Issue N° 24 | Volume VII | July 2025

AM PET FOOD MAGAZINE

INTERNATIONAL MAGAZINE
ABOUT THE PET FOOD INDUSTRY

WHY IS IT CRUCIAL THAT COMPANIES OR MANUFACTURERS INVEST IN INNOVATIONS?

INNOVATION IN NATURAL EXTRACTS, PREBIOTICS & PARABIOTICS FOR PET NUTRITION

PRECISION INNOVATION IN PET FOOD

INSECTS IN DOGS AND CATS FEEDING: COMPOSITION, APPLICATION, AND FUNCTIONAL BENEFITS

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INTERNATIONAL MAGAZINE ABOUT THE PET FOOD INDUSTRY

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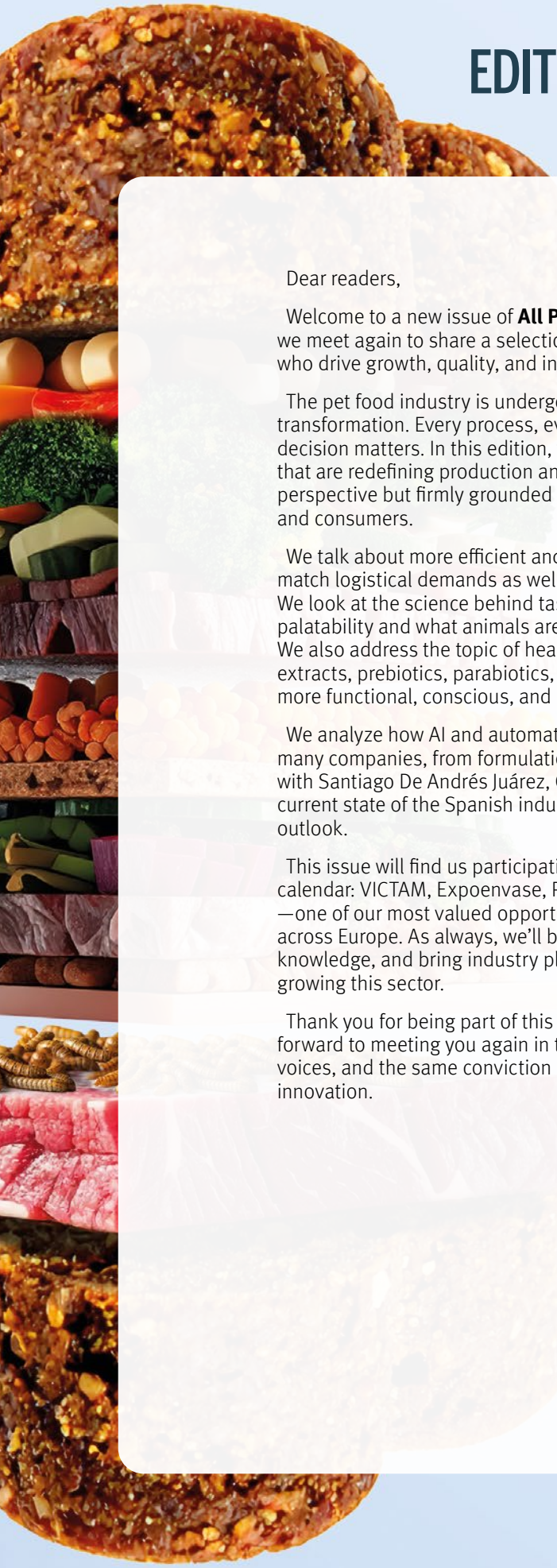
Content



EDITORIAL

Dear readers,

Welcome to a new issue of **All Pet Food Magazine**. As every quarter, we meet again to share a selection of content designed to support those who drive growth, quality, and innovation in the pet food industry.

The pet food industry is undergoing a quiet but profound transformation. Every process, every ingredient, every technological decision matters. In this edition, we explore some of the key innovations that are redefining production and processing, with a forward-looking perspective but firmly grounded in the current needs of both companies and consumers.

We talk about more efficient and adaptable packaging solutions that match logistical demands as well as growing sustainability expectations. We look at the science behind taste —how manufacturing affects palatability and what animals are telling us today about their preferences. We also address the topic of health, exploring the potential of natural extracts, prebiotics, parabiotics, and postbiotics as allies in building a more functional, conscious, and intelligent nutrition.

We analyze how AI and automation are revolutionizing operations in many companies, from formulation to logistics. Additionally, we talk with Santiago De Andrés Juárez, General Secretary of ANFAAC, about the current state of the Spanish industry, its challenges, and medium-term outlook.

This issue will find us participating in key events on the international calendar: VICTAM, Expoenvase, Pet South America, and of course, CIPEU —one of our most valued opportunities to connect with colleagues across Europe. As always, we'll be there to spark conversations, share knowledge, and bring industry players closer together to continue growing this sector.

Thank you for being part of this ever-evolving community. We look forward to meeting you again in the next edition with new ideas, new voices, and the same conviction as always: better nutrition also means innovation.

Editorial Team

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TECHNOLOGICAL REVOLUTION IN THE PET FOOD SECTOR:

AUTOMATION AND AI ARE CHANGING THE INDUSTRY

The pet food industry is experiencing sustained growth and expansion, driven by current demands and increasingly discerning consumers. In this context, technology is no longer optional —it has become a necessary, strategic tool. Being more accurate, automation and artificial intelligence are profoundly reshaping manufacturing, control, and distribution processes worldwide.

By All Pet Food

Automation: Efficiency, Precision… and Scalability?

One of the most significant changes lies in the implementation of automated systems throughout the manufacturing process. From precise ingredient dosing to intelligent packaging, **automated systems reduce mistakes, optimize time, and improve food safety.**

Production plants equipped with robotic arms and integrated production lines enhanced efficiency and minimized manual handling, allowing the technical staff to focus on higher-value tasks. The main advantage of robotics is production optimization. Robotics not only improve efficiency and product quality but also enhance scalability. Machines can operate 24/7 without downtime, ensuring continuous output when properly maintained. In addition, this automation facilitates regulatory compliance due to its traceability and real-time monitoring, while reducing variability in the final product because of human-related fatigue.

Data-Driven Decisions Powered by AI

AI is playing a vital role in quality control, predictive analysis, and formula personalization. Using Machine Learning algorithms, companies can detect faults in the extrusion process, anticipate mechanical failures, or adjust

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production parameters to meet specific market needs.

