of these molecules are used as adjuvants in licensed human vaccines, including vaccines for malaria, shingles, and COVID-19. Their capacity to modulate immune responses explains the growing interest in using standardized *Quillaja* ingredients to promote animal health through nutrition.

TWO NATURES OF QUILLAJA-DERIVED INGREDIENTS

From the same raw material, two ingredient types can be obtained through different production processes tailored to distinct functional outcomes:

- **Quillaja Extracts:** Powder and liquid forms standardized in triterpenic saponins. Their defined composition provides predictable immune modulation and health support while helping control pathogen-related challenges, making them valuable during periods of increased biological pressure or vaccination programs.

- **Quillaja Pulverized:** Powders containing saponins and polyphenols. They help maintain gut condition and improve environmental quality in barns and ponds through better litter characteristics and significantly reduced emissions.

Both ingredient types share the same origin, sustainability model, and technical control, allowing nutri-

tionists to adapt their use according to health priorities, production phase, and cost sensitivity without changing the underlying scientific foundation.

BIOLOGICAL MECHANISMS AND FIELD OUTCOMES

The biological activity of Quillaja saponins has been described extensively in the literature and further investigated through research programs led by Plantae Labs in collaboration with independent centers.

Their primary mechanism is immune modulation. By activating macrophages and T lymphocytes, these compounds help maintain an alert but balanced immune system, capable of responding efficiently to natural challenges without excessive inflammation.

Immune Mechanisms and Functional Effects of Quillaja Saponin Extracts

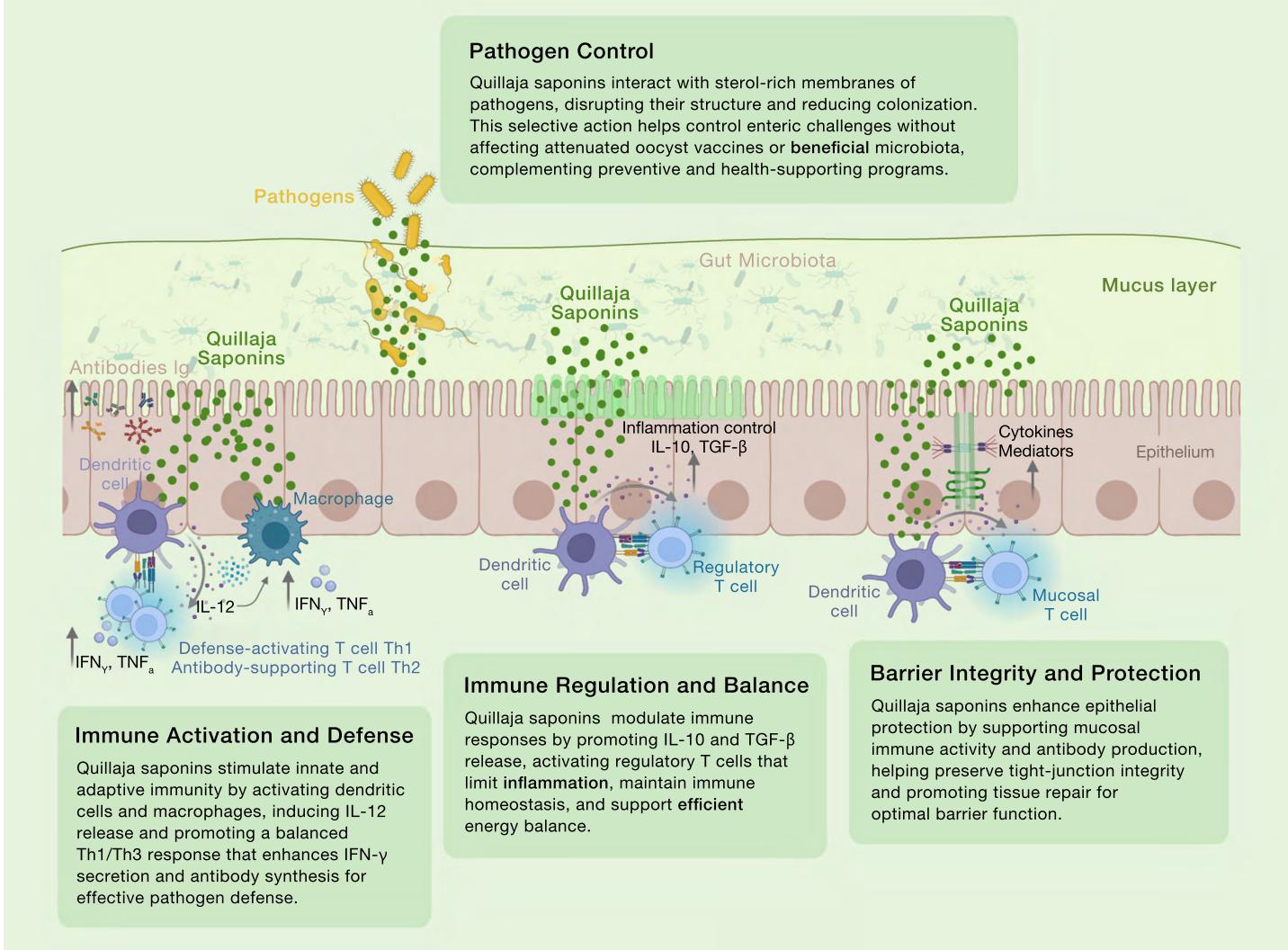




Photo: Plantae Labs

This equilibrium supports metabolic efficiency and reduces the energy diverted to immune stress.

The systemic benefits of this immune balance are reflected in healthier animals with more stable growth, improved nutrient utilization, and lower variation within flocks or herds. Better villus architecture and fewer intestinal lesions have been consistently observed, indicating enhanced digestive function and a stronger gut barrier.

As a result, animals show greater resilience, fewer health events, and improved feed efficiency, all contributing to economic and welfare gains.

These mechanisms have been validated in several *in vivo* studies across poultry, swine, aquaculture, and ruminants, confirming their capacity to mitigate the effects of enteric and pathogen-related challenges. Together, these findings show that defined phytogenic activity can translate into measurable stability and performance in real production systems.

SUSTAINABILITY MODEL AND SUPPLY RELIABILITY

At Plantae Labs, the biological consistency of Quillaja ingredients is supported by a long-term sustainability program. The company's reforestation and stewardship initiatives for *Quillaja saponaria* have established more than 400,000 trees and continue expanding every year. This renewable model ensures a continuous and traceable biomass while protecting native biodiversity.

All extraction and quality systems at Plantae Labs are standardized and certified under GMP+ and OMRI Listed, guaranteeing batch-to-batch uniformity and reliable access to markets that demand verified sustainability.

The program also stabilizes raw material supply and cost over time, linking environmental responsibility with commercial reliability.

BRIDGING PERFORMANCE AND SUSTAINABILITY

Achieving sustainable animal production requires more than replacing synthetic additives with natural ones. It depends on ingredients defined by measurable science, reproducible effects, and responsible sourcing.

Quillaja saponins represent this new generation of phytogenic solutions, capable of improving health and efficiency while preserving the ecosystems from which they originate.

By aligning immune balance, gut condition, and cleaner environments with a renewable supply model, standardized Quillaja ingredients allow producers to pursue performance and sustainability as a single, trackable objective.

About Diego González Morgado

Diego González Morgado is Regional Business Manager for America & Oceania at Plantae Labs, Chile. He leads technical and commercial strategies for the Animal Health & Nutrition division, driving adoption of Quillaja-based solutions across poultry, swine, and aquaculture markets while supporting sustainable and science-based animal nutrition programs.



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From Discovery to Delivery: **DEVELOPING PHYTOCOMPLEXES FOR ANIMAL NUTRITION**

Dr. Ellen Hambrecht

*Global Product Manager PhytoComplex Solutions
Trouw Nutrition*

“The future of phytotechnology is bright. Advances in genomics, metabolomics, and artificial intelligence are opening new frontiers in plant-based solutions. These tools enable us to predict biological effects, optimize formulations, and accelerate development timelines without compromising safety or efficacy.”

In the September 2025 issue of *Feed & Additive*, Trouw Nutrition introduced the concept of PhytoComplexes. These plant-based solutions are designed to support animal health and resilience by working in tune with the animal's physiology and adopting a host-focused, preventive approach instead of targeting pathogens. Our Phytotechnology program goes beyond antimicrobial replacement, embracing complexity to address the multifaceted challenges of modern livestock production. This article provides an in-depth look at how Trouw Nutrition develops its PhytoComplexes - from initial discovery to final delivery. Spanning continents and disciplines, the process reflects a deep respect for the intelligence of nature.

A NEW PARADIGM FOR A COMPLEX WORLD

Today's dynamic and interconnected animal production systems are shaped by climate variability, evolving regulations, microbial pressures, and shifting consumer expectations. In this context, simplistic solutions often fall short. Producers face a balancing act: maintaining productivity while meeting higher standards for animal welfare, sustainability, and food safety. Feed additives have become an essential tool in this equation, but the industry is moving beyond single-function products.

Trouw Nutrition's PhytoComplexes represent a response to this complexity. These multi-compound, multi-target plant-derived solutions are designed to interact with animal biology through conserved receptors and signal transduction pathways. Their development relies on a model that integrates discovery science, biological modeling powered by artificial intelligence, plant domestication, and global supply chain design. Trouw Nutrition has anchored this integrated approach at Nutreco's Garden of the Future. This proprietary center of excellence in phytotechnology located in Switzerland brings together all necessary expertise under one roof.

WHY COMPLEXITY MATTERS

Livestock production is influenced by multiple stressors: immune challenges, dietary transitions, microbial imbalances, and environmental conditions such as heat stress. These factors rarely act in isolation. For example, heat stress can impair gut

integrity, which in turn affects nutrient absorption and immune function.

Addressing such interconnected challenges requires solutions that can act on multiple physiological pathways. PhytoComplexes are designed with such challenges in mind. They combine diverse plant metabolites that interact with conserved receptors and signaling cascades in the animal, supporting functions such as gut integrity, metabolic balance, and immune modulation.

This complexity is not accidental; it is intentional. By leveraging nature's diversity, PhytoComplexes aim to deliver consistent benefits across varied production environments without relying on antibiotics or synthetic growth promoters.

FROM ROOT-CAUSE TARGETS TO BOTANICAL CANDIDATES

The development of a PhytoComplex begins with pinpointing a specific challenge that may hinder an animal from reaching its full genetic potential. For example, supporting liver function is crucial in laying hens and dairy cows, where fatty liver syndrome and metabolic stress can compromise productivity

and health. In weanling piglets, the transition at weaning exposes them to dietary and environmental stress, increasing the risk of intestinal barrier dysfunction and digestive disorders. Broiler chickens often face subclinical, chronic inflammation, which can reduce growth rates and feed efficiency even in the absence of overt disease. Meanwhile, dairy and beef calves experience rapid physiological changes and immune challenges during early development, making enhanced resilience essential for improved survival, growth, and long-term performance. These challenges are defined in collaboration with business teams and customers to ensure relevance to real-world production environments.

Once the challenge is defined, biological mechanisms are mapped, including receptors in the gut, enzymes in metabolic pathways, and immune signaling cascades. This target-driven approach ensures that discovery efforts are grounded in biology and tailored to the needs of animal nutrition. However, scientific understanding of the exact mechanisms is often incomplete. That is why we always anchor our approach in measurable physiological outputs, for example, triglyceride accumulation in the liver for fatty liver prevention,



The PhytoComplex Journey From Discovery to Delivery



or GLP-2 secretion for gut integrity. This ensures that our search for botanical candidates remains open and inclusive, allowing us to capture promising solutions regardless of whether all mechanisms are fully understood.

Candidate plants are identified using ethnobotanical knowledge, phytochemical databases, and advanced data modeling. Screening is conducted to evaluate the full constellation of specialized metabolites each plant can produce. Genetically distinct samples, or accessions, are collected from around the globe. Each accession undergoes rigorous evaluation, including in vitro bioassays with animal-specific cell lines and phytochemical profiling. Only those candidates demonstrating consistent and relevant biological effects progress to the next stage.

FROM FIELD TO FEED: DOMESTICATION, STANDARDIZATION, AND QUALITY ASSURANCE

Once candidates are chosen, plants are cultivated under controlled conditions, following practices that safeguard their unique properties. The focus shifts from maximizing biomass to optimizing the yield of bioactive compounds most relevant to animal health outcomes.

Cultivation protocols are implemented with a global network of experienced growers. These part-

ners follow plant-specific production guidelines, which often differ significantly from conventional agricultural practices. Technical support and quality monitoring are provided throughout the growing season to maintain high standards. Growing plants specifically for animal nutrition - according to the physiological needs of animals - is both unique and challenging. It requires precision, adaptability, and a deep understanding of plant complexity to consistently produce feed additives that deliver the desired effects.

Throughout this process, stringent quality control measures are applied. These include safety checks, microbiological testing, and phytochemical fingerprinting to confirm identity and assure consistency. The objective is to deliver a feed additive that is effective, safe, and traceable. What's more, the complexity of the plant must be preserved while ensuring that the final product performs reliably in diverse production environments.

THE POWER OF AN INTEGRATED APPROACH

The distinguishing feature of Trouw Nutrition's phytotechnology program is its integration. Discovery, development, and production are all housed within a single center of excellence, enabling seamless collaboration and full control over the supply chain - from initial plant selection to final product



Photo: Trouw Nutrition

delivery. PhytoComplex development aims to deliver targeted, science-based solutions that help animals thrive in demanding production environments. The conversation around phytogenic feed additives often starts with antibiotic replacement, but our vision goes much further. PhytoComplexes are not substitutes for traditional health management tools; they are solutions designed to enhance resilience, optimize performance, and contribute to sustainable production systems. This holistic perspective aligns with global trends toward preventive health strategies, reduced environmental impact, and improved animal welfare. It also reflects a commitment to innovation that is both science-based and nature-inspired.

A NEW ERA IN PHYTOTECHNOLOGY

The future of phytotechnology is bright. Advances in genomics, metabolomics, and artificial intel-

ligence are opening new frontiers in plant-based solutions. These tools enable us to predict biological effects, optimize formulations, and accelerate development timelines without compromising safety or efficacy.

Cultivating plants specifically for animal nutrition, with the goal of producing effective and consistent feed additives, is a complex endeavor. It requires interdisciplinary expertise, robust infrastructure, and a commitment to continuous improvement. PhytoComplexes are more than products: they are the result of collaboration between science, agriculture, and animal nutrition. They are science-based, nature-inspired, and solution-driven, designed to meet the evolving challenges of animal production and contribute to a more resilient and sustainable future.

About Dr. Ellen Hambrecht

With a PhD from Wageningen University, the Netherlands, Ellen Hambrecht brings over 20 years of experience in the agricultural industry. Her career at Trouw Nutrition spans diverse roles in R&D, QA, Sustainability, and Global Marketing. In her current role as Global Product Manager, Dr. Hambrecht is responsible for Trouw Nutrition's PhytoComplex portfolio, innovative phytotechnology-based solutions designed to harness the power of plants for sustainable animal production.



PREDICTIVE QUALITY AND PROCESS OPTIMIZATION IN FEED MANUFACTURING

André Magrini
Chief Revenue Officer
OGI Systems

As feed manufacturers face rising variability, tighter regulations, and cost pressure, predictive quality and process optimization are becoming essential operational capabilities. By applying AI and machine learning to real-time process data, feed mills can move from reactive quality control to earlier, more informed intervention, improving stability, efficiency, and decision-making across production.

Feed manufacturers are operating under increasing pressure to deliver consistent product quality while managing rising raw material variability, tighter regulatory requirements, and ongoing cost constraints. In this context, traditional quality control approaches based primarily on end-product inspection and reactive intervention are often insufficient to prevent losses linked to variability, rework, or unplanned downtime.

Conventional quality management in feed production relies heavily on sampling, laboratory analysis, and statistical process control to identify deviations once they have already occurred. These methods remain essential for compliance and verification, but their retrospective nature limits their ability to prevent quality issues before they affect production. In many feed mills, quality deviations are only fully understood after production has moved on, when laboratory results confirm an issue that operators had already suspected but could not quantify in time.

Advances in artificial intelligence (AI) and machine learning (ML) are enabling a shift toward predictive quality control and more proactive process

optimization. Rather than replacing existing quality systems, these technologies complement established practices by analyzing process data continuously and identifying early signs of process drift before they result in quality failures or performance losses.

Modern feed mills already generate significant volumes of operational data, including process parameters such as temperature, pressure, throughput, and energy consumption; equipment-related signals such as vibration and motor load; raw material characteristics including moisture content and bulk density; and quality indicators such as pellet durability index (PDI), fines percentage, and homogeneity. Historically, much of this data has been reviewed in isolation or used primarily for troubleshooting after an issue has occurred.

Machine learning models are designed to evaluate these variables simultaneously rather than independently. This capability is particularly relevant in feed manufacturing, where quality outcomes are rarely driven by a single parameter. Instead, they result from the interaction between formulation, con-

ditioning, equipment condition, environmental factors, and raw material variability. ML-based systems can identify patterns in which individual parameters remain within acceptable limits, yet their combined behavior increases the likelihood of pellet quality deterioration, nutrient losses, or process instability.