Tools, such as generative AI, are being tested to enhance information and analysis through chatbots, allowing human operators to enhance their performance. By combining AI with Machine Learning, manufacturers can improve forecasting, simulate production scenarios, and make better-informed decisions. The goal: to empower decision-makers with accurate and well-informed insights.

While AI is increasingly integrated in manufacturing, data security and scalability emerge as critical concerns. Cloud Computing —cloud technology that allows manufacturers to test AI-driven pilot programs at single facilities before scaling them across multiple locations— is being implemented in different companies.

Another application is artificial vision, which enables millimeter-precise control over kibble size, shapes, and color —ensuring consistent standards without human intervention.

Companies joining digital transformation hand in hand with these tools will benefit themselves in many ways. However, they will face certain challenges, including investment costs, staff training, and the integration with existing systems.

Beyond Operational Performance

The advantages of adopting automation and artificial intelligence go far beyond speed and error reduction. **Its impact changes the whole operation, generating more sustainable processes** —by improving the use of raw materials and energy, they reduce waste and optimize available resources, crucial in a context with increasing precision for efficiency and sustainability.

They also provide agility in responding to changes in market demands, e.g., new nutritional trends or regulatory updates. In an environment where launches are more frequent and personalized, data-driven, flexible production systems offer a major competitive edge. These technologies also facilitate regulatory compliance and documentation required by the global market, which strengthens the commercial position. **Digital transformation in pet food manufacturing not only improves operational performance but also redefines industry standards in quality, innovation, and adaptability.**

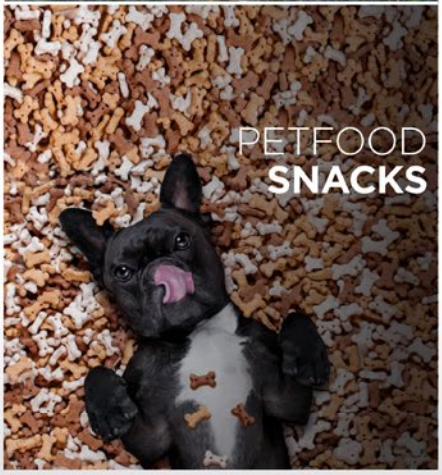
Conclusion

Digital transformation in the sector does not happen in isolation, it addresses a sustained, growing context and a more competitive market. According to the American Per Products Association, in 2023, the pet food and snack industry reached $64.4 billion in sales, **representing a 10.8% increase over 2022.** Projections are even more ambitious: **the market is expected to exceed US$112 billion by 2030.** Considering this, investing in automation and artificial intelligence not only is an operational improvement but also **a key strategy to ensure long-term competitiveness, efficient scaling, and respond to a growing global demand.**

What once felt like science fiction is now the reality of many pet food plants around the world. **The convergence of automation, artificial intelligence, and analytics is setting a new industry standard —one that is smarter, more efficient, and more interconnected.** Companies embracing this transformation will not only optimize current operations but also prepare themselves for the future.

SINGLE SCREW MULTIPLE MARKETS

SINGLE SCREW EXTRUSION SYSTEM OPTIMIZES FLEXIBILITY AND MARKET OPPORTUNITIES



Optimize the return on your capital investment with a single screw extrusion system. Buy one system and cost-effectively deliver product to multiple market opportunities.

- One system capable of economy up to super premium fresh meat petfood
- Aquatic feeds that range from floating to sinking shrimp feed
- Capitalize on high margin petfood treat opportunities
- Significantly lower operating cost per ton versus competitive systems

As the chart below demonstrates, an Extru-Tech Single Screw Extrusion System provides all the flexibility and production efficiencies at around half the cost of competitive extrusion systems with high operating costs.

	Extru-Tech Solution		The Competition
Capital Investment	1.0		2.5
Operating Costs	1.0	VS	1.60
Ingredient Flexibility	Excellent		Excellent
Complexity	Low		High
Operating Cost ($/M Ton)	1.08		2.80

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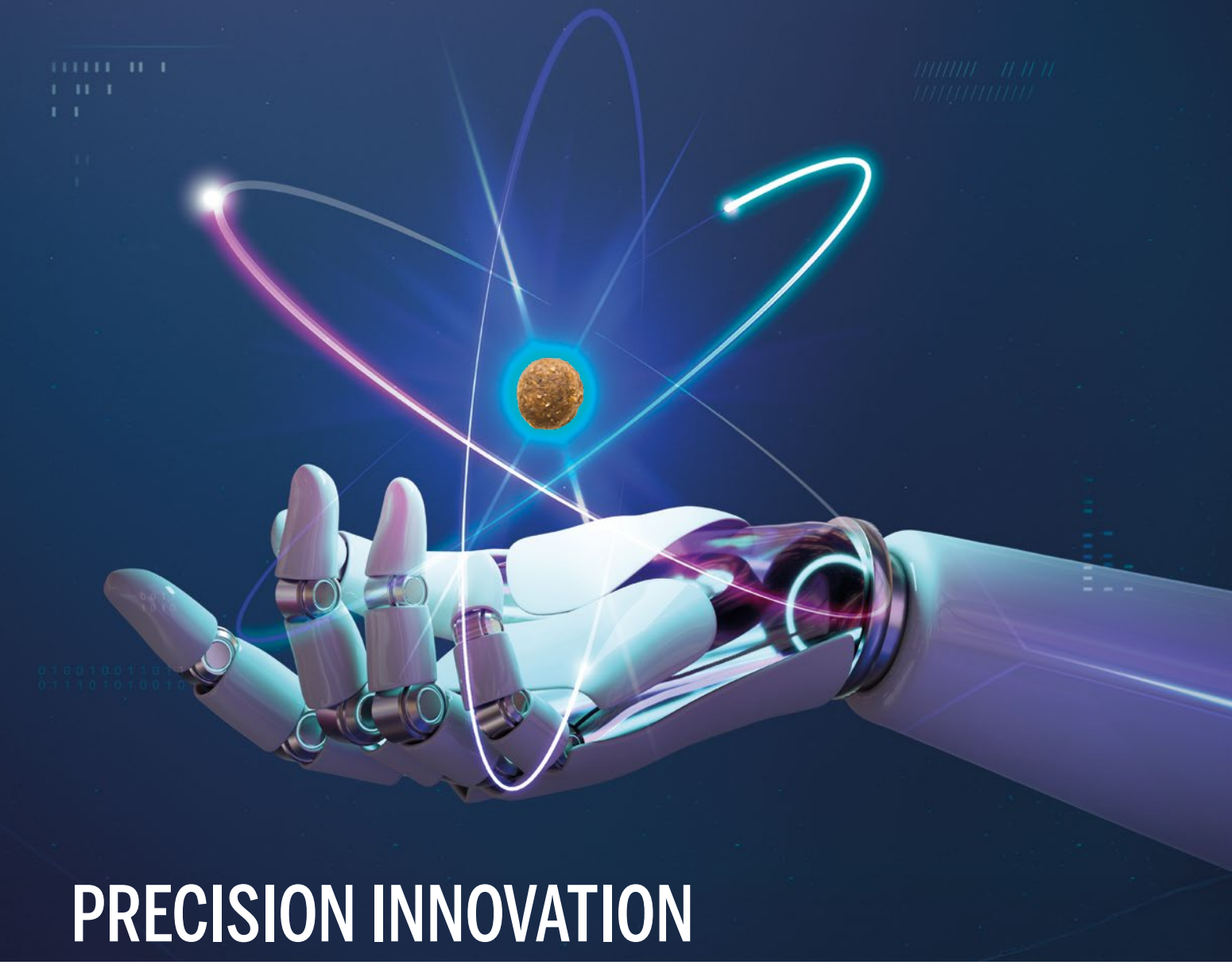

PRECISION INNOVATION IN PET FOOD

For Michael Porter, companies achieve competitive advantages through innovation through any practices in the value chain.

By MVZ Armando Enriquez de la Fuente Blanquet

Innovation in pet food is an evolving topic driven by trends, including pet humanization, sustainability, and the pursuit of improved nutrition. Innovations in pet food production and processing aim to enhance specific nutrition, functional health, and digestive performance by using the right amount of bioactive compounds and nutrients. We will address this issue from the perspective of ingredient innovation.

Protein is one of the most important compounds for pet parents when purchasing pet food. Innovation is not the exception to this nutrient in the formulation process. Animal proteins (chicken, lamb, fish, etc.) are the most commonly used, but there are some alternatives. Moreover, others are in the initial implementation phase or used only in a few segments:

Insect proteins: Cricket flour, black soldier fly larvae, etc. are highly digestible, sustainable sources, rich in proteins and with less environmental impact.

Vegetable proteins: Different from traditional sources, such as soybean paste. Nowadays, it is not surprising to see lentils, chickpeas, peas, and/or quinoa, among others.

Cell culture: Cultured meat for super-premium food is being studied.

Emerging functional ingredients are another important aspect of innovation in nutrients. They are not only nutritious but also beneficial for health. Sometimes, they result in superfoods that are detailed below:

• Spirulina, chia seeds, and blueberries were widely used in the pet food industry due to their antioxidant and anti-inflammatory benefits.

• Prebiotics, such as FOS (fructooligosaccharides), MOS (mannan oligosaccharide), XOS (xylooligosaccharides), and beta-glucans are known as gastrointestinal microbiome enhancers that improve the growth of beneficial intestinal bacteria.

• Probiotics are microorganisms that help the digestive system and the gut microbiome. Innovation in pet food is associated with probiotic capsules or spore-forming probiotics (e.g., *Bacillus coagulans*, *Enterococcus faecium)* which support extrusion thermal processing.

Postbiotics are by-product metabolites from beneficial b • acteria that promote gut and immune health. They also reduce inflammation without needing living organisms.

• Enzymes, such as amylase, protease, and lipase are added to enhance nutrient digestibility, especially in diets with alternative ingredients. However, you should be careful since enzymes are thermolabile and need accurate technology to withstand the thermal process, for example, the extrusion.

• Organic minerals are more bioavailable than traditional sources (sulfate or oxides); they strengthen metabolism, bone health, dermal health, and the immune system. In this segment, there are different organic sources, depending on the metal-binding element. Beginning with the most advanced technology, these can be bisqueled with HMTBa [(hydroxymethyl)butanoic acid]; followed by chelates, essential and non-essential amino acids, complex polysaccharides, or complex propionic acids (according to the AAFCO's classification).

• Vitamins are essential nutrients for pets' health and well-being. Food and vitamin capsules are typically combined in the pet food industry because they protect from heat and oxidation during the extrusion or cooling processes, improving the final product's stability.

• Phytonutrients and/or botanical extracts, such as polyphenols, flavonoids, and essential oils (e.g., rosemary, turmeric, and oregano) are an alternative due to their antioxidant, anti-inflammatory, and natural preservative properties.

Specific fatty acids can be a good source of p • olyunsaturated fatty acids or omegas. The controlled incorporation of EPA/DHA (omega-3) microalgae as a more sustainable ingredient than fish oil is not surprising. Medium-chain fatty acids are widely used as immediate sources of energy.

• Bioactive peptides are hydrolyzed protein by-products, for example, hydrolyzed collagen with specific functions

(immune response modulator, joint health enhancers, cartilage regeneration, and skin elasticity).

• Functional fermented vegetable foods, such as miso or kefir (adapted for pets), are beneficial as they provide natural digestive enzymes and beneficial microorganisms.

• Adaptogens (e.g., ashwagandha, ginseng, or rhodiola) are natural ingredients that help the body manage stress. Usually, they are used in supplements to reduce anxiety, support the nervous system, and adapt to changes.

• On the other hand, there is a trend to reduce toxic ingredients in food; in those cases, we must look for innovative alternatives.

• Reduce sodium, sugar, and synthetic additives by replacing artificial colorants with natural pigments (e.g., beta-carotenes, spirulina) or substituting artificial antioxidants with natural products.

Referring to precision innovation, we cannot forget about integrating technology, such as apps that recommend diets or provide nutritional follow-up or intelligent vending machines that ration food and compile consumption data.

Another innovative area we must follow closely is innovation in formulation and dosing. Microencapsulation technologies are still evolving to enhance the stability of sensitive compounds (vitamins, oils, and probiotics). Some lab tests allow the understanding of certain genetic predispositions and the gut health of our pets. The applied nanotechnology area is being developed, related to the use of nanoparticles that improve the absorption of minerals and antioxidants (even in the experimental or regulatory stage). **Finally, data-driven formulation employs AI and nutritional algorithms that adjust the right amount of micro-ingredients according to age, breed, activity or pathologies, sleep, and pet food consumption in real time.**

BRINGING COMMERCIAL AREAS CLOSER TO PET FOOD MANUFACTURING PROCESSES

In the competitive world of pet food brands, collaboration among different areas within a company is critical for success. From my experience, I have often observed that commercial areas (Marketing and/or Sales Departments) have a narrow understanding of operations, especially about the manufacturing processes in factories. For them, the factory is magical: raw materials enter and packaged products with added value emerge. However, when commercial teams learn more about how the products they sell are produced, they obtain six clear benefits that help them in their own responsibilities.