Traditional control systems depend on fixed thresholds and alarms, which are effective for detecting clear failures but less suited to identifying subtle, emerging risks. Predictive models learn from historical and real-time data to recognize combinations of conditions that typically precede defects, yield loss, or equipment issues. This allows production teams to intervene earlier and with greater precision, adjusting process settings or maintenance actions before deviations escalate.

At this point, many organizations make a critical mistake. Predictive quality is often treated as a data or technology initiative rather than an operating capability. Models are developed, dashboards are deployed, but the way decisions are made on the plant floor remains unchanged. When predictions are not clearly linked to authority, responsibility, and action, they add information without reducing variability.

The difference between leaders and laggards is rarely the sophistication of their algorithms. It is whether predictive insight is allowed to influence daily operations. Leading feed mills define in advance how predictive signals will be acted upon, who owns the response, and how interventions are prioritized. Laggards continue to rely on experience and intuition alone, using predictive tools mainly to explain issues after they have already occurred.

The practical value of predictive quality systems depends on how effectively these insights are integrated into daily workflows. Predictive outputs must translate into clear, actionable guidance for operators, quality teams, and maintenance staff. In feed mills, this may involve adjusting conditioning parameters to stabilize pellet quality, scheduling maintenance based on predicted wear rather than fixed intervals, or modifying ingredient handling to compensate for

incoming raw material variability. When these insights are embedded into standard operating procedures, reliance on reactive troubleshooting and emergency interventions can be reduced.

Beyond defect prevention, predictive quality control supports broader process stabilization and optimization. By identifying which variables have the greatest influence on quality and efficiency, feed manufacturers can narrow operating ranges and reduce unnecessary variability. This contributes to more consistent finished feed, improved nutrient retention, and more predictable production performance. In many cases, greater stability also supports higher throughput, lower energy consumption, and reduced waste.

Implementation challenges remain. Data quality is a common constraint, as incomplete or poorly contextualized data limits model effectiveness. Organizational alignment is equally important, as predictive quality systems typically span quality, production, maintenance, and IT functions. Clear ownership and defined response protocols are essential to ensure predictions lead to timely and appropriate action. Expectations must also be managed, as predictive models improve progressively as they learn from ongoing operational feedback.

As feed manufacturers face growing demands for consistency, traceability, and efficiency, predictive quality control and process optimization are becoming strategic capabilities rather than experimental tools. AI and machine learning support a transition from reactive quality management toward earlier, more informed intervention, helping operations remain stable in an increasingly complex production environment.

Ultimately, predictive quality is less about seeing problems earlier and more about deciding differently when early signals appear. Feed mills that treat prediction as operational authority, rather than advisory information, move from managing variability to controlling it. In that sense, the competitive advantage does not come from the model itself, but from the discipline to act on what the process is already telling you.



Yunuen Bustamante

*University of Hawai'i at Mānoa,
College of Tropical Agriculture
and Human Resources*

Melelani Oshiro

*University of Hawai'i at Mānoa,
College of Tropical Agriculture
and Human Resources*

CHICKENS EATING KALO LEAVES? A FOWL-TASTIC SUPERFOOD

“Kalo leaves present a promising alternative feed ingredient for poultry, offering high protein content, essential vitamins, and improved digestibility. Studies indicate that incorporating kalo leaf meal at levels of 5% to 7% in broiler diets enhances growth performance, nutrient composition, and cost efficiency.”

Taro (*Colocasia esculenta*), widely known as kalo in Hawai'i, is a tropical plant that offers a viable alternative feed source for poultry. Studies suggest incorporating kalo leaves into chicken diets can enhance nutrient composition, digestibility, and meat quality while reducing feed costs. A study conducted in Ethiopia (Temesgen, Retta & Tesfaye, 2017) found that kalo leaves, rich in proteins, carotene, and trace minerals, can replace up to 7% of soybean meal in chicken feed, improving growth performance and cost efficiency. This alternative feed source is particularly relevant in Hawai'i, where livestock producers face high feed costs and food security concerns.

NUTRITIONAL COMPOSITION OF KALO LEAVES

Kalo leaves provide essential nutrients beneficial to poultry, including:

- **Proteins:** Crucial for the growth and development of chickens.
- **Carotene:** A precursor to vitamin A, essential for vision, growth, and immune function.
- **Trace Minerals:** Includes iron (Fe), zinc (Zn), and copper (Cu), vital for metabolic processes.
- **Vitamins:** Contains vitamin C, which supports immune function and overall health.
- **Digestible Fiber:** High in soluble fiber, promoting nutrient absorption and digestion.
- **Ash Content:** Indicates a good supply of minerals essential for poultry nutrition.

Kalo leaves contain 86.94% water, 16.48% protein, 17.24% fiber, 1.45% potassium, 0.4% phosphorus, 4.3% fat, 30.46% digestible carbohydrates, and provide 3966 kcal/kg of energy (Suwitari N., Suariani L., Yudiastari N. 2022).

DIET PREPARATION AND TREATMENT FORMULATION

Freshly picked kalo leaves were separated from their veins and dried in a shaded environment for four days. The dried leaves were then ground into a fine powder using a stainless steel hammer mill (1.6 mm particle size) and stored in a cool, dry place for later use in feed formulations.

Four dietary treatments were prepared, incorporating kalo leaf meal at 0%, 3%, 5%, and 7% levels to replace soybean meal as a protein source in broiler diets. The feed formulation included maize (*Zea mays*), noug seed (*Guizotia abyssinica*) cake, wheat middlings (*Triticum sp.*), soybean cake (*Glycine max*), vitamin premix, salt, limestone, methionine, and lysine to meet the chickens' nutrient requirements (Temesgen *et al.*, 2017).

RESULTS

Statistical analysis demonstrated that incorporating kalo leaf meal significantly ($P < 0.01$) affected the digestibility of crude protein. The results showed improved growth performance, particularly at higher inclusion rates (5% and 7%).

Temesgen *et al.* (2017) also found that chickens fed higher levels of kalo leaf meal (5% and 7%) had breast muscles with superior nutrient composition, higher protein, lower crude fiber, and en-

hanced vitamin C content compared to those fed lower levels.

ANTI-NUTRITIONAL FACTORS

Despite its benefits, kalo leaves contain some anti-nutritional compounds, including:

- **Oxalate:** Binds to minerals, reducing bioavailability.
- **Tannin:** Interferes with protein digestion and nutrient absorption.
- **Phytate:** Binds essential minerals, decreasing absorption efficiency.

However, the levels of these compounds in kalo leaves are relatively low and do not significantly impact feed intake or nutrient utilization in chickens. Anti-nutritional factors can be mitigated by processing methods such as drying, heating, or fermentation before feeding to poultry according to Suwitari *et al.* (2022).

CONCLUSION

Kalo leaves present a promising alternative feed ingredient for poultry, offering high protein content, essential vitamins, and improved digestibility. Studies indicate that incorporating kalo leaf meal at levels of 5% to 7% in broiler diets enhances growth performance, nutrient composition, and cost efficiency. While kalo leaves contain some anti-nutritional factors, proper processing methods

Parameters	0% kalo leaf	3% kalo leaf	5% kalo leaf	7% kalo leaf
Dry feed intake (grams/bird)	76.33	74.25	82.17	79.19
Initial body weight (grams/bird)	43.5	42.95	42.25	40.56
Final body weight (grams/bird)	1106	1010.63	1279.65	1324.50
Body weight change (grams/bird)	1062.5	967.68	1237.40	1283.94
Average daily growth (grams/bird)	18.89	18.66	25.28	29.53
Protein content (%)	21.3	21.27	21.62	21.77
Digestibility (%)	99.6	99.62	99.64	99.68

effectively mitigate their impact, ensuring safe and beneficial inclusion in poultry feed. Given Hawai'i's high feed costs and food security concerns, utilizing kalo leaves as a sustainable feed source could provide economic and nutritional advantages for local poultry producers.

References:

- Temesgen, M., Retta, N., Tesfaye E. (2017). *Nutrient Composition and Digestibility of Taro Leaf in the Diets of Chicken and Effects on the Meat Quality*. *Journal of Nutrition, Health & Food Engineering*, 7(3): 00238. DOI: 10.15406/jnbfe.2017.07.00238
- Suwitari, N., Suariani, L., Yudiaستاري, N. (2022) *The Effect of the Use of Taro Leaf Flour on the Digestiveness of Native Chicken Rate*. In *WICSTH 2021: Proceedings of the 1st Warmadewa International Conference on Science, Technology and Humanity, WICSTH 2021, 7-8 September 2021, Denpasar, Bali, Indonesia* (p. 56). European Alliance for Innovation.

Disclaimer

This literature review is for informational and educational purposes only. While kalo leaves show promise as an alternative poultry feed, producers should carefully consider anti-nutritional compounds, proper feed formulation, and poultry health. The University of Hawai'i at Mānoa and the authors are not liable for any outcomes resulting from the use of kalo leaves in poultry feed without professional evaluation and guidance.



Photo: University of Hawai'i

About Yunuen Bustamante

Yunuen Bustamante recently joined the University of Hawaii at Manoa as a Livestock Extension Agent for Oahu County. She holds a Master's degree in Agroforestry from the Autonomous University of Chapingo in Mexico. Her extension program focuses on promoting sustainable livestock practices, improving animal nutrition and health, advancing animal welfare, and providing youth education.

About Melelani A. Oshiro

Melelani A. Oshiro has been with UH Mānoa's College of Tropical Agriculture and Human Resilience (CTAHR) since 2009, transitioning from Research Assistant to Associate Extension Agent for Livestock Programs in 2019. She holds an MS in Animal Science, focused on grass-finished beef systems. Her Extension work centers on livestock production, health, husbandry, and low-stress stockmanship, and she also serves as Hawaii's Beef Quality Assurance (BQA) Coordinator and trainer.



FEED EFFICIENCY STARTS WITH THE RIGHT PROTEIN SOURCE

Dr. Essi Evans
President
E+E Technical Advisory Services

Feed efficiency starts with the right protein source. Feeding excess crude protein wastes energy and reduces efficiency. By focusing on the amino acid balance of a ration, rather than total protein level, dairy cows conserve energy. Microbial protein supplies about half of the needs; the remainder must fit properly. Efficient amino acid balancing helps cows make better use of energy and supports higher milk yields.

Protein plays a critical role in milk production and cow health, growth and reproduction. For years, the industry has aimed to meet dairy cow needs by including more protein in rations than needed to ensure an adequate supply. However, ongoing research suggests that feeding more protein doesn't necessarily correlate with better performance.

Feeding excess protein can have unintended consequences, including wasted energy and reduced efficiency. By looking closer at the amino acid balance of a ration and optimizing it rather than focusing on total protein level, you can help reduce nutrient waste, conserve energy and improve overall feed efficiency.

HOW IS PROTEIN USED BY A DAIRY COW?

True protein consists of amino acids, which are composed of nitrogen and carbon. Crude protein, on the other hand, includes both amino acids and non-protein nitrogen sources.

When we talk about protein in dairy diets, we need to consider what the rumen microbes can use. The microbes are not particular about whether ni-

rogen comes from a true protein or non-protein source as long as it's accessible to them.

In order for nitrogen to be used by rumen microbes, it needs to be both soluble and degradable. The microbes use this nitrogen to grow and digest fiber and other nutrients, which supplies energy to the cow and supports microbial growth. The microbes help supply the majority of the protein that is needed by the cow. They also provide amino acids in the proportions that the cow needs for all her protein-requiring functions.

SOLVING THE PROTEIN PUZZLE

In general terms, about 8 to 10% of ration dry matter is converted into microbial protein. The remainder of the cow's diet needs to supply the rest of the amino acids she requires to thrive. The closer this balance of amino acids aligns with the cow's requirements, the less energy she spends synthesizing the proteins she needs.

Think of amino acid balance as a puzzle: about half of the pieces are provided by the microbial pro-

tein. If the rest of the dietary pieces are readily available and fit properly, the cow completes the puzzle efficiently. If pieces are missing or there are too many, energy will be diverted from milk production to managing the imbalance, either by compensating or disposing of the excess.

Every gram of excess protein that a cow doesn't use is a gram she must eliminate. That disposal costs energy which could otherwise be used to support milk production.

In one beef cattle study, feeding excess protein from corn byproducts (poorly balanced proteins) increased maintenance energy use by more than 5%.¹ This energy was spent breaking down the excess protein, converting it into urea via the liver and then sending the urea to the kidneys to be excreted.

Another study determined that excess dietary protein directly impacts milk gross energy output, which means the disposal of any protein overage has a direct effect on milk yield.²

Table 1. Calculating the ability of feed ingredients to meet the demands for milk production³

Amino Acid	Needs	Microbial supply	Deficit	Barley	Corn	Soybean meal	Canola meal	Fishmeal
Amount, g								
Lysine	99.7	81.8	17.9	17.9	17.9	26.6	21.5	28.7
Methionine	31.4	25.4	6	8.7	13.1	6	8	10.5
Threonine	68.4	58.6	9.8	16.9	21.5	16.7	17.5	16.1
Isoleucine	66.6	64.1	2.5	17.9	20.9	20.6	15.3	15.4
Leucine	113.1	85.1	28	34.8	74	33.4	28	28
Valine	75.9	68.5	7.4	25.6	32.2	20.6	20.4	18.9
Phenylalanine	59.4	56.4	3	25.2	28.6	21.4	15.6	14.4
Overage								
Lysine				0	0	8.7	3.6	10.8
Methionine				2.7	7.1	0	2	4.5
Threonine				7.1	11.7	6.9	7.7	6.3
Isoleucine				15.4	18.4	18.1	12.8	12.9
Leucine				6.8	46	5.4	0	0
Valine				18.2	24.8	13.2	13	11.5
Phenylalanine				22.2	25.6	18.4	12.6	11.4
Total				72.4	133.6	70.7	51.7	57.4

WHAT IS THE “IDEAL” PROTEIN FOR DAIRY COWS?

To help farmers visualize amino acid balancing, Danish researchers explored the concept of an “ideal” protein for dairy.³ An ideal protein may be from a single source, or it can be formed from mixtures of protein ingredients that collectively meet the ideal amino acid requirements, while minimizing excess that must be disposed of through the liver and kidneys.

The researchers presented an example where they calculated amino acid needs for a cow producing 66 pounds of milk and evaluated how well different feed ingredients – barley, corn, soybean meal, canola meal and fishmeal – filled the gap left after microbial contribution (Table 1).

Using estimates for how much each amino acid would be available from rumen microbes, they calculated the deficit by subtracting the microbial supply from the total needs and then determined how much protein from each of the ingredients would be needed to fulfill the deficit.

For each ingredient, the protein inclusion rate stopped when the limiting amino acid was met. To demonstrate the excess, the deficit was subtracted from the amount of the ingredient provided after the first limiting amino acid was met. The values are zero for the limiting amino acid. The total overage is the amount that must be processed by the cow.

This research demonstrates that some proteins are better aligned with the cow’s amino acid requirements. For this example, canola meal stands out as a highly efficient source.

This example found that canola meal and fishmeal were the proteins that best meet the needs of

the cow. Corn protein is a poor source of amino acids when it comes to meeting the needs of cows for milk production. The amino acids from barley and soybean meal are intermediate sources.

PRECISE FEEDING PAYS OFF

While meeting the amino acid needs of cows is essential for milk production, doing so conservatively is more important as it’s the cow’s energy use that determines how she performs. By meeting the amino acid needs of cows and avoiding overage, less energy is wasted.

However, these energy losses may not be considered by ration formulation programs and consequently, an opportunity for greater milk production and improved feed efficiency can be lost.

When formulating rations, it’s important to go beyond just meeting crude protein levels. Targeting the right amino acid profile helps you reduce energy waste and optimize protein utilization and milk production.

By focusing on the quality of protein sources, particularly those like canola meal that deliver amino acids more efficiently, you can improve milk yield, reduce energy waste and support long-term performance.

References:

¹Jennings, J.S., Meyer, B.E., Guiroy, P.J. and Cole, N.A., 2018. *Energy costs of feeding excess protein from corn-based by-products to finishing cattle*. *Journal of Animal Science*, 96(2), pp.653-669.

²Reed, K.F., Bonfá, H.C., Dijkstra, J., Casper, D.P. and Kebreab, E., 2017. *Estimating the energetic cost of feeding excess dietary nitrogen to dairy cows*. *Journal of Dairy Science*, 100(9), pp.7116-7126.

³Boisen, S., Hvelplund, T. and Weisbjerg, M.R., 2000. *Ideal amino acid profiles as a basis for feed protein evaluation*. *Livestock Production Science*, 64(2-3), pp.239-251.

About Dr. Essi Evans

Dr. Essi Evans is an experienced nutritionist with a long history of working in the animal research field. As president of E+E Technical Advisory Services, she assists and advises her clients through technical and managerial support to overcome research and development challenges. Evans’s work focuses on mathematical modeling, research trial design, technical support and product development.



Precision Technology in Piglet Nutrition: **DUAL MICROENCAPSULATION FOR TARGETED GUT HEALTH**

Dr. Stephanie Ladirat

R&D Director

Nuqo Feed Additives

“Dual microencapsulation represents a significant advancement in feed additive design, providing precision, consistency, and multifunctionality through the controlled, sequential release of bioactive compounds. By protecting sensitive molecules during feed processing and gastric passage, the technology ensures their targeted availability in specific regions of the gastrointestinal tract, where they can modulate microbiota, support digestive function, and enhance immune resilience.”