By Felipe J. Martínez

1. Understanding the Business Core: The Product

The first and most obvious benefit of knowing the production process is gaining a deep understanding of the product itself. The commercial area, by learning about each stage of manufacturing —from ingredient selection to final packaging— can better appreciate the quality, attributes, and uniqueness of the product. **This knowledge translates into more effective communication with clients, allowing the team to highlight product differentiators and build trust.**

Additionally, understanding the process enables the commercial team to accurately answer customer questions about ingredients, manufacturing methods, packaging, quality controls, and other relevant aspects. This transparency builds credibility and fosters long-term relationships.

2. Low-Effort, High-Impact Innovation

Familiarity with the production process opens the door to low-effort, high-impact innovation. By understanding limitations and opportunities at each stage, the commercial team can identify subtle improvements in formulation, packaging, or processes that can generate significant value for both customers and the company.

For example, an adjustment to the size of the kibble that improves digestibility for smaller breeds or a change in packaging that extends product shelf life could be simple innovations that make a substantial difference in the market.

STRUGGLING WITH KIBBLE QUALITY?

PLASMA INCLUSION SOLVES MANUFACTURING CHALLENGES

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3. Strategic Innovation

Not all innovations are equal. Some require significant investments in equipment and technology, as well as more extended development time. By understanding the production process, **the commercial area can distinguish when an innovation is feasible with existing resources and when it requires a long-term strategic approach.**

This insight avoids the frustration of proposing unfeasible ideas and allows the prioritization of innovative projects aligned with the company's objectives and investment capacity.

4. Mastering Cost Structure: Revenue Management

Cost structure is a key element in any revenue management strategy aimed at maximizing company profitability. By understanding how costs are distributed at each production stage, the commercial team can make more informed decisions about pricing, promotions, and discounts.

For instance, if the team knows the cost of ingredients and the impact of raw material price fluctuations, they can adjust pricing strategies to achieve target profitability or create a competitive edge.

5. Robust Commercial Strategies: High Value-Added Products

As products increase in value, knowledge of the production process becomes increasingly critical. The commercial area must thoroughly understand the unique attributes and benefits that distinguish these products from competitors.

For example, this knowledge can influence communication with specific customer segments that value quality, innovation, and premium ingredients. Furthermore, **it helps identify new market opportunities and expand into specialized niches.**

6. Sustainability and Social Responsibility

Nowadays, consumers are increasingly concerned about the sustainability and social responsibility of companies. By understanding the production process and sustainability strategies, the commercial area can better communicate these efforts to clients.

For example, it's important for commercial teams to know details about the environmental impact of key ingredients as well as initiatives focused on energy and water optimization. **By sharing these efforts with customers, the company can strengthen its brand image within the market and among key opinion groups.**

In conclusion, understanding production processes within the commercial area can generate multiple benefits. From improving client communication to identifying innovation opportunities and optimizing cost structures, knowledge of the production process strengthens a company's ability to compete effectively in the pet food market.

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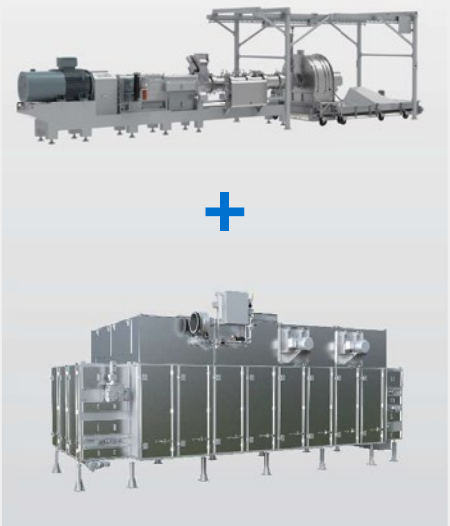
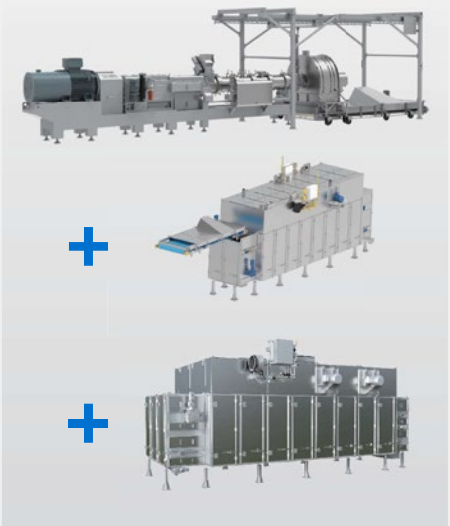


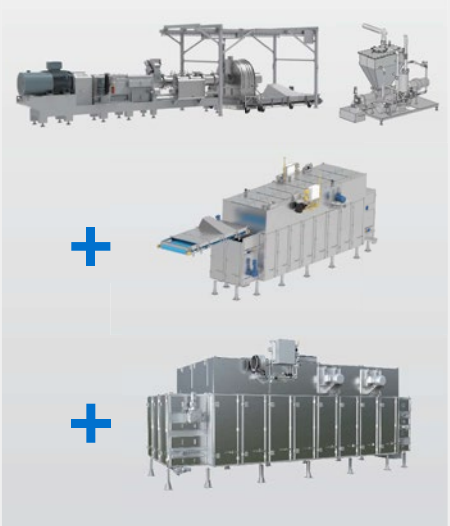
LV I : Normal Fresh Meat

0%-40% @ DMR
0%-30% @ Total Formula



LV II : High Fresh Meat

40%-100% @ DMR
30%-50% @ Total Formula



LV III : Ultra High Fresh Meat

100%-140% @ DMR
50%-60% @ Total Formula

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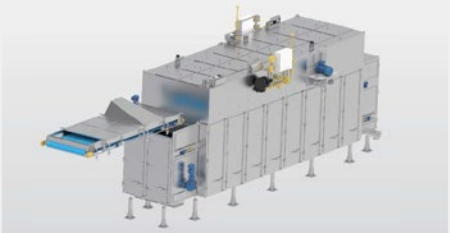
MJ Series
Three-layer conveyor belt

MJ Series
Single-layer conveyor belt



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CHILE: THE IMPORTER MARKET-LEADING PET FOOD SOPHISTICATION IN LATAM

In our attempt to study the Chilean pet food market, we uncovered an interesting reality. Few countries in LATAM exhibit a clear combination of selection criteria, trade liberalization, and consumer sophistication. By reviewing the imported products portfolio approved by the Agricultural and Livestock Service (Servicio Agrícola y Ganadero or SAG), through brands that fill the shelves of specialized retailers and digital stores, an important ecosystem is emerging, which rigorously selects what is available on the market. The ability to discriminate changes the entire outlook.