The transition from traditional, high-dose feed additives toward precision-based nutritional strategies reflects a broader shift in animal production systems. Dual microencapsulation represents an advanced technology designed to provide controlled and site-specific release of bioactive compounds within the gastrointestinal tract. By safeguarding sensitive molecules and ensuring their targeted availability, this approach supports intestinal health, enhances feed efficiency, and contributes to more sustainable strategies for early-life nutrition in pigs.

MODERN CHALLENGES IN GUT HEALTH MANAGEMENT

Contemporary pig production is undergoing a transformation, shaped by stricter regulations, heightened consumer expectations, and sustainability imperatives. Among the most pressing concerns is the management of gut health and performance in piglets during weaning, without relying on pharmacological interventions such as antibiotics or high doses of zinc oxide.

Weaning remains one of the most critical and stressful phases in a piglet's life. Piglets face abrupt separation from the sow, dietary transition to solid feed, environmental changes, and shifts in microbial exposure. These stressors compromise intestinal integrity, destabilize microbial populations, and strain immune responses. As a result, weaning is frequently associated with reduced feed intake, impaired nutrient absorption, intestinal inflammation, microbial imbalance, and increased susceptibility to enteric disorders such as post-weaning diarrhea (PWD).

Historically, pharmacological doses of zinc oxide and antibiotic growth promoters provided effective protection against pathogens such as enterotoxigenic *Escherichia coli* (ETEC). However, the ban on zinc oxide in Europe and the global effort to reduce antibiotic use in livestock have driven the need for novel approaches that maintain piglet health and productivity while minimizing ecological and food safety concerns.

A wide range of alternatives—organic acids, probiotics, phytogenics, postbiotics, and enzyme

preparations—has been explored. While many of these exhibit partial benefits, their limitations often stem from inconsistent delivery, poor stability, or uncontrolled release within the digestive tract. This has highlighted the need for advanced delivery systems capable of maximizing efficacy while remaining adaptable to commercial conditions.

DUAL MICROENCAPSULATION: PRINCIPLES AND ADVANTAGES

Dual microencapsulation is an emerging feed additive technology designed to overcome these limitations. Unlike unprotected or single-coated active compounds, dual-layered encapsulation provides a two-phase release mechanism that aligns with the physiological conditions of the gastrointestinal tract.

The outer layer, typically composed of functional phytogenic and phycogenic metabolites, can exert antimicrobial, antioxidant, and anti-inflammatory effects in the proximal small intestine, thereby stimulating digestive function and protecting mucosal tissues. A subsequent inner layer, containing organic acids or other antimicrobial molecules, is released later in the intestinal tract where pathogenic challenges are more prevalent.

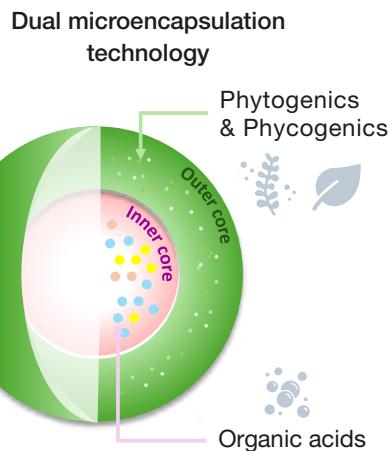
This sequential release confers several advantages:

- Protection of sensitive compounds from degradation in the upper digestive tract.
- Targeted delivery of actives where their effects are most beneficial.
- Reduced variability compared to conventional products that rely on high inclusion levels or unprotected ingredients.
- Lower required dosages, minimizing costs and environmental impact while maintaining efficacy.

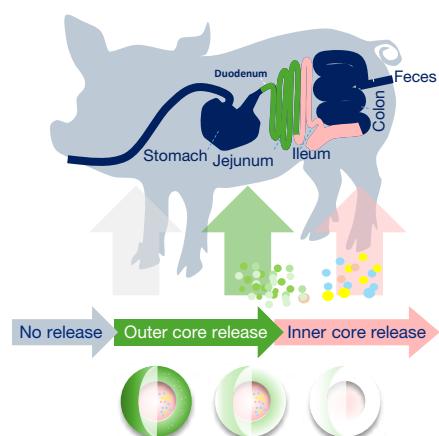
Such systems provide both local benefits, such as microbiota modulation and epithelial barrier support, and systemic outcomes, including improved nutrient utilization and immune function.

EVIDENCE FROM FARM TRIALS

Field evaluations have provided valuable insights into the practical benefits of dual microencapsula-



Mode of action of dual microencapsulation



Effect of dual microencapsulation vs non-encapsulated organic acids

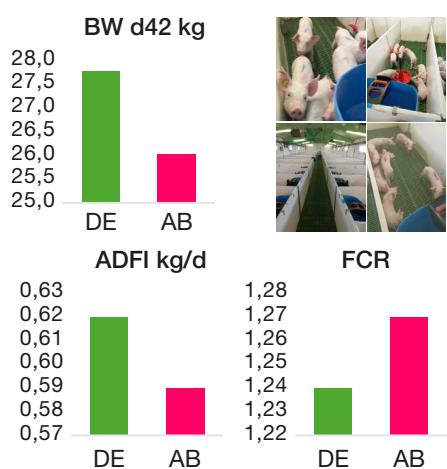




Photo: Nuqo

tion. In a trial conducted on a commercial pig farm in Spain during 2024, the performance of piglets receiving a diet supplemented with a dual-encapsulated formulation was compared against a diet supplemented with high doses of a non-encapsulated acid blend. The study involved two groups of piglets over a 42-day post-weaning period:

1. A control group fed a standard diet supplemented with 8 kg/t of an acid blend from days 1–14 and 4 kg/t from days 15–42.
2. A treatment group receiving the same basal diet with 800 g/t of a dual-encapsulated formulation while still receiving 2 kg/t of the acid blend from days 1–14, and 1 kg/t from days 15–42.

Performance indicators included average daily gain (ADG), feed intake, feed conversion ratio (FCR), fecal consistency, and veterinary interventions. Fecal samples were analyzed at the end of the trial to assess microbial composition. Results showed that piglets receiving the dual-encapsulated formulation exhibited:

- +8% increase in ADG compared to the control.
- +5.5% increase in feed intake, resulting in a 2.5% improvement in FCR.
- Improved fecal consistency, with fewer cases of diarrhea and reduced need for electrolyte treatments.
- Favorable shifts in gut microbiota, including lower *E. coli* counts and higher abundances of beneficial bacteria such as *Lachnospiraceae* (butyrate producers) and lactic acid bacteria.

An economic assessment further highlighted a return on investment exceeding 8:1, driven by improved growth, reduced veterinary costs, and enhanced feed efficiency.

IMPLICATIONS FOR PIG PRODUCTION

These findings underscore the potential of dual microencapsulation technologies to serve as reliable and sustainable alternatives to pharmacological additives. By combining site-specific delivery with multi-targeted functionality, they address the complex biological challenges of the weaning phase more comprehensively than single-mode solutions. From a practical perspective, dual encapsulation supports:

- More uniform piglet performance,
- Enhanced resilience to microbial challenges,
- Reduced dependence on high-dose additives,
- Improved economic sustainability of production.

As global pig production continues to evolve, technologies that integrate precision delivery with proven biological efficacy are likely to play a central role in shaping the future of swine nutrition.

CONCLUSION

Dual microencapsulation represents a significant advancement in feed additive design, providing precision, consistency, and multifunctionality through the controlled, sequential release of bioactive compounds. By protecting sensitive molecules during feed processing and gastric passage, the technology ensures their targeted availability in specific regions of the gastrointestinal tract, where they can modulate microbiota, support digestive function, and enhance immune resilience. This stepwise delivery allows diverse functional compounds - such as antimicrobials, antioxidants, and immunomodulators - to act synergistically at appropriate intestinal sites, improving nutrient utilization, gut health, and growth performance while reducing the need for high-dose additives or pharmacological interventions. The approach also minimizes variability in outcomes, enables lower inclusion levels, and aligns with sustainable production goals by supporting animal welfare and reducing reliance on antibiotics or zinc oxide. Ongoing field applications and research demonstrate that dual microencapsulation provides a science-based, practical solution for optimizing post-weaning piglet nutrition, integrating performance, health, and sustainability in modern swine production.



SILKWORM PUPAE AND THE FUTURE OF BIO-CIRCULAR FEED SYSTEMS

Ankit Alok Bagaria
*CEO & Co-Founder
 Loopworm Private Limited*

Traditional animal nutrition methods are shifting toward biotechnology-driven preventive strategies due to antimicrobial resistance and environmental constraints. In this context, silkworm pupae offer a bio-circular ingredient with high digestible protein and bioactive peptides. This resource, validated in aquaculture and livestock, plays a critical role in supporting immunity, enhancing stress tolerance, and building sustainable food systems.

Today, almost 86% of the world's population consumes animal-derived foods, from milk and meat to eggs and fish, for their nutrition. Close to 12% of the world's population directly depends on these foods for livelihood. As population rises and production of animal nutrition scales, the impact on land and water, the effects of climate change, and the threat of antimicrobial resistance and zoonotic disease outbreaks are already on the horizon.

Under these constraints, how can we look at 'performance' and 'productivity'? While we optimise these systems for more productivity, we also need to consider how they shape food security, environmental systems and public health. The One Health approach, which focuses on preventing, predicting, detecting, and responding, helps chart the fundamental interconnectedness of these three aspects while using a multidisciplinary framework to provide holistic strategies.

NUTRITION FOR THE NEXT-GEN

For much of the past few decades, short-term gains have been the priority for animal nutrition. Despite

the negative impacts of feed ingredients like soymeal and fishmeal on land and water, they were preferred for enhancing performance. Antibiotics and synthetic additives were preferred for increased short-term output. But what we did gain in performance in the short run, we paid for in the long term with antibiotic resistance, ecosystem degradation, and nutritional imbalances that have disrupted the food chain.

It clearly showed us that nutrition is not just a feed industry concern. It is health policy, environmental commitment, and moral responsibility rolled into one. Feed choices now shape outcomes far beyond growth rates and feed conversion ratios. They determine gut integrity, immune function, disease susceptibility, antimicrobial dependency, and the resilience of production systems over time. Within the industry, this has prompted a shift from a reactive strategy for diseases to one of preventing them from the get-go. Functional feeds that support gut integrity and microbiome balance are increasingly viewed as complementing biosecurity and management practices while reducing dependence on antimicrobials.

A CRISIS WITHOUT HEADLINES – ANTIMICROBIAL RESISTANCE

AMR has quietly become one of the most pressing global threats of our time. Once considered a breakthrough in animal agriculture, antibiotics were used to grow and treat animals and aid the rapid scaling of animal farms. Antibiotics have been routinely mixed with animal feed over the last few decades. This has created an incubator for superbugs that are resistant to treatment to thrive in. These superbugs are not just confined to farms. They move through soil and water runoff and thrive. They reach humans through food and spread through direct contact between animals and people. Consequently, infections are becoming harder and harder to treat. Approximately 1 million people die of AMR each year and the number is only growing. While antibiotics are a double-edged sword, it is unlikely and unethical to stop using antibiotics. That leaves us with the option to find a way to build systems beyond antibiotics.

BIOTECH TO THE RESCUE?

The bridge between nutrition and AMR resilience is being paved by biotech. It allows for nutrition to function as a preventive, biologically aligned intervention. Instead of a one-size-fits-all approach, biotechnology provides an arsenal of tools that enable better nutrition for animals. There have been numerous advances in fermentation, enzyme technology, and microbial products; furthermore, precision biomolecules can truly change the feed game. They ensure that

nutritional feed can cause fewer health disruptions, improve survival, and provide more stable economics.

In an industry where predictability is as important as innovation, biotech has enabled exactly that. By turning traditional feed into a powerful preventive tool, biotech is reimagining nutrition as a first line of defence. In the years ahead, a bag of feed will represent a bioengineered ecosystem. It will be a customized formula designed to promote gut health and elevate productivity naturally. The future of preventive health is in the feed mill, the fermentation tank, and the genetics lab.

INSECTS AND CIRCULAR BIORESOURCES

Feed formulation is undergoing a strategic pivot, and diversification is the hot topic of conversation. Plant protein concentrates, microbial biomass, algae-derived lipids, and insect-based ingredients are being used, not as replacements for conventional inputs, but as ingredients in diversified portfolios. Within alternative protein sources, insect-derived ingredients offer a compelling case. They contain high protein content, balanced amino acid profiles, and functional lipids. The cherry on top is that insects require relatively little land and water.

Sure, alternatives exist, but the question for next-gen nutrition is if they can deliver commercially viable results every single time across contexts and geographies without birthing new vulnerabilities.

THE NEW SILK ROAD:

A great example of a commercially viable bio-circular ingredient is silkworm pupae. A byproduct of sericulture, silkworm pupae are at the heart of our work at Loopworm. Sustainability elevates them as a circular economy star. With established supply chains and proven nutritional value, they are transforming animal feeds for trout, salmon, shrimp, poultry, and swine.

Typically, they contain 50–60% crude protein and 20–30% lipids, and deliver better digestibility along with bioactive compounds that support immune function and stress tolerance. These pupae are high-performance ingredients that boost productivity and fortify immunity.



Photo: Loopworm

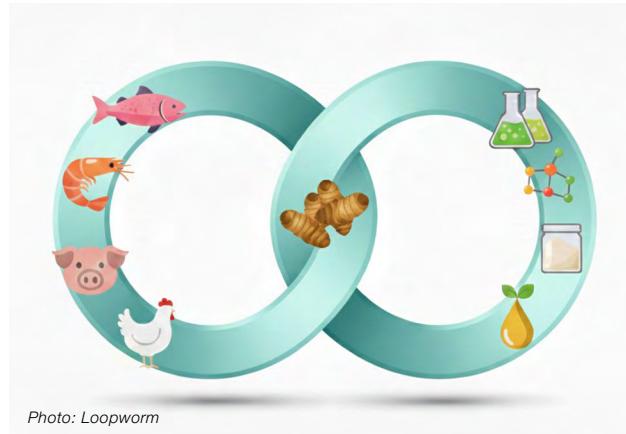
Silkworm pupae are nutritionally dense and highly bioactive. They contain high quantities of lysine, methionine, phospholipids, and omega-3, -6, and -9 fatty acids. According to a study published in 2021, silkworm pupae proteins exhibit high digestibility. Their PDCAAS score is 86. Lipids gain extra stability from tocopherol-phospholipid synergy, which preserves feed integrity and enhances omega-3 enrichment in meat and fillets.

In aquaculture, performance data is compelling. According to the Aquaculture journal (2019), in Pacific white shrimp, a full fishmeal replacement with defatted silkworm pupae improved growth and antioxidant capacity. Researchers recommended up to 75% substitution to safeguard hepatopancreas health. Rainbow trout thrived on 5 to 15% silkworm inclusion, matching fishmeal growth. As per the studies conducted between 2019 and 2025 on salmonids and crustaceans, bioactive peptides enhanced immunity and slashed disease losses by up to 40% through better pathogen resistance.

Livestock sectors report parallel wins. As per studies conducted between 2021 and 2024, broilers fed 4-10% of defatted silkworm pupae showed high growth and high stress resistance. For swine, as researched by animal nutritionists in heat stress models, the balanced amino acids in silkworms supported liveweight gains and gut health. Furthermore, they comply with EU regulations, reduce emissions, and bolster gut microbiota for stress resilience.

FROM CLAIMS TO CREDIBILITY

Along with attention comes scrutiny, deservedly. This has made sure that transparency is the baseline. Assurances, claims and vague labels no longer satisfy consumers, regulators and buyers. However, unverified sustainability narratives are still a common



theme. When promises exceed proof, trust fractures precisely when the food system can least afford it.

The questions confronting animal nutrition and biotechnology have become surgical. What does "antibiotic-free" mean across the entire production cycle? How traceable is each ingredient from origin to feed mill? Where is the evidence for claims about immune function, environmental impact, or contaminant levels? Only rigorous data, reproducible results, and independent validation can provide answers. Documenting performance through controlled trials is a must before making claims at all.

NUTRITION AS THE FOUNDATIONAL INFRASTRUCTURE FOR THE FUTURE

While breakthrough ingredients form a small part of the nutrition story, the other part of the story is about how effectively we embed nutritional strategy into the structural fabric of food systems.

Adopting a One Health lens means accepting this responsibility fully. It requires choices grounded in biology, validated through science, and proven at commercial scale. This is not simply an industry priority. It is fundamental to preserving the trust on which global food security depends.