By Iván Franco

This article focuses on the importing profile of the Chilean market. We chose to keep the local offer analysis out for now to look at the question: can a country build a competitive, highly valuable market by importing? The Chilean market suggests that is possible. However, we also discovered that Chile reconverted its external dependence in a beneficial strategy, shaping a consumption environment that stands out for its quality, variety, and value orientation.

That decision brought extraordinary outcomes. Instead of just meeting basic nutritional needs, the Chilean pet food market promotes standards that aim at functional health, veterinary specialty solutions, tailored convenience, and premium experience.

The Most Diverse, Specialized Market in the Region

The clearest sign of sophistication is in SAG's imported products portfolio. The current portfolio has more than 7.000 references, and analyzing their names, positioning, and origin allows us to understand the market structure. There are brands, such as Royal Canin, Hill's, Orijen, Eukanuba, Taste of the Wild, and Pro Plan, which also have different functional lines, from formulas for specific breeds to hypoallergenic, metabolic, and advanced gut-support versions. **In other words, the Chilean market reflects a synthesis of the most advanced global pet food portfolio.**

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- 🔍 Channel's information: Self-service, pet shops, animal hospitals, and e-commerce.
- 📈 Key Performance Indicators: Accurate decision-making about portfolio, pricing, and expansion.

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It does not happen by chance; several conditions make an importing market functioning as a sophistication point. In the first place, the sociodemographic profile: with a PIB per capita closer to USD 17,000 —the highest in Latin America, only exceeded by Panama and Costa Rica— Chile has a consolidated social media class with aspirational consumption habits.

Added to this is a dynamic demographic transformation: the average household size is progressively decreasing (2.5 persons per household), while the number of single-person and childless households has grown significantly. **As pets (especially cats and dogs) play an emotional and symbolic role, consumers spend a lot of money on them.**

It results in a demanding, informed, and quality-oriented request. Instead of importing a large amount of generic products, the Chilean market chose to import added value. As a consequence, the SKU (Stock Keeping Unit) is highly functional and specialized. Just look at the variety of Hill's or Royal Canin in Chile —formulas for small breeds of dogs, food for cats with kidney disease, kibbles to regulate intestinal microbiota, prescribed diets, and immune-boosting snacks.

Without a consumer willing to pay more for tailored solutions, this portfolio would be impossible; it can also be possible without a commercial infrastructure that understands and supports that logic. In Chile, specialized shops are not a marginal niche but a robust channel that coexists with stocked and digital veterinaries offering fast, segmented distribution. **The channel's professionalization is key to maintaining the rotation and visibility of high-end products.**

Less Volume, More Quality, and a Global View

Contrary to other markets where national offer tends to collapse with generic formulas at low prices. Chile appreciates not only the brand but also the product format, origin, technical support, and design. **It means that importing is not a weakness but an opportunity to be different.**

World access was a strategic advantage: the possibility to follow global trends in real time. Chile rapidly adopted innovations, such as alternative proteins (duck, salmon, lamb), grain-free products, supplement snacks, and diets with an ancestral approach or biologically appropriate. Moreover, brands with European or Canadian small niches find in Chile an enthusiastic and educated host market, ready to experiment.

Petco Does Not Happen by Chance

Petco's arrival must not be surprising. The American chain found a market aligned with its value proposal —consumers who treat pets as family, prioritize quality above price, and demand a professional and kind purchasing experience. The most relevant thing is that Petco is not here to train in the market but to insert itself into a mature ecosystem.

A Model with Experiences for the Region

This market is a hub of well-informed consumers, a platform to innovate in pet food, and a reliable element that shows the region's direction. Instead of building protectionist barriers or encouraging a less competitive national production, Chile has put faith in opening its market to global quality —far from weakening it, that decision turned it into a benchmark.

What is happening in Chile is not the result of chance or a passing trend. It is the outcome of combining factors strategies: socioeconomic level, demographic profile, commercial infrastructure, and access policies. Intelligent selection, sophisticated offerings, and a strong emotional bond with customers could help the nation shape its identity in the pet food industry. As a result, it becomes the ideal model of how the LATAM pet food market must evolve.

Soon, our detailed research about this phenomenon will provide data, maps, and market forecasts. Nowadays, we can firmly affirm that Chile is the market representing the future of the LATAM premium food sector at its best. It makes it from its importing role, but also its ability to choose the best.

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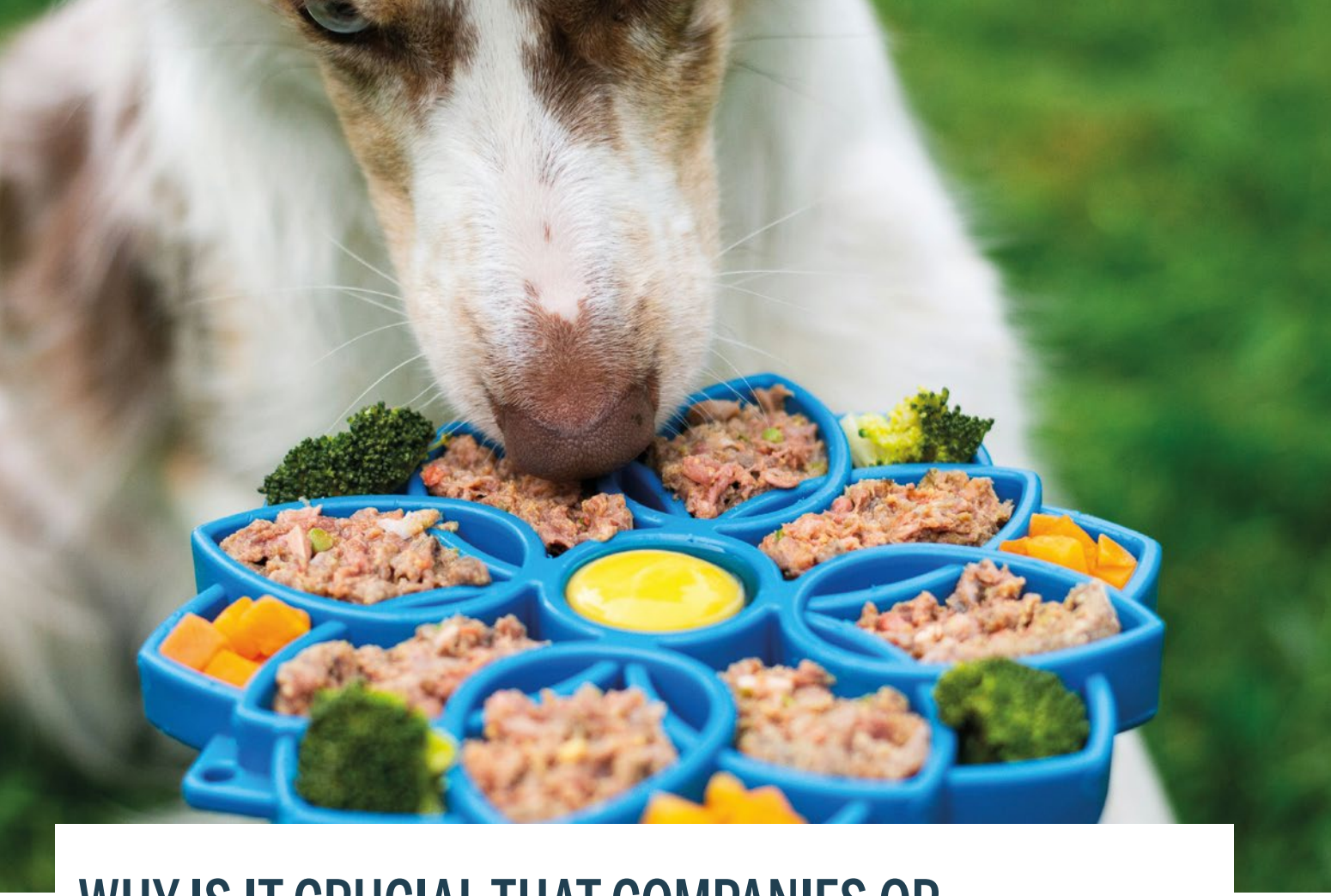