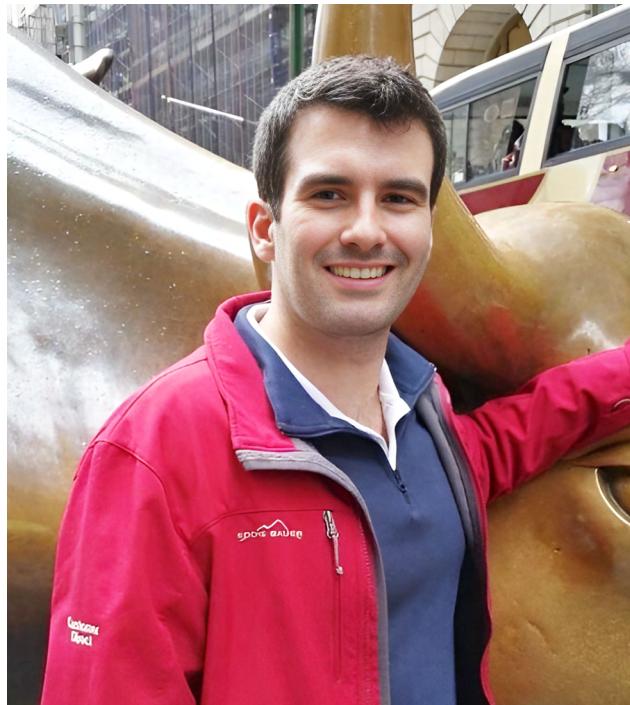
About Ankit Alok Bagaria

Ankit Alok Bagaria is the CEO & Co-Founder of Loopworm, one of India's largest insect-biomanufacturing platforms supplying proteins and lipids for aquaculture, poultry, pet, and specialty nutrition. An IIT Roorkee alumnus, he leads business development, R&D, and product strategy, focused on scalable manufacturing and bio-circularity. A Forbes 30 Under 30 Asia honouree, he is redefining global biomanufacturing and building a new silk road from India.

Chris Trant, Head of US Agriculture

at Hedgepoint: "It all comes down to Brazil and Argentina's 2026 crop.

Hedgepoint Market Intelligence analyst team estimates, with normal weather and trend line yields, Brazil may have a record soybean crop of 178 mmt. Should that crop materialize without a negative impact from La Niña, the trend of large global crops keeping prices contained will likely continue in the short term."



NAVIGATING CORN AND SOYBEAN MARKETS FOR FEED IN AN UNCERTAIN 2026

Rising uncertainty in global agricultural markets—driven by climate volatility, geopolitical tensions and shifting trade flows—is reshaping cost structures and sourcing strategies across the feed industry. Price fluctuations in corn, soybeans and other key feed ingredients are no longer a temporary disruption but have become a structural challenge, making risk management a necessity rather than a choice for producers. In our interview with **Chris Trant, Head of US Agriculture at Hedgepoint**, we examine the 2026 projections and the key dynamics expected to shape markets. Trant addresses critical themes ranging from La Niña risks in South America and China's strategic soybean stock policies to shifting protein demand in the livestock sector and next-generation risk management tools such as "Parametric Derivatives". For feed industry professionals seeking cost stability and supply security in feed raw materials, this analysis offers

valuable insights into navigating an increasingly uncertain year.

Mr. Trant, firstly, could you introduce Hedgepoint to our audience? What do you do, which markets and regions do you specifically focus on?

Hedgepoint is an independent and global Agricultural & Energy risk management firm. Our clients face commodity price volatility as part of their business – our role is to provide clients access to risk management derivatives and tailored strategies to turn risks into opportunities. We have offices across five continents, offering over 450 hedging strategies for more than 60 commodities and currencies.

Speaking from the US Agriculture perspective, our primary clients are those connected with row crop production, commercial processing, and live-

stock feeding. Our role is to offer a menu of custom strategies to fit the client's unique profile and needs.

Looking at 2026, how do you assess the overall outlook for global agriculture, particularly in terms of production trends, trade flows and major macroeconomic pressures?

Let's start with the financial health of the global farmer - where the food supply chain ultimately starts. The farmer is facing a perfect storm of crises – after years of large global crop production, the sale price grains and oilseeds have been pressured. Compounding this revenue problem, the farmer has not been immune to inflation pressure. Costs have gone up: interest rates on loans, seed, chemical inputs, fertilizer, and transportation costs have all increased. The result is margin compression and the potential that the farmer in 2026 may be forced to invest and produce less.

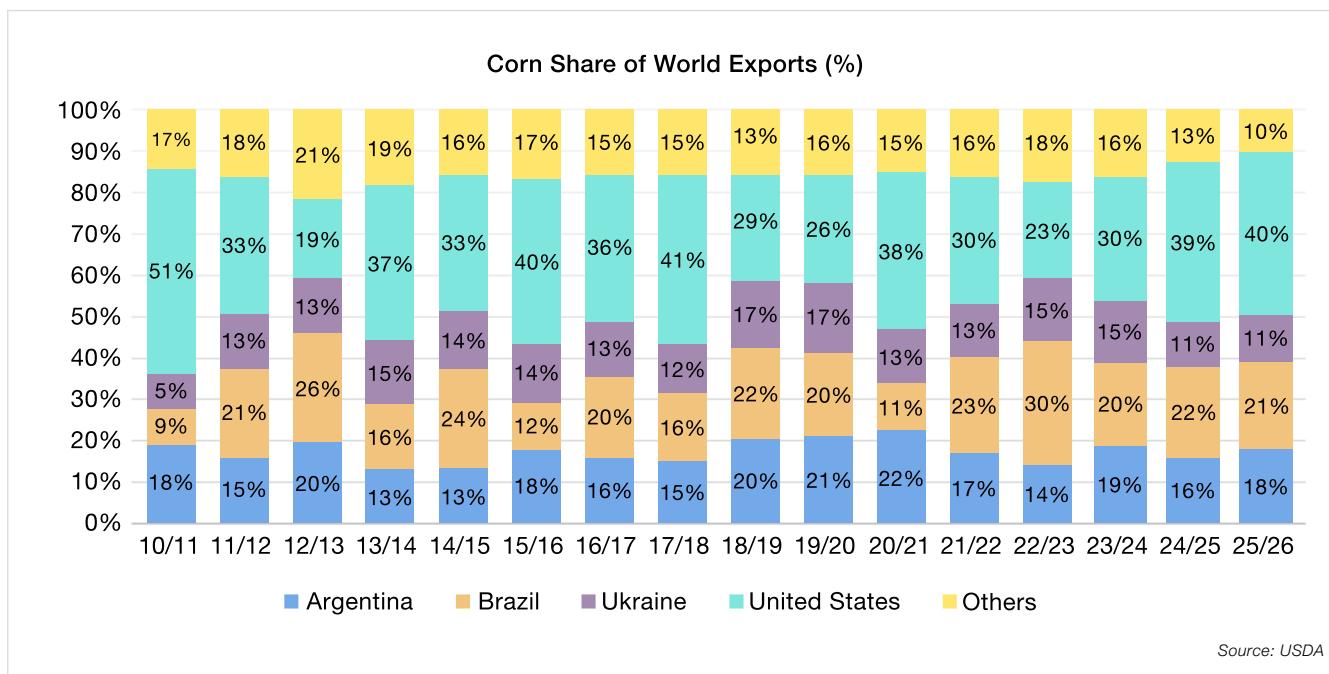
From a global trade flow standpoint, over the past decade, the United States has lost global export market share to South America. With a potential record soybean crop being planted in Brazil and increased US domestic consumption of soybean oil for biodiesel, South America will likely continue to be the critical supply source for global food next year. However, if there is a weather event in South

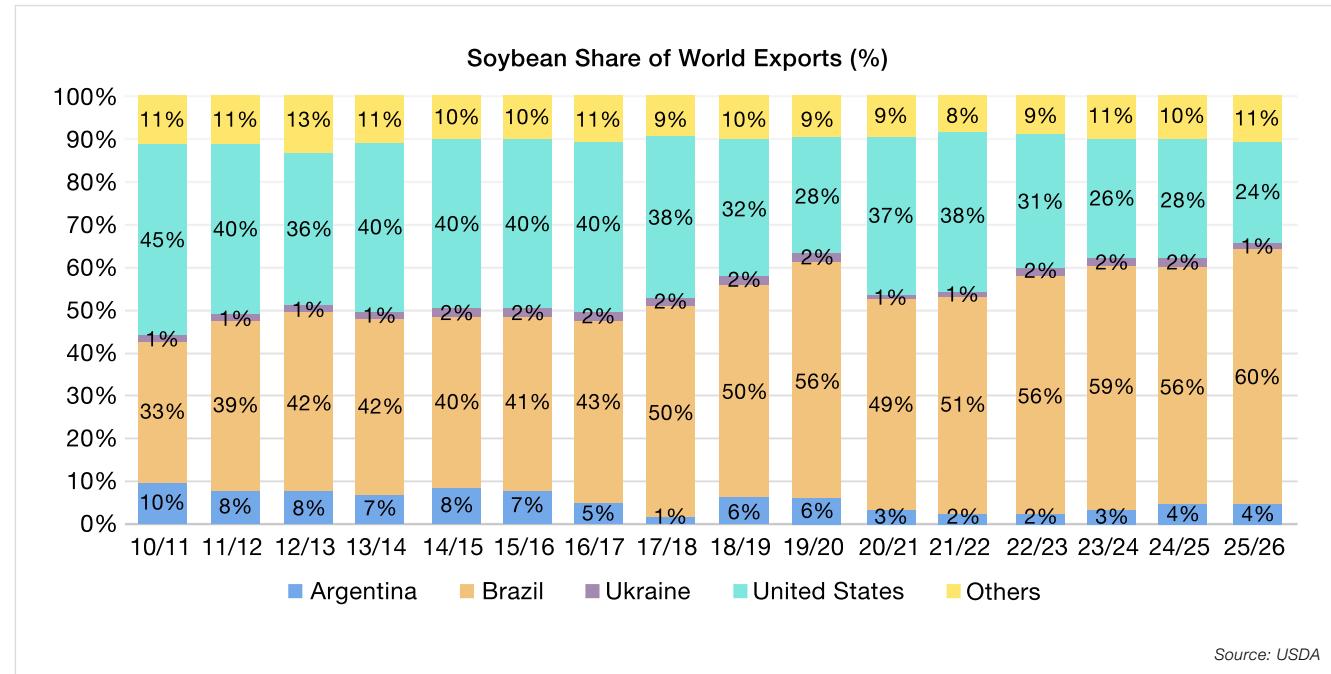
America in 2026, this trend may be upended, as the US will be one of the few sources with ample stocks from 2025.

The United Nations World Food Program projects 318 million people will face acute hunger in 2026- double pre-pandemic levels. This is a man-made famine, not the result of a crop production shortfall, but rather military conflict and associated supply disruptions. Conflicts in Africa, the Black Sea, Red Sea, and Middle East all have served to disrupt the distribution of food.

As you mentioned, weather extremes, logistics disruptions and geopolitical tensions are reshaping commodity markets. How do you expect these factors to influence global grain and oilseed availability in 2026, and which regions do you see as the most vulnerable or resilient?

Climate is becoming increasingly volatile, violent, and unpredictable. Despite that, the world's recent crop cycles have been rather ample. Arguably, the last major supply disruption was in 2022 during the start of Ukraine War. At some point, perhaps in 2026 or perhaps later, the world will have to contend with a climate driven crop production disruption that we have not seen in recent crop cycles.





The region that has the most concerning potential for a weather driven supply disruption in 2026 is the critical global export countries of Brazil and Argentina. The world is facing its 5th La Niña in six years, which may stress crop development in South America. La Niña results in a dryer and warmer trend in major growing regions of South America. With South American farmers beginning their soybean new crop, the market will watch weather trends and crop development very closely.

Should South America have a weather event that impacts crop production, the likely benefactor

would be the United States which has burdensome stocks from 2025's harvest and the ability to meet dislocated export demand should South America experience a production shortage.

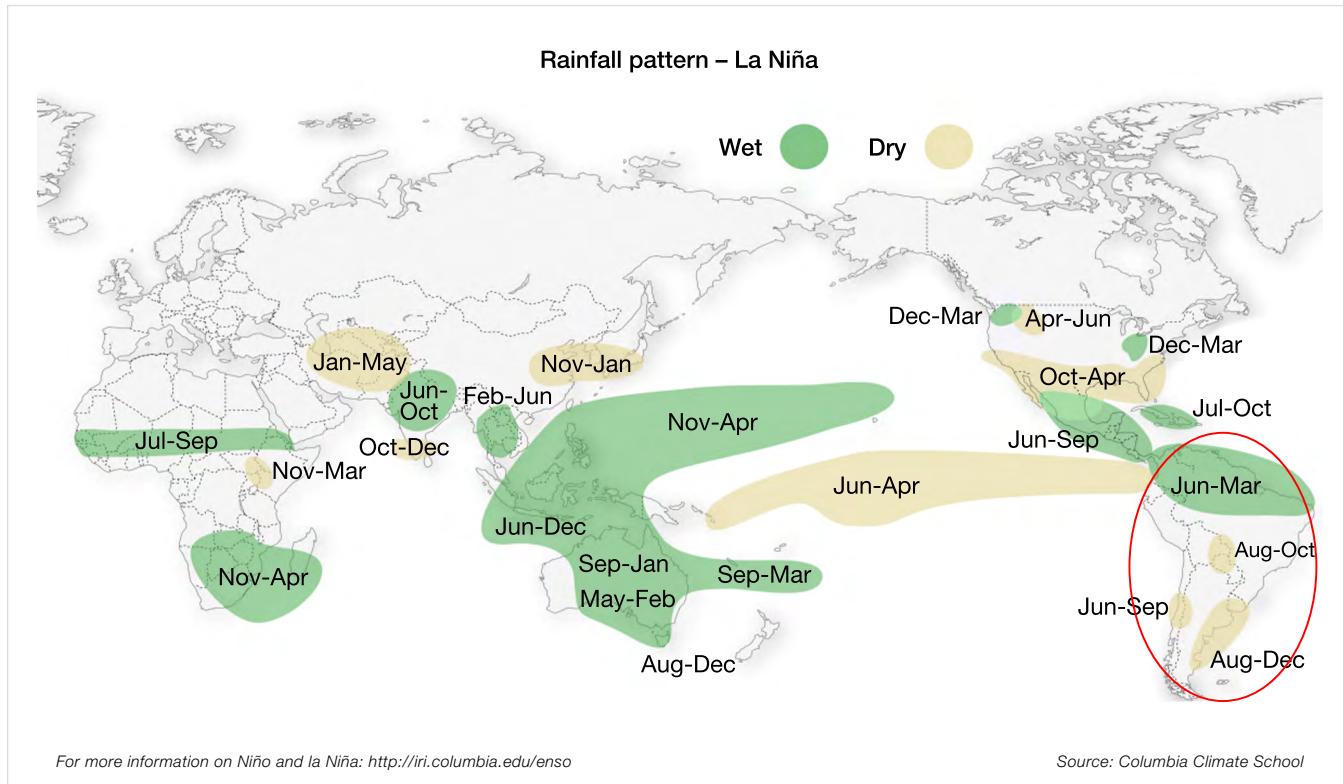
Feed raw materials like corn, soybean meal, and wheat saw significant price swings in 2024–2025. Based on your modelling and market signals, what are Hedgepoint's expectations for supply–demand balances, market trends and price movements in key feed ingredients for 2026?

It all comes down to Brazil and Argentina's 2026 crop. Hedgepoint Market Intelligence analyst team estimates, with normal weather and trend line yields, Brazil may have a record Soybean crop of 178 mmt. Should that crop materialize without a negative impact from La Niña, the trend of large global crops keeping prices contained will likely continue in the short term.

There are several risks to this assumption however:

1. A South American weather event, as previously mentioned
2. US-China trade deal that results in a large increase in China demand for US Agriculture products
3. Government mandated biodiesel programs that result in large increase of US domestic soybean crush





Should just one of those three scenarios occur in 2026, it is possible we will see price volatility increase to the upside. Even more so should a combination of the three occur.

Volatility has become a structural feature rather than a temporary spike. What are the main volatility triggers Hedgepoint is tracking for 2026 in terms of weather models, global stocks, or policy decisions, and how do you suggest feed manufacturers prepare for them?

For weather, La Niña in South America over January and February will be the metric. This time period is the key time for Brazil Soybeans, Argentina Corn and Soybeans, and the start of the Brazil Safrainha crop planting.

Turning to global stocks and trade – it is interesting to note that China has maintained Soybean reserves of around 44mmt the past few years. Historically, China's ending stocks would fluctuate along with demand and pricing. It now appears that the 44mmt level is a strategic target from the Chinese government. At normal consumption, this represents about three months of normal Chinese

crush demand. With a possible US – China Trade Soybean thaw appearing, it will be interesting to see if new US soybean supply is allocated to Chinese Crush demand directly or put directly into the state soybean reserve. Should China buy US Soybeans for stockpiling purposes, this will result in less global soybeans available for global crush.

Another item of note for feed manufacturers in 2026 for those that manufacture soybean meal, will be the livestock herd size in the United States. US Beef prices remain close to all time highs, and the US consumer is responding with a demand shift to more affordable proteins - poultry and pork. If this trend continues in 2026, feed manufacturers may well enjoy strong demand for soybean meal for poultry and pork feeders.

What risk-management strategies or hedging tools do you consider essential for feed and livestock companies? How can they better integrate data, forecasting models and cross-commodity insights to stabilize costs in 2026?

We are seeing a new interest and demand for weather-based risk management tools. Historically,

INTERVIEW

the preferred method to hedge weather risk was in the futures and options market on the underlying commodity price movements. Now, we are seeing specific interest in products that hedge precipitation and climate events! While these products are still rather new, the Chicago Mercantile Exchange offers weather derivatives.

Hedgepoint also offers these tools, also known as Parametric Derivatives. We use public data sources to create a benchmark and track parameters like: Precipitation, Temperature, Wind Speed, Solar Radiation, and Soil Moisture. We then model those parameters to build custom structures based on

our client's regional and operation needs to protect them from extreme weather events.

Besides regular farmers and commodity traders, we see this tool as an alternative for private credit funds, for instance, that have collateral in form of future commodity crops.

I would encourage feed manufacturers to explore these products for their sourcing area regions. If there is a localized flood for example, the broader commodity market may not be as impacted as the feed company who relies on that specific impacted region for their sourcing needs.

About Chris Trant

Chris Trant started his career in the commodity industry as a college intern at Daniels Trading. After graduating from Miami University (OH) with a degree in International Business and History, he worked in various commercial roles with Bunge North America, Green Plains, and Informa / HIS Markit-S&P Global prior to Hedgepoint. Trant lives and works in Chicago and enjoys geopolitical books, cooking Italian food, and running along the lakefront.



Happy Holidays

Happy Holidays from Feed Formulation!

As we approach the end of 2025, we'd like to thank our partners, exhibitors and industry friends for an inspiring year.

We're excited to share that pre-booking for Feed Formulation Latin America 2027 is **now open**.

Reserve your participation before 1 May 2026 to secure early access and the best stand options for the upcoming edition.

For more information or to pre-book, scan the QR-code or contact Nick Mouthaan at nickmoutahaan@victam.com or **+31 (0)6 21 26 43 98**

Wishing you joyful holidays and a wonderful start to 2026!



**Join us 14-16 September
at Expo Center Norte
São Paulo, Brazil**





THE IMPORTANCE OF BIOSECURITY ON BEEF AND DAIRY FARMS

Kayla Taitz

*European Marketing Coordinator
Alltech*

“Disease outbreaks such as FMD and LSD are reminders to us all of the importance of biosecurity on beef and dairy farms. Good biosecurity plans can be our most efficient tool in protecting our farms and the agri-food sector from the risk of disease. One small breach in these biosecurity measures could allow disease to enter our farms.”

In the ever-expanding world of agriculture, the health of our animals is integral to our success. Efficient production, greater profits and sustainable agriculture are vital to the future of the livestock sector, and all of these are dependent on the health and vitality of our beef and dairy herds.

This is where biosecurity measures are crucial in supporting animal health. To ensure that we are keeping pathogens (disease-causing bacteria) off our farms, there must be stringent biosecurity measures in place. One simple change could mean the difference in protecting the health and the efficiency of your herd, impacting the financial success of the farm enterprise.

Farm biosecurity refers to the specific and critical measures farmers can implement to prevent disease and illness from entering their farms and spreading within or beyond the premises. These measures are paramount in supporting animal health, which underpins safe and efficient production, greater profits and the sustainable future of the livestock sector. A single breach in these protocols could allow disease to enter, impacting animal health and herd efficiency and potentially leading to extreme financial and

economic disruptions for farm enterprises. Therefore, good biosecurity plans are our most efficient tool in protecting our beef and dairy farms and the agri-food sector from disease risks.

DISEASE IMPACTS ON CATTLE HERDS

Over recent years, we have seen a resurgence of disease outbreaks amongst our beef and dairy cattle across Europe. These diseases can only remain under control when proper biosecurity measures are in place. Illnesses like cow foot-and-mouth disease (FMD) as well as lumpy skin disease (LSD) are two examples of just how detrimental illness can be to our herds.

Foot-and-mouth disease (FMD), once known as a disease of the past, has re-emerged in early 2025, with outbreaks occurring in Europe. This illness is highly contagious and economically devastating to agriculture, as it can lead to mass herd culling; outbreaks have caused extreme financial and economic disruptions to the sector in recent years.

Symptoms of FMD include skin lesions surrounding the mouth and feet, but a full diagnosis requires specific laboratory testing which can be costly and

time consuming. The disease spreads at a rapid rate through contaminated feed, direct contact and vehicle tyres. Both vaccinations and antibiotics can aid in handling outbreaks, but neither is a cure.

Lumpy skin disease (LSD) in cattle is characterized by a range of clinical signs including fever, nodules (lumps) on the skin, swelling under the skin, enlarged lymph nodes, weight loss and even emaciation, and possibly death. Transmitted by biting flies and mosquitos, it reduces milk yield, can cause sterility in bulls, and permanently damages hides. LSD has been reported in Europe as recently as June 2025. While a higher rate of vaccinated animals and the use of antibiotics can help control it, strict biosecurity plans remain essential as no definitive treatment exists.

Although both of the above illnesses can have detrimental effects on the agricultural sector, biosecurity measures can lessen the risk.

WHAT'S INVOLVED IN BIOSECURITY?

Biosecurity refers to the measures that farmers can take to minimize the risk of disease and illness entering their farms and spreading within or beyond their farms. This promotes the safety not only of the herd, but of the agri-food sector, as it helps to prevent the entry of disease and illness into the food supply chain.

There are two forms of biosecurity: external and internal.

External biosecurity relates to building strong barriers to keep pathogens off the farm entirely. External methods include:

- Placing stringent control measures in place surrounding the entry and exit of visitors. This will lessen the likelihood of individuals carrying illness from one farm to another.
- Disinfecting the boots of anyone entering and exiting the farm.
- Disinfecting any vehicles entering and exiting the farm.

Internal biosecurity is meant to prevent the spread of pathogens within the farm. Internal methods include:

- Quarantining newly purchased animals. Remember that an animal may be asymptomatic for a disease that could nonetheless spread rapidly amongst the herd.

- Keeping equipment and housing disinfected and maintained to a high standard. Milking parlours, handling areas (crushes, head gates, sorting gates, etc.) and feeding equipment should all be disinfected as often as possible.

- Providing enough space when animals are housed indoors. This will ensure that the animals are not in too-close contact with one another.

- Providing sufficient ventilation. This means that bacteria are less likely to accumulate, and it lowers the risk of mosquitos and biting flies/insects gathering.

- Isolating any infected cattle immediately upon display of symptoms.

THE ROLE OF NUTRITION IN PROTECTING YOUR HERD

Alongside enhanced biosecurity on beef and dairy farms, we can help our herds resist disease challenges by ensuring strong and balanced nutrition.

Optimal immune function in the animal requires a high standard of nutrition. Nutritional supplements such as Bioplex® trace minerals for correct mineral balance, Sel-Plex® trace minerals for antioxidant function, and Actigen® technology to enhance the gut microbiome can all help to enhance the animal's nutritional status, which in turn reduces susceptibility to illness.

It is vital that we stay informed and up to date regarding illness on farms, not only at a local level but on a European level. This allows us to remain prepared and proactive in our approach to animal health.

Disease outbreaks such as FMD and LSD are reminders to us all of the importance of biosecurity on a farm. Good biosecurity plans can be our most efficient tool in protecting our farms and the agri-food sector from the risk of disease. One small breach in these biosecurity measures could allow disease to enter our farms. By carefully and thoroughly implementing such measures, you are ensuring not only animal health but the financial security of your farm.



What if

you could reduce your
carbon footprint while
improving animal
performance?

A photograph of a man and a child standing in a field of tall grass at sunset. They are seen from behind, silhouetted against the bright sky. The man is wearing a cap and a plaid shirt, and the child is wearing a dark jacket. The scene is framed by a white line that starts from the top left and bottom left corners and meets in the center.

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From Efficiency to Sustainability: BIG DATA AND AI IN ANIMAL NUTRITION



The transformation of animal nutrition from efficiency to sustainability is gaining momentum through systems powered by big data and artificial intelligence. In the face of raw material variability, climate-induced stress factors, animal health risks, and narrowing profit margins, feed formulations are no longer managed through static recipes; instead, they are driven by real-time data, predictive models, and integrated analytics. While big data infrastructures consolidate formulation, feed processing, animal performance, and environmental indicators, AI makes sense of these complex datasets, making correlations visible and enabling predictive insights for more accurate and timely decision-making.

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By Derya Gulsoy Yildiz

The animal nutrition industry stands on the brink of a technology-driven revolution, moving beyond traditional methods. For many years, animal nutrition strategies based on static formulations, average nutritional values, and historical performance data are now giving way to data-driven, predictive, and dynamic decision systems. Uncertainties in the supply and pricing of basic feed ingredients, climate-related stress factors, increasing risks related to animal health, sustainability pressures, and ultimately shrinking profit margins are among the main drivers of demand for data and artificial intelligence-based solutions.

BIG DATA AND THE ANIMAL NUTRITION INDUSTRY

The concept of big data refers not only to high-volume data but also to the interpretation of data produced from different sources, at different speeds, and in different formats. In the animal nutrition industry, this translates to a complex data ecosystem extending from the field to the feed mill, and from the farm to the processing plant. Effective management of this ecosystem offers critical advantages for risk management and sustainable growth.

Luis Valenzuela, Precision Services Manager at dsm-firmenich Animal Nutrition and Health, explains the importance of big data and its role in the industry: “Over the past decade, animal nutrition has entered a new phase of transformation. What was once driven by static formulations, fixed nutrient matrices, and retrospective performance analysis is increasingly becoming a predictive and insight driven discipline. The rapid growth of data availability across the animal production system has made big data management essential for delivering value, managing risk, and supporting sustainable growth.”

“Big data in nutrition is now essential rather than a nice-to-have,” says **Armin Pearn, Head of Insights at Dairy Data Warehouse (DDW)**, focusing on how big data shapes daily operations in the industry. Pearn shares the following: “Big data provides consultants with accurate, up-to-date herd insights, helping them make better, faster decisions that improve both efficiency and sustainability on farm. Here are some examples of how big data is shaping day to day in animal nutrition and feeding: We combine individual cow data with TMR information to support ration formulation tools. We can enable direct integration of herd inventory, group, and production data with mixer wagons to automatically adjust feed loads. We can deliver milk yield and feeding efficiency metrics per cow, helping nutritionists fine tune diets to optimise milk output and cost. We can provide fertility performance and health data per cow, for consultants to identify key improvement areas and support the farm with targeted feeding strategies. By connecting



Armin Pearn
Dairy Data Warehouse

and standardizing these data streams, DDW turns information into measurable performance gains across feeding.”

Ian Mealey, Product Marketing Director – Formulation at Datacor, touches upon the impact of big data on efficiency: “Quality data has always been fundamental to the success of the animal production industry. However, livestock production now operates within far tighter margins and far greater complexity than ever before. This impacts feed manufacturers who continue to balance volatile ingredient markets, evolving regulations, sustainability targets, animal health outcomes, and the growing demand for precision nutrition. To remain competitive and efficient, decisions can no longer be made in isolation or based on a narrow slice of information. “Big data” offers the opportunity to increase efficiency and productivity through improved data collection, verification and analysis.”

All these approaches position big data not merely as a pile of information, but as a strategic resource that adds value to the industry when managed correctly.

WHICH DATA, WHICH RESULTS?

Animal production systems involve numerous variables and data points. Collecting these data is no longer an option but a prerequisite for remaining competitive in today’s conditions. Formulation



Ian Mealey
Datacor



Luis Valenzuela
dsm-firmenich

and raw material data, feed processing parameters, animal health and performance indicators, climate and environmental conditions, economic indicators, and sustainability metrics are all parts of this ecosystem.

Ian Mealey summarizes this multi-layered data structure and its interrelationships: “Across the value chain—from raw material sourcing and additive selection, to ration formulation, feed processing, and on-farm performance—each stage generates data that influences decisions and outcomes. Ingredient variability affects nutrient availability and ingredient value; processing conditions impact pellet quality and nutrient integrity; feeding strategies influence gut health, efficiency, and emissions. When these data streams remain disconnected, opportunities are missed and risks increase.”

However, in an environment with such vast amounts of data, one of the most important issues is ensuring data integration between different processes and evaluating the existing data flow holistically. **Luis Valenzuela** explains: “Livestock production today operates under increasing complexity. Feed ingredient quality is more variable, disease pressure continues to evolve, climate related stressors such as heat stress are intensifying, and producers face constant pressure to improve feed efficiency while meeting stricter sustainability and regulatory expectations. Data collected at isolated points in the

system provides limited value. The real opportunity lies in integrating data across processes.”

Why is it important to integrate data from different processes and interpret it as a whole? What are the gains? **Mealey** elaborates on these benefits: “By collecting and connecting data across these processes, the industry gains visibility into how formulation decisions translate into real-world performance. For example, understanding historical ingredient quality trends allows nutritionists to adjust formulations proactively rather than reactively. Linking formulation data with production and animal performance data enables more accurate assessments of feed efficiency, health outcomes, and cost control. Big data also supports consistency and trust. When data is centrally managed and validated, organizations reduce dependency on spreadsheets and informally held knowledge. This creates a shared foundation for collaboration between nutritionists, operations, procurement, and management. Ultimately, comprehensive data management and analysis based on proven principles enables the industry to move from static formulation toward adaptive, insight-driven nutrition strategies that improve profitability, animal welfare, and sustainability.”

Valenzuela also highlights the holistic perspective: “By connecting information from crop production, feed ingredient sourcing, formulation, feed processing, animal health, farm performance, and

environmental metrics, nutritionists and producers gain a holistic view of the production system. This integrated perspective enables earlier risk detection, more targeted nutritional interventions, and better economic decisions. In this context, data becomes a strategic asset that supports faster, smarter, and more confident decision making.”

HOW SHOULD DATA BE EVALUATED AND INTERPRETED?

We know that collecting data alone is not enough; big data gains value through its capacity to bring fragmented data together to make it meaningful. But how can we collect accurate, consistent, up-to-date, and comparable data? And how do we ensure that big data creates decision support instead of decision confusion? In short, what solutions do we have to make sense of data, analyze it, and integrate it into decision processes?

This is where powerful tools that complement human expertise, such as Artificial Intelligence (AI) and Machine Learning (ML), come into play. At dsm-firmenich Animal Nutrition and Health, this integrated approach is made possible through the global Precision Services foundation. **Luis Valenzuela** describes their solutions: “Precision Services brings together digital solutions such as Verax™, Sustell™, Farmtell™, and additional analytics platforms to help producers transform complex datasets into practical and value creating decisions. Our global infrastructure aggregates data from multiple sources including feed mills, farms, laboratory analyses, production records, and external datasets. Advanced analytics, machine learning, and predictive modeling are applied to

convert this information into AI driven decision support. Rather than focusing solely on historical performance, these tools help predict risk, quantify impact, and guide proactive actions. Verax™ for example, supports poultry production, combining health, nutrition, and performance data to identify emerging challenges and optimize interventions. Farmtell™ focuses on dairy and beef systems, helping ruminant producers improve efficiency, resilience, and productivity by integrating farm-level data. Sustell™ spans the entire value chain across species, from crops to processing plants, enabling robust life cycle assessment insights. In parallel, mycotoxin risk management analytics use predictive models to warn of contamination risks in crops and livestock feed, creating awareness and enabling timely mitigation. The common denominator across these solutions is not data volume, but the ability to turn data into decisions that deliver measurable business outcomes.”

Dairy Data Warehouse (DDW) is a Netherlands-based company with over 12 years of experience helping the global dairy industry unlock the full potential of farm data. **Armin Pearn** describes the solutions offered by DDW as follows: “We turn complex dairy data into actionable insights that drive more sustainable and profitable farming. We connect directly to herd management and on-farm systems, processing and standardising millions of data points daily into a consistent, high-quality dataset. This allows dairy professionals whether in nutrition, genetics, animal health, or cow monitoring to work with accurate, comparable information across all their herds. In practice, if a consultant supports 20+ herds using different software systems,



DDW removes the complexity by collecting, cleaning, and harmonising all that data in the cloud. The result is a seamless data flow into the consultant's own tools, enabling faster, smarter decision-making on farm."

Ian Mealey shares Datacor's data infrastructure and the process of transforming data into usable insights: "At Datacor, our data infrastructure is designed to turn complex, high-volume data into practical, usable insight. Our formulation platforms—Ara® Formulation, Brill® Formulation, and New Century—serve as the central intelligence layer for feed formulation operations. Ara is our flagship formulation platform built to manage formulation data at scale. It consolidates ingredient libraries, nutrient matrices, constraints, costs, regulatory rules, and historical formulations into a single, structured environment. This allows nutritionists to work from a trusted data source, that enables enterprise-wide visibility and control while reflecting local specifics. We apply advanced optimization methods to evaluate thousands of formulation possibilities simultaneously, identifying solutions that best balance cost, performance, and constraints. Powerful tools help nutritionists identify patterns and opportunities that would be difficult to detect otherwise. This enables better, more confident decision-making."

PRECISION NUTRITION AND SUSTAINABILITY WITH BIG DATA AND AI

Precision nutrition and sustainability are among the most critical agenda items in the animal nutrition sector. Unlike traditional feeding approaches, precision nutrition aims to feed animals according to their individual needs—based on variables such as age, yield level, physiological state, health, and environmental conditions—rather than herd averages. At the core of this approach lies a decision-making process based on accurate, continuous, and meaningful data.