WHY IS IT CRUCIAL THAT COMPANIES OR MANUFACTURERS INVEST IN INNOVATIONS?

It is a fact that dog and cat nutrition has shifted in the last years, becoming the focal point of several studies. Innovations in pet food processing and production have undergone significant evolution.

By Dr. Ma. Candela Bonaura

Some of the most remarkable trends include:

Natural and organic ingredients: Brands are increasingly choosing high-quality, natural, organic ingredients to avoid artificial additives (colorants, palatants, and preservatives), antioxidants, and by-products.

Alternative proteins: Alternative protein sources are studied (e.g., insects or vegetable proteins), which are more sustainable and digestible for pets.

Processing technologies: Technologies, such as extrusion, dehydration, freeze-drying, and cooling allow the production of food with better nutrient retention and long shelf life.

Functional supplementation: Functional ingredients that promote integral pet health are being incorporated, for example, probiotics, omega-3s, and antioxidants.

Personalized diets: With technological advancements, some companies offer personalized food based on the specific needs of pets, considering breeds, age, and size. Most importantly, contemplating health conditions without options on the market.

Sustainable packaging: Sustainability is also reflected in packaging that tries to reduce plastic by replacing it with recyclable or biodegradable materials. In past issues, we developed this topic.

A pet's diet can significantly influence their behavior. An accurate, balanced diet not only contributes to physical health but also their emotional well-being and behavior in the family.

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Síganos en

Enhancing the way nutrients are obtained from raw materials for pet feeding involves different strategies:

1. **Raw materials selection:** Selecting high-quality ingredients with a balanced nutritional profile. Prioritize highly digestible proteins.

2. **Efficient processing:** Optimizing processing methods, such as baking or dehydration, to preserve nutrients.

3. **Nutrient analysis:** Carrying out regular analysis of raw materials and final products to ensure quality and consistency.

4. **Research and development:** Investments in research to develop new formulas and enhance existing ones. This includes studies on ingredients' digestibility and palatability.

5. **Consumers' feedback:** Gather opinions of pet parents about their pet's acceptance and health after consuming certain products.

Generally, pet parents want to know about the food characteristics they are giving to pets, for example:

a. **Ingredients:** to know their components, assuring they are of high quality and accurate.

b. **Nutritional value:** to understand the amount of proteins, fats, carbohydrates, vitamins, and minerals it contains. In addition, if it meets pet-specific needs.

c. **Portion recommendations:** to know the amount of food you should give to your pet, according to their size, age, activity, and general health.

DIGESTIBILITY

It is the ability of the organism to break down and absorb food nutrients.

Digestibility can be affected by factors, e.g., food composition and its production, and the digestive system's health.

VS.

BIOAVAILABILITY

It refers to the portion of a nutrient that absorbs and becomes available for the organism to use after digestion.

d. **Allergies and intolerances:** identify if the pet is allergic to some ingredients and choose hypoallergenic food, if needed.

e. **Benefits for health:** understanding its origin can contribute to dental health, skin, coat, and pets' overall health.

f. **Origin and manufacturing:** to be informed about its precedence and manufacturing methods. Be sure that they are secure and ethical.

These aspects help you guarantee accurate and healthy nutrition for your pets.

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CHALLENGES IN THE MANUFACTURING OF AUTOCLAVED PET FOOD

The natural pet food market has experienced growth, driven by owners' increasing demands for the quality and origin of the products they offer. This trend contributes to the global movement toward healthier and more sustainable diets with reduced processing, which is also reflected in the pet food sector.

By Ludmila Barbi Trindade Bomcompagni

In this context, autoclaves emerge as a promising technology for producing natural, secure, and long-shelf-life food without the use of artificial preservatives. This article explores the potential of autoclaves in the pet food industry in LATAM, addressing the technical aspects of the process, types of packaging, challenges in the formulation of natural products, investments, and logistic or commercial opportunities.

What Is an Autoclave?

It is a thermal sterilization process widely used in the feed, pharmaceutical, and medical industries. **For the pet food industry, it lets them make natural, wet food that is highly microbiologically safe without artificial preservatives.**

The process involves the high-temperature treatment of packaged food using autoclave equipment —between 115 °C and 130 °C— and pressure for a certain period. This thermal process eliminates microorganisms, pathogens, and sources of decomposition ensuring product stability for months, even at room temperature.

Compared to extrusion (for dry food), the autoclave preserves sensorial and nutritional characteristics like fresh food. This is a valued aspect in the natural product segment, where people seek simple formulas, recognizable ingredients, and minimum industrial interference. Moreover, autoclaves are compatible with different packaging, widening design possibilities and product positioning in the market.

Types of Packaging

When processing sterilized food in autoclaves, packaging selection is essential, particularly for natural pet food. The packaging must withstand high temperatures and pressures in the sterilization process while protecting the sensorial and nutritional characteristics of food.