It is impossible to implement precision nutrition practices effectively without real-time data. When large datasets collected through sensors, automat-

ed monitoring systems, and digital records are processed with AI and advanced analytical tools, they enable the dynamic optimization of rations, increased nutrient utilization efficiency, and the prevention of performance losses.

Sustainability offers a broader framework that encompasses the precision nutrition approach. Through accurate feeding strategies, feed conversion rates increase while waste nutrients, emissions, and the environmental footprint are reduced. This contributes both to increasing production efficiency and limiting the environmental impact of livestock production. Big data and AI-supported precision nutrition practices are playing an increasingly decisive role in establishing the balance between performance enhancement and environmental sustainability.

"Big data and artificial intelligence are redefining precision nutrition," says **Luis Valenzuela from dsm-firmenich**, explaining: "Instead of relying on average assumptions, nutrition strategies can increasingly be adapted to real production conditions, accounting for disease challenges such as coccidiosis, environmental stressors like heat stress, antimicrobial resistance pressure, and economic constraints related to feed cost volatility. This shift is also fundamental to sustainability. Sustainability starts at the farm. Highly efficient production systems, where animals convert feed effectively and reach their performance potential, inherently have a lower environmental footprint per unit of product. Once efficiency is optimized, environmental impacts can be significantly reduced."

Valenzuela exemplifies this through Sustell™, dsm-firmenich's life cycle assessment (LCA) platform: "Data plays a central role in achieving this. With solutions such as Sustell™, producers can assess their footprint across 19 standardized environmental impact categories, including but not limited to carbon emissions. By quantifying Scope 3 emissions and linking them to purchased animals, rations, farm operations, and resource use, producers gain transparency and independence. This enables credible sustainability reporting, supports compliance with



frameworks such as CSRD, and creates opportunities for product differentiation and value creation.”

Armin Pearn focuses on the impact of big data and AI on efficiency and sustainability. **Pearn** says: “Farmers have been collecting farm data for decades enabling them to take strategic, data-driven decisions together with their consultants as well as to drive operational implementation via scheduled tasks and to do lists. Simple benchmarking against standard thresholds or data from a group of like minded farm colleagues allowed to identify key areas for improvement. Today, thanks to DDW and other companies specializing in farm data processing, a large amount of data is transferred and stored in the cloud allowing the creation of big data sets, which in turn can be used to train artificial intelligence models. Artificial intelligence, once trained on big data from thousands of dairy farms and hundreds of thousands of animals, has unmatched capabilities in detecting anomalies in individual farm and animal data sets. This allows us to predict with unprecedented accuracy future milk production, inventory evolution, conception probability, feed conversion rate, disease events or losses due to heat stress events. Knowing with a high degree of certainty what the future will bring if the farm continues the current

path can drive changes in farm strategy in time to ensure future optimization of farm profit and environmental footprint. For example, predictions of future inventory in a dairy farm allow to determine the number of replacement animal conceptions that need to be produced in any given month while the remaining open animals can be inseminated with beef semen driving reduced heifer raising costs, increased sales from calf sales as well as significant reduction of the environmental footprint of the given farm operation.”

Emphasizing that big data and AI are fundamental to achieving meaningful progress in precision nutrition and sustainability, **Ian Mealey** shares: “Precision nutrition depends on understanding not just nutrient requirements, but how animals respond to feeds, environments, and management practices. Data affecting feed formulation, such as ingredient quality, markets, production data and past feeding outcomes, can now be collated and analyzed more efficiently than ever before. It is vital to ensure its quality and apply appropriate analysis. Then, in combination with application of the latest nutrition research and genetic advances, it offers the prospect of more precise, consistent outcomes. By aligning nutrient supply more closely with animal

needs, such as optimizing to more precise amino acid requirements to reduce over-formulation, feed manufacturers can improve feed conversion while lowering costs. These gains also support sustainability goals through appropriate ingredient usage, reduction of nutrient excretion and overall environmental impact.”

Mealey points to the latest version of Datacor’s software, Ara Formulation: “Ara Formulation allows nutritionists to model these strategies confidently, balancing economic and environmental objectives while maintaining animal health and performance.”

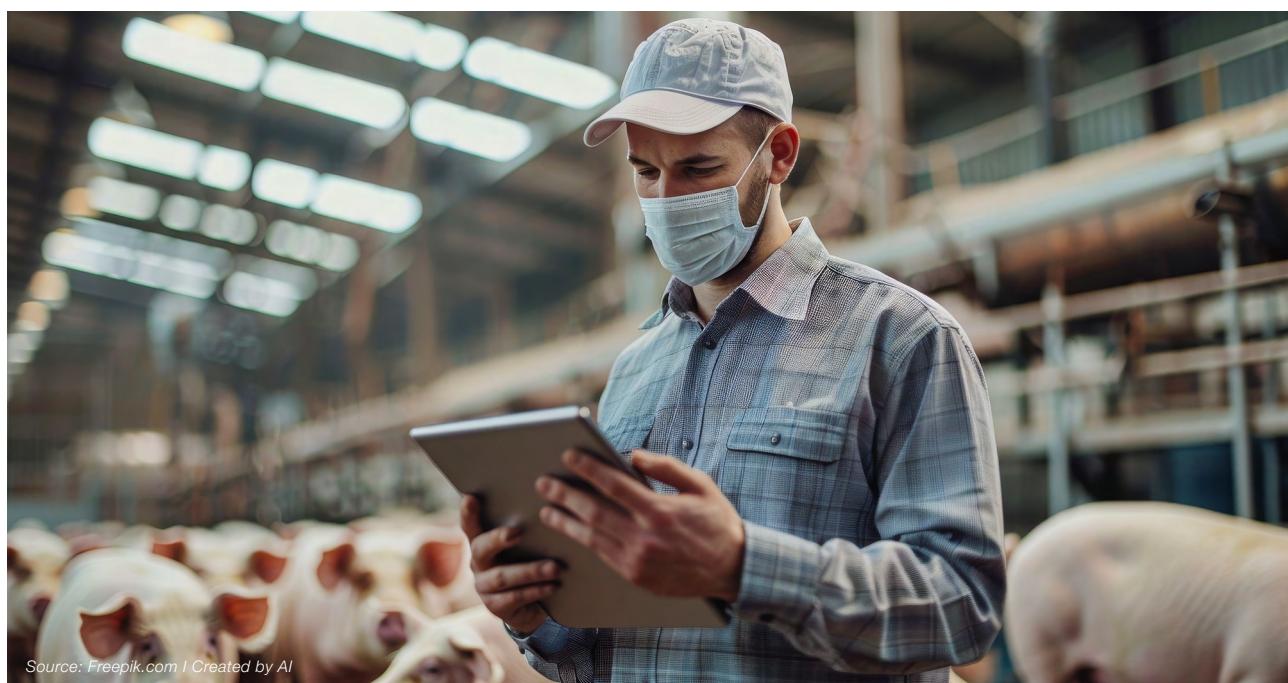
A LOOK TO THE FUTURE: WHERE WILL BIG DATA AND AI TAKE LIVESTOCK?

Big data and AI have begun to radically transform decision-making processes in the livestock sector. In the future, it is assumed that nutrition, health management, and production planning will be based on real-time analysis and predictive models rather than historical performance data. AI-supported systems will enable the dynamic adjustment of rations by predicting nutrient needs at the individual animal level, while early detection of disease risks will prevent losses. At the same time, increasing feed conversion rates, optimizing resource use, and reducing the environmental footprint remain primary goals.

There is a widespread view that this transformation will move livestock toward a more efficient, traceable, and sustainable production model.

Armin Pearn from DDW shares his future predictions based on practical field experience: “We work with 2 of the 5 major feed companies. Given the size of these companies and their complex business structure, it took them some time to drive digital transformation and change throughout their organizations. After a cautious start, we have seen a massive increase in the use of dairy data services from feeding companies over the last few years. And we expect these companies to use this momentum to leverage the power of AI on the data infrastructure and digital culture they have created going forward. As more farms use digitized feeding equipment, our AI models will be able to have an increasing amount of context not only of a given farm (i.e. dry matter content, feed consumed) or feeding group level but going forward also increasingly on animal level. This will drive feed conversion optimization and productivity on farm and in turn make dairy farms ever more sustainable.”

Ian Mealey from Datacor explains his expectations for the future: “The most successful feed businesses are those that place importance on forward



Source: Freepik.com / Created by AI

planning and aligning ingredient purchasing policy to their feed production, so they can be more in control of their circumstances. Big data and artificial intelligence will enhance their ability to achieve this by encapsulating more data with a deeper understanding of the meaning of that data and the potential within it. For those who have been less able to take this approach, these new capabilities will offer the chance to fundamentally shift from a reactive discipline to a predictive and adaptive one.”

Touching on the balance between theoretical knowledge and real-world applications, **Mealey** continues: “It is possible that the formulation process will increasingly move toward continuous optimization informed by real-world performance data. However, this should be approached with caution. Appropriate analysis of data will advise the best course of action – there are many variables within the system, from ingredients through to efficiency of feed usage on farm. Utilizing new approaches to data analysis will help companies understand the complexity and variability in the real world and make the best decisions accordingly. It is important to balance the theoretical with the practicalities and implications of application in the real world. Artificial intelligence will help capture feedback and accelerate learning from the success or otherwise of previous decisions. Many in the industry attempt to do this now but, due to complexity and lack of data or time, these attempts can be based on subjective measures or gut-feeling. Big data and the application of artificial intelligence offers a step-change improvement in this process with the potential for better outcomes for those who can take advantage.”

“Looking ahead, big data and artificial intelligence will further transform animal nutrition from a formulation focused activity into a continuous optimization process,” says **Luis Valenzuela from dsm-fir-menich**, sharing his predictions: “Closer integration between feed mills, farms, genetics, and processing will allow nutritional strategies to evolve dynamically as conditions change. Decision cycles will shorten, confidence in data supported recommendations will increase, and collaboration across the value chain will

deepen. Nutritionists and producers will move from reacting to problems toward anticipating them, reducing risk while unlocking new efficiency gains.”

Finally, **Valenzuela** notes that AI is used to empower human expertise rather than replace it: “Ultimately, big data and artificial intelligence are not about replacing expertise. They are about amplifying it. By combining scientific knowledge, digital intelligence, and practical experience, the animal production sector can build systems that are more resilient, more efficient, and more sustainable, while delivering tangible value to producers and the broader food chain. We at Precision Services believe in making the invisible, visible and the visible valuable.”

Like Valenzuela, **Mealey** focuses on the empowering aspect of AI: “There is no doubting the imminent transformation. The transformation will not be about replacing human expertise, but amplifying it—giving nutrition professionals better tools, deeper insight, and greater confidence to make decisions that support efficiency, sustainability, and long-term resilience. It will give nutritionists time to spend on value-added activities such as ingredient evaluation, further improving efficiency and profitability for all involved.”

SUMMARY OF DIGITAL TRANSFORMATION IN ANIMAL NUTRITION

Big data and AI are moving animal feed formulations away from static recipes and into real-time, predictive, and adaptive systems. In the face of ingredient variability, increasing sustainability pressure, and narrowing profit margins, data-driven decision-making is no longer an option but a fundamental element of remaining competitive. Big data infrastructures and AI-supported analytics make it possible to optimize feed efficiency, animal health, and environmental performance together while increasing formulation accuracy. In the coming period, businesses that effectively adopt these digital approaches—which empower human expertise—are expected to lead in developing more resilient, transparent, and sustainable production models.



Source: Freepik.com / Created by AI

CHINA: Livestock and Feed Market Analysis

At the heart of the global feed and livestock industry, China is undergoing a profound transformation during the 2024-2025 period, focused on efficiency, sustainability, and reducing foreign dependency. The structural changes in animal protein production, the compound feed market, raw material composition, and additives are reshaping global commodity balances and sectoral strategies.

By Derya Gulsoy Yildiz

China stands as the epicenter of the global livestock and feed industry. Rapidly increasing demand for protein driven by economic prosperity, together with urbanization and shifting dietary habits have transformed the country into a massive compound feed market. In China, which maintains its leadership in global compound feed production according to 2024 data, the feed sector is undergoing a fundamental transformation driven by state policies aimed at increasing efficiency, ensuring sustainability, and reducing foreign dependency.

LIVESTOCK SECTOR AND ANIMAL PROTEIN CONSUMPTION

Although China's livestock economy has historically been structured around pork, shifting



modern consumer preferences are driving an increased demand for beef, poultry, and seafood. According to data from Rabobank, per capita meat consumption in the country—which stood at 35 kilograms in the mid-1990s—has more than doubled, reaching 72 kilograms as of 2023. National Bureau of Statistics of China also indicates that total red meat and poultry production reached 96.63 million tons in 2024, representing a 0.2% increase. This explosion in demand has facilitated the livestock sector's transformation from traditional, small-scale “backyard” farming into massive, technology-driven, and capital-intensive industrial complexes with vertical integration.

Pork and the Swine Sector

Pork is the absolute dominant force in China's food security and agricultural economy. The coun-

try alone accounts for approximately 50% of global pork consumption. However, 2024 has been a challenging period for the sector. Following three years of steady growth, pork production fell for the first time in 2024, decreasing by 1.5% to 57.06 million tons.

The deep financial losses experienced in 2023 and the disease outbreaks seen at the end of the year are cited as the primary reasons behind this contraction in the sector. According to the USDA's report titled Livestock and Products Semi-Annual, Chinese pork producers recorded their largest annual losses since 2014 in 2023. This situation led to the liquidation of herds and a planned reduction in the breeding sow inventory in 2024.

Beef and Dairy Sector

In China, the beef and dairy sectors are highly interconnected, in contrast to the U.S. model. In 2024, beef production increased by 3.5% to reach 7.79 million tonnes. However, this increase does not reflect healthy sector growth; rather, it is driven by the diversion of female cattle and dairy cows into the beef market due to the ongoing crisis in the dairy sector.

The dairy sector entered a “production at a loss” period in 2024. Continuous declines in raw milk prices combined with weak domestic consumption have caused more than 80% of dairy farming enterprises to operate at a loss. This economic pressure has led to the early slaughter of dairy cows, creating deflationary pressure on beef prices. To stabilize beef and mutton production, the Chinese Ministry of Agriculture and Rural Affairs (MARA) has announced subsidies for feed conversion and quality improvement projects.

In terms of live cattle imports, a dramatic decline was observed at the beginning of 2025. In the first five months of 2025, live cattle imports fell by 65% compared to the same period of the previous year, dropping to 14,000 head. This situation reflects the extremely cautious approach of domestic producers toward new investments and capacity expansion.



Source: Freepik.com | Created by AI

Poultry Sector

The poultry sector was the most resilient and fastest-growing segment of Chinese livestock in 2024. According to data from the National Bureau of Statistics, total poultry meat production rose by 3.8% to 26.6 million tons. The primary driver of this growth is the emergence of chicken as a more economical and “budget-friendly” protein option compared to pork and beef.

The number of broilers slaughtered in 2024 broke a historical record, reaching 13.56 billion head. In particular, white-feathered broilers (up 2.77%) and yellow-feathered broilers (up 3.26%) were driving force behind the market. On the egg production side, the sector has reached a saturation point; while small-scale breeders are being phased out, the number of modern, high-capacity facilities housing millions of birds is increasing rapidly. The poultry sector is one of the segments with the highest integration rate, which directly supports professional feed consumption.

Aquaculture

China stands as the undisputed global leader in the production, consumption, and trade of aquatic products. The years 2024 and 2025 represent a critical threshold in the sector's transition from traditional methods to a technology-intensive, sustainable, and efficiency-oriented structure. The sector plays a central role not only in terms of food security but also in rural development, technological innovation, and maritime economy strategies. As of 2024, China maintained its title as the world's larg-

est producer of aquatic products, with total production reaching 74.1 million metric tons. This volume represents a 4% increase compared to 2023, and the main driver of growth is aquaculture activities, which account for more than 80% of total production (60.8 million metric tons).

The increase in disposable income across the country is shifting consumption habits away from basic protein sources toward high-quality, value-added products. As of 2024, seafood consumption in China is growing faster than meat consumption. According to OECD-FAO projections, per capita seafood consumption in China is expected to increase by 14% by 2032.

INDUSTRIAL FEED PRODUCTION AND CONSUMPTION IN CHINA

As the world's largest feed producer, China represents a remarkable market in terms of the animal nutrition sector. According to the report titled 2025 Agri-Food Outlook prepared by Alltech, in 2024, when global feed production reached approximately 1.396 billion metric tons, China's feed production declined slightly by 2.03% compared to the previous year, falling to 315.030 million metric tons. Oversupply, low prices, and disease outbreaks caused a decline in the use of swine, beef, dairy, and aquafeeds across the country, resulting in a minor reduction in total compound feed production. Despite this decline, China maintains its global leadership in feed production with a massive volume of 315 million metric tons, surpassing its closest competitor, the United States (approximately 270 million tons). The country controls more than 22.5%

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of global feed production on its own and produces more than the combined output of other major producers such as Brazil and India.

Swine feed is the backbone of China's compound feed production, representing approximately 47% of total output. Swine feed production, which reached a record level of 149.75 million metric tons in 2023, came under pressure in 2024 due to severe losses in the livestock sector and capacity reduction processes. In the first half of the same year, a 6% decline was observed in swine feed consumption, which remained at 142 million metric tons. The USDA estimates that swine feed consumption increased again in 2025, reaching a level of 146 million metric tons.

Poultry feed is the second-largest segment, representing 40% of feed production in China. Within the poultry group, broiler feed production recorded a 1.8% growth in 2024, as consumers turned to chicken—a more affordable protein source—due to rising red meat prices. The USDA predicts that broiler feed consumption, which was around 96 million metric tons in 2024, will exceed 97 million metric tons in 2025. The layer feed segment presents a more complex picture compared to the broiler segment. USDA analysts estimate that layer feed consumption, which stood at 32.7 million metric tons in 2024, will reach levels of 32.9 million tons in 2025, representing a 0.6% increase.

As the world's largest producer of **aquatic products**, China also stands out in the consumption of

aquafeed, in direct proportion to its production volume. However, the 2023-2024 period saw a contraction in aquafeed production due to falling fish prices and disease outbreaks. According to USDA data, the country's aquafeed consumption in 2024 was approximately 21.9 million metric tons. Forecasts indicate that consumption will increase by 2.2% in 2025, reaching around 22.5 million metric tons. As a sub-segment, freshwater fish account for more than 80% of the aquafeed market.

China's **ruminant feed** production represents approximately 5% of the total market and stood at 16.7 million metric tons in 2023. Production and consumption are showing a decline, particularly due to problems in the dairy farming sector. According to USDA data, total ruminant feed consumption fell to 15.4 million metric tons in 2024. It is estimated that this decline continued into 2025, with consumption hovering around 15.3 million metric tons, representing a 0.5% decrease.

Pet food is the fastest-growing and most profitable niche area of the Chinese feed sector. In 2024, China's total pet food production increased by 9.3%, reaching 1.6 million tons. This segment continues to move in a positive direction despite the contraction in the overall feed sector.

A NEW ERA IN FEED RAW MATERIALS

The massive scale of China's feed sector is directly linked to the country's food security policies. The raw material composition of feed in the country is

China: Industry Feed Production from Calendar Year 2024 to 2026

	Swine	Layers	Broilers	Aquaculture	Ruminants	Total
Production in 2024 (in MMT)	142	31	96	23	13	313
Estimated Production in 2025 (in MMT)	151	32	97	24	14	322
Forecast Production in 2026 (in MMT)	152	31	96	24	15	320
Year-on-Year change (percent)	0.6	-3	-1	+1	+1	-0.5

Source: USDA, *China Grain and Feed Update Report*, September 30, 2025

largely based on corn and soybean meal. However, in line with the goals of reducing geopolitical risks and foreign dependency, a revolutionary change is taking place in ration structures.

The Beijing administration has adopted the “Dual Circulation” strategy, which aims to reduce foreign dependency and optimize domestic production, particularly in key inputs such as corn and soybean meal. This strategy is supported by concrete action plans, such as lowering the ratio of soybean meal in feed rations and increasing domestic corn production.

Corn and Energy Sources

Corn is the cornerstone of China’s feed rations. For the 2024/25 marketing year, corn production is expected to break a record, reaching 294.9 million metric tons due to an increase in planted areas and the use of high-yield varieties. Low corn prices have allowed feed mills to increase the proportion of corn in their rations, which in turn has reduced the share of alternatives such as wheat and old-stock rice in the feed.

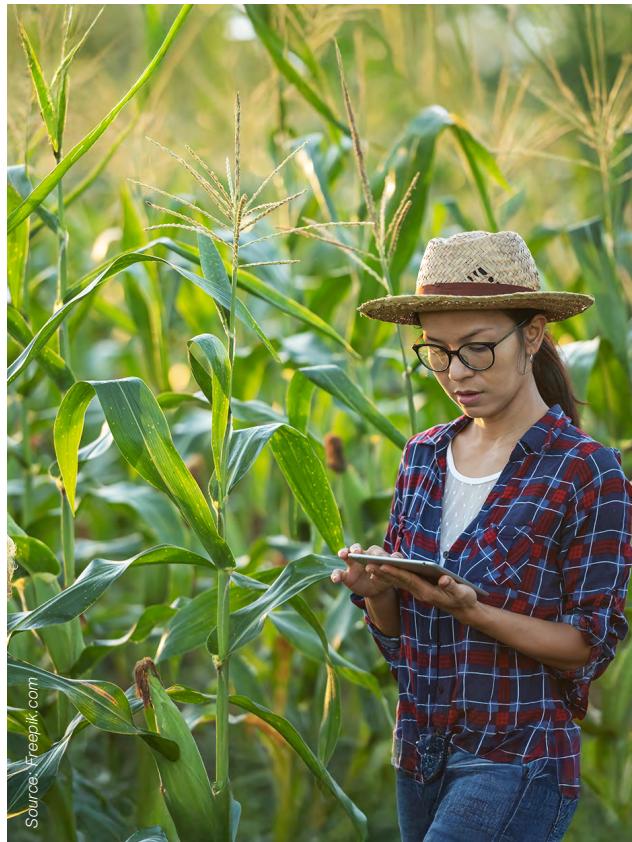
China is also promoting the use of genetically modified seeds and “grain-to-feed” projects to increase self-sufficiency in corn production. In the 2025/26 period, corn is expected to maintain its dominant position in feed rations, thereby suppressing the need for imported raw materials.

Soybean Meal Reduction Strategy

China imports approximately 100 million tons of soybeans annually, with over 90% of this demand met by Brazil and the United States. This massive dependency is considered a strategic risk in terms of food security. In response, MARA implemented the “Three-Year Action Plan for Reducing Soybean Meal Consumption” in 2023.

The primary goals of the action plan are:

- **Inclusion Rate:** Reducing the soybean meal ratio—which was 17% in 2017—to below 13% by 2025 and to 10% by 2030.
- **Mechanism:** Supplementing low-protein diets



with synthetic amino acids (lysine, methionine, threonine).

- **Alternatives:** Expanding the use of protein sources such as rapeseed, cottonseed, peanut meal, and food waste.

According to official data, the soybean meal inclusion rate was reduced to below 13% in 2023, resulting in a saving of 9 million tons in soybean demand. However, the USDA and some independent analysts suggest that this decline is occurring more slowly than official figures claim, as low soybean prices incentivize producers to use more soybeans.

FEED ADDITIVES AND MICRO-NUTRITION

The 2020 ban on antibiotic growth promoters (AGPs) has pushed the Chinese feed sector toward a biotechnology-oriented transformation. The market's focus has shifted to functional additives that enhance productivity while protecting animal health. In 2024, the production value of China's feed additives increased by 7.5%, reaching 131.58 billion yuan (approximately 18.4 billion USD).

In particular, the production of amino acids such as lysine, methionine, and threonine showed a 21.7% increase. This growth stems from the supplementation of low-protein rations (the soy reduction policy) with synthetic amino acids. On the enzyme side, enzymes that enhance carbohydrate digestion maintain their leadership with a 46% share, while the phytase enzyme is rapidly becoming widespread to reduce phosphorus pollution and increase feed efficiency.

FEED MILLS AND PRODUCTION INFRASTRUCTURE

China possesses one of the world's most advanced feed infrastructures, not only in terms of quantity but also in regarding facility modernization. The sector is evolving from small, inefficient mills into massive, fully automated, and digitally controlled facilities with annual capacities exceeding millions of tons.

As of 2024, industrial feed production in China is concentrated in the Shandong and Guangdong provinces. Each of these two provinces produces over 30 million tons annually. Other strategic production hubs exceeding the 10-million-ton threshold include provinces such as Jiangsu, Guangxi, Sichuan, and Henan.

In 2024, China's feed infrastructure expanded with 475 new modern feed mills. These investments aim to decommission facilities using outdated technology and replace them with high-capacity, energy-efficient, and environmentally friendly plants.

TOP 10 FEED PRODUCERS IN CHINA

1. New Hope Group
2. Wen's Foodstuff Group
3. CP Group (Charoen Pokphand)
4. Haid Group
5. Twins Group
6. Tongwei Group
7. Cargill (China)
8. COFCO
9. CJ Tianjin Feed
10. TRS Group (Tech-bank)

Notably, 49.2% of industrial feed production is delivered as bulk feed, which significantly reduces packaging and logistics costs.

CONCLUSION AND STRATEGIC OUTLOOK

The livestock and feed sectors of the People's Republic of China are undergoing a process of "transition and consolidation" during the 2024–2025 period. The era of rapid expansion has been replaced by a structure focused on efficiency, digitalization, and reducing foreign dependency. The most significant transformation within the sector is the systematic reduction in the use of soybean meal and the optimization of rations through synthetic amino acids and enzymes.

In the coming decade, the engine of growth in the Chinese feed market will no longer be volume expansion, but rather the increase in value-add. Pet food, smart feeding technologies, and antibiotic-alternative additives are emerging as the most attractive areas for global suppliers and investors. The deepening vertical integration of Chinese giants is making the sector more resilient to fluctuations in raw material markets, while also indicating that China's influence on global commodity prices will continue to grow.

References:

1. [2025 Agri Food Outlook Report | Global Feed Production Trends & Insights](#) | Alltech





Source: Freepik.com / Created by AI

2. [Animal feed preparations in China Trade](#) | The Observatory of Economic Complexity
3. [Aquaculture Industry Composition, Distribution, and Development in China](#) | MDPI
4. [Brazilian soybeans and China's food security](#) | The Strategist
5. [Can China Reduce Soybean Import Demand? Evaluating Soybean Meal Reduction Efforts](#) - farmdoc daily | Jilang Qing and Joe Janzen, Department of Agricultural and Consumer Economics, University of Illinois
6. [China 2024 pork output falls for first time in four years](#) | The Pig Site
7. [China Animal Feed Industry Outlook 2024 - 2028](#) | ReportLinker
8. [China Animal Feed Market By Size, Share and Forecast 2030F](#) | TechSci Research
9. [China Animal Feed Market Size, Trends & Forecast Report 2031](#) | GMI Research
10. [China Animal Feed Market Size, Trends and Forecast to 2032](#) | DataBridge
11. [China Animal Feed Market, By Region, Competition, Forecast & Opportunities, 2020-2030F](#) | Research and Markets
12. [China Aquafeed Market - Manufacturers, Suppliers & Industry Analysis](#) | Mordor Intelligence
13. [China Compound Feed Market Size & Share Outlook to 2030](#) | Mordor Intelligence
14. [China Feed Additives Market Share & Size 2030 Outlook](#) | Mordor Intelligence
15. [China Fishery Products, Grain and Feed Annual, Grain and Feed Update, Livestock and Products Annual, Pet Food Market Update Reports](#) | Browse Data and Analysis | USDA Foreign Agricultural Service
16. [China Pet Food & Animal Feeds Market 2024](#) | Euromonitor International | Scribd
17. [China's production of cattle, sheep, poultry remains stable in 2024](#) | The State Council, The People's Republic of China
18. [Could China's Soy Policy Changes Drive a Sustainable Agricultural Transformation?](#) | The FAIRR Initiative
19. [A review of China's feed production in 2023](#) | eFeedLink
20. [Characteristics and implications of changes in China's feed industry in 2024](#) | eFeedLink
21. [Sector Trend Analysis – Fish and seafood trends in China](#) | Agriculture and Agri-Food Canada (AAFC)
22. [The changing face of China's animal protein market – four key trends set to shape future of consumption](#) | Rabobank
23. [Tighter times ahead for the soybean market](#) | ING Think
24. [Top 10 Animal Feed Manufacturers in China](#) | Knowlege | CJ (Tianjin) Feed Co., Ltd

Innovafeed confirms sustainable growth with B Corp

Innovafeed, one of the global leaders in insect-based ingredients for animal and plant nutrition, announced the renewal of its international B Corp™ certification. This recertification comes three years after first achieving the label in 2022, during a period of rapid industrial and commercial expansion.

In 2025, Innovafeed achieved an overall score of 118, an improvement over its initial 111/200. Innovafeed notes that this progression reflects the company's growing maturity in em-

bedding impact at the core of its business model and governance.

"Being recertified as a B Corp™ is an important recognition of the progress achieved and the daily commitment of our teams. This improvement motivates us to continue transforming our industry and to demonstrate that new industrial models, both high-performing and sustainable, can deliver solutions for tomorrow," said Maye Walraven, Chief Impact Officer at Innovafeed.

The company states that this renewed certification reinforces the



credibility of Innovafeed's model, based on a unique, fully circular and fossil-free industrial symbiosis, and strengthens the company's ambition to pursue growth aligned with major environmental and societal challenges.

[Read more>>](#)

University of Stirling secures £1.4m grant for salmon health research

Scottish salmon farming generates around £750 million in exports annually, despite smolt (young fish) mortality rates of 15% to 20%, with gill and skin conditions being major contributors.

Dr. Rose Ruiz Daniels, a Lecturer in Aquaculture Genomics, secured more than £1.4 million in funding from the UKRI Biotechnology and Biological Sciences Research Council (BBSRC) that she believes can transform understanding of salmon health and disease resilience.

The project will explore tissue remodelling processes in salmon, aiming to reduce mortality linked to gill and skin health issues - major ongoing challenges affecting the global aquaculture industry. The research, hosted at the University's world-renowned Institute of Aquaculture, also benefits from £120,000 of in-kind support from Benchmark Genetics - a global leader in aquaculture innovation.

Researchers will study salmon during smoltification - a key stage when young fish adapt from freshwater to seawater. This critical process involves major changes in the body, making it valuable for



Photo: University of Stirling

understanding how fish both repair and strengthen their tissues.

"When smoltification fails to proceed normally, the fish become more vulnerable to stress and disease. By examining smoltification as a biological remodelling event, we can identify how salmon repair tissues, resist disease, and adapt to changing environments," Dr. Ruiz Daniels explained. "The findings will help inform improved breeding and health management strategies that enhance resilience across the industry."

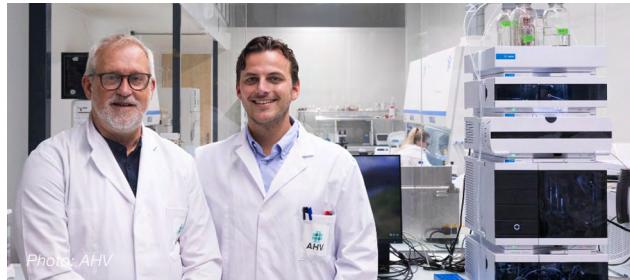
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AHV secures patent for quorum sensing innovation

Through its patented QSI Technology Extract, AHV (Animal Health Vision) International keeps animals healthy by influencing the quorum sensing of microorganisms, supporting resilience to biofilm-related disorders. This contributes to a reduced incidence of chronic diseases in ruminants, swine, poultry, and aquatic animals, according to the company.

“Receiving this patent is a proud moment for our entire R&D team,” said Maarten van der Heijden, Chief Research & Product Development at AHV. “This confirms the scientific foundation of our quorum sensing approach and reinforces our commitment to developing natural solutions with proven results. By promoting animal health and reducing the need for antibiotics, we help lower the risk of antibiotic resistance, supporting consumer demands for animal welfare and food safety.”

Lex de Boer, PhD, Chief Innovation Officer at AHV, oversees the company’s patent portfolio and has played a leading role in developing and publishing this patent over the past five years: “Innovation is the result of bold experimentation that shapes the future of life on this planet. I’m proud to have been part of



this journey—we’re creating a future where preventive care becomes the standard, not the exception.”

More than 80% of bacterial infections are biofilm related (Abranches J., 2011). Biofilms are structured communities of microorganisms that attach to surfaces. This matrix shields bacteria from external threats, including antibiotics and the host’s immune system. AHV’s patented Quorum Sensing Inhibition (QSI) Technology is able to avoid formation and maintenance of biofilms, enabling the immune system to eliminate biofilm-related disorders without milk/meat withhold or antimicrobial resistance. This has a significant impact on animal health, sustainability, and the profitability of farms worldwide — as well as on the global food supply chain.

[Read more>>](#)

PigTek launches five-year warranties for stainless-steel feed line equipment

Following recent updates to its feed line offering, PigTek announced new five-year limited warranties on select products. The company’s anchor bearing, stainless-steel boots and stainless-steel control units now come with the industry-leading warranties for customer peace of mind.

“We’re so confident that we have the most robust feed line in the industry that we’ve intro-

duced these five-year warranty programs,” said Chris Elvidge, COO and Lead Engineer at PigTek. “It’s also another reason for customers to choose our long-lasting stainless-steel finishes for only a minimal cost upgrade from galvanized options.”

PigTek said that its new anchor bearing, featuring a triple lip seal for superior dust and water protection, now includes the



enhanced five-year warranty. The bearing is made in the USA for even greater durability and more reliable sourcing.

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Dairy farm employees honored at Alltech Dairy Summit

Alltech presented the 2025 Most Valuable Employee (MVE) Award to Alejo Gutierrez of Enchanted Dairy in Little Falls, MN. This award recognizes the value of a dairy farm employee with an exceptional work ethic who exhibits integrity and who engages in their responsibilities on a dairy farm. Nominations are made by a farm manager, dairy owner, farm consultant, or nutritionist based on qualities such as perseverance, honesty, and integrity. The finalists were honored during the annual Alltech Dairy Summit on Dec. 11, in Green Bay, Wisconsin.