The most used formats include:

Flexible packaging: they are light, easy to store, and offer a good barrier against oxygen and moisture. They enable modern and practical presentation, valued by urban consumers.

Metal cans: commonly used for wet food, they provide excellent thermal resistance and a long shelf life. However, they are heavy and have a major environmental impact, depending on the local recycling system.

Thermoformed trays (with sealed caps): they combine rigidity and practicality. Thermoformed trays are deal for individual portions. It can be made of recyclable or biodegradable materials to align with the "natural" and sustainable proposal. The material must be compatible with the autoclave as well as costs, visual appeal, sustainability, and logistics. Packaging with intelligent barriers, such as multi-layer films or steam release valves, is gaining ground in the sector.

Challenges in Formulation of Natural Products

Formulating natural pet food sterilized in autoclaves faces technical and regulatory challenges since it is difficult to add additives. "Natural" appeal requires clean labels, recognizable ingredients, and minimum chemical interference, which limit the use of preservatives, stabilizers, and palatants —commonly used in traditional products.

During the thermal process, one of the main obstacles is ingredient stability. Besides being efficient

in sterilization, the autoclave can degrade sensitive compounds, such as vitamins, natural antioxidants, and certain amino acids. So then, it requires careful selection of raw material and, in most cases, supplementation.

On the other hand, the absence of artificial preservatives improves the importance of controlling pH, water activity (aw), and microbiological quality. Strategies, such as the use of plant extracts with antimicrobial properties (e.g., rosemary, green tea), functional fibers, and essential oils have been explored as natural alternatives. **Natural zeolite, a microporous mineral with high absorption capacity, has gained importance.** Its use reduces free moisture, enhances microbiological stability, and reduces fecal odors. It is also thermal stable, which makes it compatible with the autoclave process. However, zeolite must be carefully evaluated according to local regulations, its type and purity, and consumer perception, mostly in products with high natural appeal.

In other words, **formulation must balance naturality, stability, and palatability while meeting the limits imposed by law and market expectations.**

Investments and Infrastructure

Implementing a natural, sterilized food production chain in autoclave requires careful planning and specific investment, especially for companies that aim to join this niche with differentiation and quality.

An industrial autoclave is the principal equipment. It can vary on capacity, automation levels, and operation (per batch or continuous). **In addition, aseptic packaging systems, thermal sealing, temperature and pressure control are essential, as well as rigorous microbiological management.**

Other investments are:

- Commercial kitchen design to prepare and homogenize formulas.
- Packaging equipment is compatible with the selected formats (bags, cans, and trays).
- Traceability and quality control systems are essential to ensure food security and regulatory compliance.
- Training technical staff in Good Manufacturing Practices (GMP) and thermal control.

The initial cost can be high, but there are some alternatives, such as production externality (co-manufacturing) that allows trying the market with fewer risks. Another possibility is the gradual adoption of technology, beginning with small batches and improving it according to demand. Companies investing in this model are gaining added value and logistics flexibility since autoclave products are stable at room temperature by removing the need for a cold chain, which reduces distribution costs and widens the geographic reach.

Logistics and Distribution

Another advantage of these autoclave products is the stability at room temperature, which significantly eases logistics and reduces cooling and conveying costs. It allows them to be distributed to far regions or with limited infrastructure, widening commercial reach, especially in LATAM countries with geographic diversity.

Moreover, its long shelf-life —between 12 and 24 months— facilitates inventory planning and entering sales channels, such as specialty retailing, E-commerce, and exportation. Sterilized products in autoclaves can be stored at conventional distribution centers, representing a competitive advantage against dairy and frozen foods.

It is important to consider packaging weight and volume since it influences the cost per unit conveyed. Flexible packaging (bags) is more advantageous than cans or strong trays.

Educating the consumer is also relevant. Since many pet owners still relate natural food with cooling, it is crucial to transmit that the product is safe and stable, even outside the cooler, because of the sterilization process in the autoclave.

Conclusion

To produce natural pet food, sterilization in the autoclave is a robust, versatile technological solution combining microbiological security, logistics practicality, and commercial appeal. Although it faces technical challenges, mostly in formulation and packaging selection, it offers big opportunities for innovation and differentiation in the LATAM market.

Having this technology, combined with clear communication and sustainable positioning, paves the way for new markets and helps brands consolidate as benchmarks of natural, quality pet nutrition.

INSECTS IN DOGS AND CATS FEEDING: COMPOSITION, APPLICATION, AND FUNCTIONAL BENEFITS

The search for sustainable protein sources has driven research worldwide and insects have stood out as a promising alternative because of their highly efficient productivity, low environmental impact, and nutritional value. Insect meals have been studied due to their nutritional and functional potential in companion animal diets —black soldier fly larvae, roaches, crickets, and worm meal.

By Caroline Deleffe, Murilo Marques and Erika Stasieniuk

Insects: Chemical Composition and Nutritional Profile

The growing interest in the protein potential of insects promoted studies that reveal relevant details about their nutritional composition (Table 1):

The composition of insect meals varies depending on species, developmental stage, diet, and origin (Reilly et al., 2022), and they are generally rich in crude protein and fat. Regarding the amino acid profile, BSF larvae have high levels of glutamic acid (3.49%), aspartic acid (2.70%), alanine (2.47%), and leucine (2.15%), but low levels of methionine (0.47%), lysine (1.67%) and histidine (0.70%) (Astuti; Komalasari, 2020). Cricket meal *(Gryllus bimaculatus)* is rich in essential amino acids, such as methionine (1.80%), valine (6.28%), histidine (11.10%), lysine (6.59%) and leucine (7.49%), as well as non-essential amino acids, such as glutamine (13.00%), alanine (8.13%), arginine (6.90%) and glycine (6.36%) (Jayanegara et al., 2018).

SPECIES	Dry matter (%)	Crude protein (%)	Ethereal extract (%)	Crude Fiber (%)	Mineral matter (%)	References
Black soldier fly *(Hermetia illucens)*	95.75	42.35	24,90	7,00	21,50	Kępińska-Pacelik e Biel (2022)
Tenebrio *(Tenebrio molitor)*	93.60	53.75	37,10		2,75	Kępińska-Pacelik e Biel (2022)
Tropical house cricket *(Gryllodes sigillatus)*	96.62	70,00	18,23	3,65	4,74	Kępińska-Pacelik e Biel (2022)
House cricket *(Acheta domesticus)*	92.58	67,57	20,68		4,33	Kępińska-Pacelik e Biel (2022)
Madagascar hissing cockroach *(Gromphadorhina portentosa)*	92.10	85,60	14,30	5,60		Reilly et al. (2022)
Cinereous cockroach *(Nauphoeta cinerea)*	92.60	61,30	33,10	8,70		Reilly et al. (2022)
Giant mealworm *(Zophobas atratus)*	93.50	53,40	34,80	8,00		Reilly et al. (2022)
Silkworm pupa *(Bombyx mori)*	94.00	43,80	30,10	3,24	4,30	Areerat et al. (2021)

Table 1: insect meal composition used in animal feeding.