"Alltech is proud to honor Alejo Gutierrez as this year's Most Valuable Employee Award winner for his hard work and dedication," said Jorge Delgado, Alltech on Farm Support, People+. "This award is designed to recognize the people behind the cows and their exceptional work ethic and integrity."

The other finalists honored during the Alltech Dairy Summit included Ken Walsh, of Soaring Eagle Dairy, Newton, WI, nominated by Julie Maur-



er; and Chris Granius of Ebert Enterprises, Algoma, WI, nominated by Michelle Shambeau, Jordan Ebert and Robb Bender.

"Congratulations to each of these employees on your nomination for this award. We acknowledge the dedicated work that you do every day," said Delgado. "And thank you to the individuals who nominated each employee and for recognizing their dedication, talent and understanding the importance of employee recognition in our industry."

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Innovasea leads \$4.8M AI project for automated fish species identification

Innovasea, one of the global leaders in technologically advanced aquatic solutions for aquaculture and fish tracking, is leading a new \$4.8 million project, which will enable hydropower sites to automatically identify fish species.

This initiative, dubbed Species Aware, is one of six new projects funded in part by Canada's Ocean Supercluster (OSC). As part of this operation, Innovasea will partner with Canadian-based power companies to test its new, automated fish species identification models at select hydro dams.

"Through the Species Aware Project, we're delivering the next

wave of AI innovation for fish passage monitoring," said Mark Jollymore, Innovasea's CEO. "By automating species identification, we're helping hydropower sites further streamline compliance, reduce downtime, and collect vital data to protect and support their surrounding ecosystem."

The species classification capabilities will be integrated into Innovasea's HydroAI product, an AI-powered solution designed to automatically provide accurate, real-time fish counts. The new models, which were trained on real-world footage, utilize a series of visual features – including size,



shape, and color – to automatically identify fish species as they pass in front of the system's cameras, Innovasea highlights.

This next, crucial step is expected to allow Innovasea to test and fine-tune the solution, preparing it for real-world deployment.

[Read more>>](#)

FAO declares 2026 the International Year of Rangelands and Pastoralists

The Food and Agriculture Organization of the United Nations (FAO) launched the International Year of Rangelands and Pastoralists (IYRP 2026), a global campaign aimed at raising awareness of and enhancing the vital contributions of rangelands and pastoralists to sustainable agrifood systems, biodiversity preservation and climate resilience.

Rangelands cover around half of Earth's land surface in ecosystems such as grasslands, savannas and shrublands, deserts, wetlands or mountain areas. The steppes of Central Asia, the African savanna, the Alps and the Pyrenees in Europe, Andes in South America and the Great Plains of the United States are all examples of these landscapes. They preserve unique fauna and flora and provide essential services including carbon storage and water regulation. They sustain the livelihoods, nutrition and cultural identities of millions of pastoralists and are shaped by the movement of people and animals. Pastoralists are key custodians of these landscapes. They manage around 1 billion animals worldwide—from sheep and goats to cattle, camelids, yaks, horses, reindeer and buffaloes—contributing to food security while preserving ecosystems, cultural heritage and local and indigenous knowledge.

But FAO notes that these ecosystems are under increasing pressure from droughts, floods and other



climate impacts, land degradation, animal diseases and competing land uses, limiting pastoralists' mobility and threatening their way of life. For example, while rangelands account for about 30 percent of global soil organic carbon stocks, roughly half of them are estimated to be degraded.

Speaking at the launch event, FAO Director-General QU Dongyu emphasized that the International Year is a moment for collective action. "We must listen and empower women, youth, and pastoralist organizations to take part in the decisions that shape their lands and livelihoods. Too often, their voices remain unheard or ignored, and their contributions undervalued. We must safeguard rangelands through responsible governance, restoration, and investment and support the people who steward them," the Director-General said.

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Purina donations to five leading veterinary schools

Veterinarians play a critical role in the lives of pets and pet owners, serving as trusted partners for their pets' wellbeing. In honor of International Day of Veterinary Medicine, Purina announced its donations to five top veterinary schools in the U.S. to support veterinary education and advancements in pet health. The collaborations will support research and scientific developments in pivotal areas of pet health including

nutrition, dermatology, cognition, and canine performance, ultimately aimed at furthering scientific understanding of feline and canine health and well-being.

"For decades, we have worked closely with veterinary schools to advance pet health and support the professional development of the veterinary community," said Purina Chief Veterinary Officer Dr. Kurt R. Venator. "These five new programs promise to offer nutri-



tional and scientific advances and enrich the education and training of future leaders in veterinary medicine for generations to come."

[Read more>>](#)

Novus presents expert insights for Vietnam's poultry and swine producers

Novus recently brought its Made of More™ experience to Vietnam through two exclusive, customer-only events designed to inspire and empower poultry and swine producers. The gatherings featured thought-provoking presentations from regional and global experts and celebrated the launch of Novus' newest publication, Nutrition and Production Strategies for Today's Sows.

Aligned with Novus' aim to deliver more science, more insight, and more inspiration, the events brought together producers, nutritionists, veterinarians, and industry partners seeking fresh strategies to advance performance and efficiency in Vietnam's evolving livestock sector.

Attendees heard from three speakers whose insights addressed both current challenges and emerging opportunities in Vietnam's monogastric production systems:

- Che Minh Tung, Ph.D., Associate Professor, Nong Lam University, opened the program with Unlocking Potential in Vietnam's Livestock Indus-



try. His session examined the country's rapid livestock expansion, emerging technology adoption, and a vision of the industry to the year 2030.

- David Torres, Senior Regional Technical Services Manager—Asia Pacific, Novus, presented Intelligent Nutrition for Monogastrics: Enhancing Performance and Feed Efficiency. Torres shared considerations that support production goals, operational efficiency, and system resilience through strategic nutritional strategies and effective use of raw materials such as soybean meal.

[Read more>>](#)

Aboitiz Foods recognized for Pilmico–Gold Coin rebrand

Positioning itself among Asia's leading integrated food and agribusiness companies, Aboitiz Foods garnered top regional recognition as its rebranding initiative—integrating Pilmico and Gold Coin under a single corporate brand—won Gold in the Philippines and Bronze in Asia-Pacific at the first-ever NEXT Awards 2025.

Held in the Philippines on November 27, 2025, at Shangri-La the Fort Manila, the NEXT Awards celebrated the most innovative branding initiatives across the region.

Aboitiz Foods' rebranding ini-

tiative was honored for its creativity, innovation, and excellence in successfully unifying a diverse, multi-country business under one corporate brand, affirming the company's regional growth ambitions and reinforcing its commitment to the brand promise, "Together We Nourish the Future".

"Becoming Aboitiz Foods represented more than a name change or logo refresh; it marked a new chapter for the company," said Joeben Gamatero, Aboitiz Foods' Vice President for Brand & Reputation Management and Agribusiness Marketing, adding, "Bringing Pilmico and Gold



Coin together under Aboitiz Foods propelled our business forward, creating a distinct, singular voice that resonates powerfully with both our customers and employees. It clearly demonstrated how a unified identity can inspire teams to pursue shared goals."

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EFSA warns: US dairy bird flu unlikely, impact could be high

The likelihood of the strain of highly pathogenic avian influenza (HPAI) found in US dairy cows reaching Europe is very low, according to new advice by the European Food Safety Authority (EFSA). However, EFSA's experts conclude that should the virus arrive the impact on EU countries could be significant. To ensure preparedness, EFSA recommends raising awareness among farmers and veterinarians and strengthening surveillance for early detection.

As requested by the European Commission, EFSA focussed on the risk of infection of EU dairy cattle and poultry with the specific H5N1 genotype virus that is circulating in US dairy cattle and

outlined possible mitigating measures to prevent its introduction and spread in Europe. These may include certain trade restrictions from affected regions and thoroughly cleaning milking equipment. In the event of an outbreak, coordinated action in both poultry and dairy cows is advised, to reduce the overall impact.

To prevent the spread, experts recommend restricting cattle movement in affected areas, avoiding the exchange of workers, vehicles and equipment between farms, and enforcing strict biosecurity. These measures will also help contain other HPAI strains already present in Europe.

EFSA's assessment also exam-



Photo: EFSA

ines the potential for the virus to be transmitted through food. The primary route of consumer exposure to the virus would be through drinking raw milk, raw colostrum, or raw milk cream. However, experts emphasise that thermal treatment such as pasteurisation is highly effective at reducing the virus in milk and milk products.

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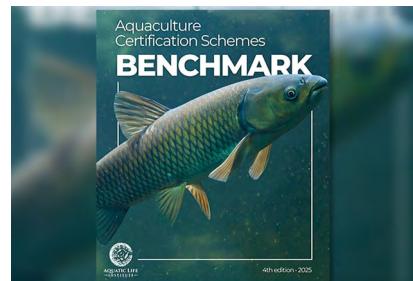


ALI releases 2025 Aquaculture Certification Schemes Benchmark

Aquatic Life Institute (ALI) published the fourth edition of its Aquaculture Certification Schemes Benchmark report. The 2025 edition analyzes current welfare requirements within the primary farming standards of nine global seafood certification schemes and two international ratings agencies, which collectively oversee a substantial share of global farmed fish and shrimp production. Through sustained research and direct engagement with certifiers and rating agencies, ALI points out that the benchmark shapes how retailers, investors, and regulators define truly responsible seafood.

The Aquaculture Certification

Schemes Benchmark remains the world's only evidence-based tool designed to evaluate how strongly aquatic animal welfare is embedded within aquaculture certification and rating frameworks, according to ALI's statement. The benchmark is part of the institute's ongoing work to help encourage progressive development related to animal welfare standards in aquaculture, and will be used as a tool by decision-makers worldwide as they make informed choices about sourcing from the certifiers that lead in aquatic animal welfare. Seafood certification schemes and ratings agencies act as de facto regulators in a largely unregulated global industry.



Through transparent, comparative ranking, the benchmark motivates certifiers to elevate their standards. The feedback period plays a crucial role in this process, offering certifiers detailed, evidence-based guidance on how to address identified gaps, turning evaluation into collaboration and competition into tangible welfare progress.

[Read more>>](#)

Ecolex and CJ Bio highlight gut health innovation

Ecolex Animal Nutrition and CJ Bio recently hosted a successful Partnering for Progress—Synergizing Gut Health and Genetics meeting during Poultry India 2025, held from November 26-28. The meeting marked a key milestone in the companies' collaboration to advance natural poultry gut health solutions distributed by Ecolex in India, Sri Lanka, and Nepal. Addressing enteric diseases, a leading threat to poultry profitability and health, the meeting attracted progressive poultry farmers, nutritionists, and distributors eager to explore innovative approaches.

Ecolex's Global Commercial Director, Edward Manchester, emphasized the importance of future-proofing poultry businesses against increasing consumer demand for antibiotic-free products, despite the current allowance of antibiotic growth promoters (AGPs) in India. This partnership highlights a shared dedication to science-driven, sustainable nutrition solutions that boost animal welfare,



productivity, and antimicrobial resistance (AMR) mitigation, he pointed out.

He highlighted that since Ecolex was established in 2005, it is evolving from a leading manufacturer and supplier of specialty rumen bypass fats and emulsification technologies to developing innovative branded products. Participants were introduced to two natural products: GutLuk, a phytogenic gut health solution and AGP alternative, and Coxield, a phytogenic substitute for anticoccidial drugs.

[Read more>>](#)

GMP+ International hits 20,000-company certification milestone

One of the world's largest schemes for safe and sustainable feed, GMP+ International passed another significant milestone, it now actively certifies more than 20,000 companies across the entire feed chain worldwide.

Managing Director for GMP+ International, Martine Boon, welcomed the news, "This achievement is the product of three decades of collaboration, passion, and determination from feed professionals around the world. It reflects the effort the industry has made to prioritise feed safety, the trust they have placed in us as a standard setter, and the growing importance they

are placing on sustainability. Our team, and the whole GMP+ community, rightly deserve to feel proud of where we are today, and what the future holds."

GMP+ International was established in 1992 to address concerns around feed contamination. It has grown into the world's largest feed safety scheme and is now increasingly supporting the industry with their sustainability certification needs.

The 20,000th company to be certified under the GMP+ Feed Certification (FC) scheme is Biomix Poland, which provides a range of supplementary feed mixes for cattle farmers. Renata Szwarc – Member of the Board



Photo: GMP+ International

of Directors, Sandra Hemerling – Customer Service and Quality Specialist for Biomix said, "We are enormously proud to be the 20,000th GMP+ certified company in the world today. We know how important safety and trust are in our industry, and we look forward to playing our part in a global community that prioritises feed safety."

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Cirkulär awarded €226k to boost aquafeed solutions

After launching its first product in late 2025 – a protein-based ingredient for fish feed produced from forest-based industry side streams – Cirkulär, together with the University of Borås and Kitcoat, was awarded € 226,000 from FORMAS to investigate how additional high-value substances can be obtained through the same process. The company states that it is also the first in the world to commercialize mycoprotein for aquaculture.

Cirkulär says that this project reinforces long-term vision: Using a filamentous fungus and an industrial side stream to develop several sustainable product streams. It marks an important step toward establishing a full-scale integrated fungal biorefinery, where a single bioprocess supports multiple product lines.

"This project will demonstrate how much value can be unlocked simply by making better use of existing side streams. Until now, our focus has mainly been on the protein component for fish feed, but



we will now evaluate other valuable compounds and identify where they offer the strongest impact. This is not just R&D, it's a strategic move toward long-term growth and a more circular bioeconomy," comments Eric Öste, Founder and CEO of Cirkulär.

In addition to its main product Mycomeal, a whole-mycelium protein ingredient for aquafeed, Cirkulär will now develop new processes and assess the potential to develop product streams from the same fungal process.

[Read more>>](#)

New Report: Mediterranean–Black Sea overfishing drops to decade low

Although fisheries' sustainability in the Mediterranean and the Black Sea remains a source of concern, the percentage of overfished stocks dropped to its lowest level in a decade, a milestone that coincides with aquaculture's rapid expansion as a major source of aquatic foods in the region, according to a report released by Food and Agriculture Organization of the United Nations' (FAO) General Fisheries Commission for the Mediterranean (GFCM).

The 2025 State of Mediterranean and Black Sea Fisheries (SoMFi) report, produced with contributions from more than 700 regional experts, demonstrates that strong cooperation and evidence-based management are paying off. Fishing pressure has been cut by half over the past 10 years and key stocks are recovering.

At the same time, marine and brackish aquaculture now accounts for more than 45 percent of aquatic food production, reaching 940,000 tonnes in 2023. Together, fisheries and aquaculture and their value chain produced 2.06 million tonnes of



aquatic foods, generated \$21.5 billion and supported 1.17 million jobs.

"Stocks are not yet where we would like them to be, but they are beginning to recover thanks to science-driven management action and strong stakeholder engagement, while aquaculture, if done responsibly, is proving it can help meet future demand for aquatic foods," said Manuel Barange, Assistant Director-General and Director of Fisheries and Aquaculture at FAO.

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Huihai Group opens aquaculture feed factory in Jiangsu

Chinese agricultural firm Huihai Group commissioned a new intelligent and environmentally friendly aquaculture feed factory in Jiangsu, marking a strategic expansion of its production and service capabilities in East China. Covering 43 mu (approximately 2.8 hectares) with a total construction area of 28,000 square meters, the facility is equipped with five advanced aquatic feed production lines and has a designed annual capacity of 300,000 tons. The factory focuses on the research, development, and production of high-end feed solutions for key aquaculture

species, including crabs, Pacific white shrimp, marine fish, and premium freshwater fish.

In a statement, the company said that aquatic feed orders had exceeded 40,000 tons, with deposits totaling more than 4.6 million yuan, fully demonstrating strong market recognition of the Huihai brand and its products.

Adhering to the core philosophy of "providing value to customers and creating happiness for employees," Huihai continues to address key pain points in aquaculture by promoting the "Four Goods" healthy farming model — good seedlings, good feed, a



good environment, and good disease prevention.

Huihai noted that through its flagship product "Xiehui Gao," the company offers farmers end-to-end technical support and scientific solutions to help them raise better aquatic products and achieve stronger sales performance.

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Skretting wins ESG Transparency Award for second consecutive year

Skretting's Impact Report won the ESG Transparency Award for the second consecutive year. The company highlights that this recognition reflects its longstanding commitment to reporting on the progress it has made on its sustainability journey.

The award was received by Marcel Görmer, Sustainability Program Manager at Skretting, at the award ceremony on November 26, 2025. Görmer said, "Winning the ESG Transparency Award reflects our belief that strong, honest and verifiable sustainability data matters more than ever to make meaningful progress. At Skretting, we are committed to being open about our progress but also our gaps - because real change starts with transparency."

EUPD Group has developed the ESG Transparency Award to give due credit to organisations that have started to embed sustainability into their ways of working, while also communicating them trans-



parently through sustainability reports.

Skretting's work on its Impact Report 2024 has gained the company recognition within the 'Excellence Class'. The applied ESG Transparency Evaluation Standard comprises a total of 350 differentiated audit criteria divided into five evaluation clusters: Transparency, Environmental, Social, Governance and Regulatory Landscape.

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