Cricket meal is also notable for its glutamic acid content, while silkworm pupae have high levels of unsaturated fatty acids, such as linoleic and linolenic acids (Astuti; Komalasari, 2020). Chitin, present in the insect skeleton, is a polysaccharide containing 6-7% non-protein nitrogen, which may overestimate the crude protein content when using the standard factor of 6.25 in the Kjeldahl method. New methodologies have been proposed to measure the actual protein content (Janssen et al., 2017; Homska et al., 2022).

Applications in Cats and Dogs Diets

The evaluation of various insect species and inclusion levels in diets for dogs and cats has already been conducted, with an emphasis on health, digestibility, and palatability. Reilly et al. (2022) tested the inclusion of 4% Madagascar hissing cockroach, cinereous cockroach, and giant mealworm in extruded cat food. Lisenko (2017) evaluated up to 15% of the insect meal in adult cat diets and found no significant differences in the apparent digestibility of dry matter, organic matter, crude protein, ethereal extract, or metabolizable energy, except for mineral matter. Also, changes in fecal levels of valerate and 4-methylphenol were observed, with no impact on pH or intestinal microbiota. The stability of blood parameters reinforces the idea that the inclusion of up to 15% is safe for adult cats.

In dogs, Areerat et al. (2021) tested up to 20% house cricket and 14% silkworm pupa in extruded diets, concluding that both inclusions are safe. Freel et al. (2021) evaluated 20% defatted meal and 5% BSF larval oil —while Penazzi et al. (2021) tested 36.5% defatted BSF meal compared to a diet with venison, observing no significant differences between groups. The studies analyzed intake, digestibility, fecal count, hemogram, and biochemical profile without observing relevant changes, which indicates the safety of the concentrations analyzed. Kara et al. (2025) also observed a reduction in mineral matter content with the inclusion of insect meal, which could be useful in formulations with lower mineral density. This finding agrees with Seo et al. (2021), who reported lower phosphorus content in BSF diets and fermented oatmeal compared to those with rice and poultry meals.

Functional and Technological Benefits of Including Insects

Several studies have investigated the effects of insect meal use on hematological parameters, intestinal microbiota, and fecal metabolites.

From an environmental perspective, insect proteins emit fewer greenhouse gases and require less space, water, and resources than conventional protein sources. Therefore, their use may be associated with sustainable features, attracting landowners willing to invest in food with a lower environmental impact.

Insects are also notable for their content of lauric acid, a medium-chain fatty acid with antimicrobial and

immunomodulatory action, effective against pathogens such as *E. coli*, *Salmonella spp.*, and *Clostridium perfringens* (Skřivanová et al., 2006).

Healthy dogs' intestinal microbiota is mainly composed of *Bacteroidetes*, *Fusobacteria*, *Firmicutes*, and *Proteobacteria*. In cats, *Actinobacteriota*, *Bacteroidota*, *Campylobacterota*, Desulfobacterota, *Firmicutes*, *Fusobacteriota* and *Proteobacteria* predominate (Jarett et al., 2019; Reilly et al., 2022). Imbalances in microbial composition are associated with conditions, such as obesity, diarrhea, and inflammatory bowel disease, reinforcing the role of microbiota modulation in disease prevention (Jarett et al., 2019).

In this context, including insects in pet diets has shown positive effects on intestinal health, attributed to chitin, a structural polysaccharide of the exoskeleton, with prebiotic potential in the large intestine (Cardoso, 2024).

Chitosan, derived from chitin, has shown benefits in cats at doses of 500 and 2000 mg/kg, with decreased diarrhea, increased antioxidant capacity, and reduced inflammatory markers. Also, higher levels of volatile fatty acids, such as acetate and butyrate, suggested increased microbial fermentation activity and beneficial modulation of the microbiota (Mo et al., 2023).

Final Thoughts

The use of insects in the formulation of dog and cat foods offers nutritional, functional, and environmental advantages. Studies indicate good digestibility, positive effects on intestinal microbiota, and the presence of bioactive compounds. **Although high cost and low availability limit their use on a large scale, insects emerge as a promising and sustainable alternative to the challenges of animal protein production.**

INNOVATIONS IN DOG AND CAT FOOD: CREAMY SNACKS AND PALATABLE WATER

Pet nutrition continues to advance year after year, driven by technological innovation and the growing interest of pet owners in providing healthier, more functional, and enjoyable diets for their companions. As a result, the pet food industry —alongside veterinarians, animal nutritionists, and other professionals— has invested in research, innovation, and the development of novel products that go beyond conventional diets. Their goal is to meet the specific needs of animals while also addressing a consumer base that consistently seeks new options.

By Josiane Volpato, Isabela Cubateli Bogo, and Shirley Souza

How New Products Are Transforming Hydration, Supplementation, and Pet Care

Among the most noteworthy innovations in the pet food market are creamy snacks and palatable water —novel alternatives designed to complement the diets of dogs and cats. These products are specially formulated to address specific requirements, while also offering hydration and key nutrients in an appealing and convenient format.

What are Creamy Snacks and Palatable Waters?

Creamy snacks are semisolid preparations with a smooth, cream-like texture, typically packed in sachets or tubes. They are designed to be highly palatable — meaning exceptionally appealing to the taste and smell of animals. While they are not nutritionally complete foods, these snacks may contain functional ingredients, such as vitamins, minerals, essential amino acids, and

even bioactive compounds, offering specific health benefits to pets.

On the other hand, **palatable water is a flavored liquid enriched with nutrients, developed to stimulate voluntary water intake in pets.** This is particularly relevant for cats, which are known for their low natural water consumption. In addition to flavoring agents, these waters can contain electrolytes, vitamins, and other beneficial additives, supporting both hydration and targeted nutrient supplementation.

Nutritional and Functional Benefits

Cream snacks and palatable water offer a variety of nutritional and functional benefits for cats and dogs, including:

Optimized hydration: One of the biggest challenges in feline nutrition is encouraging adequate water intake, as insufficient hydration is closely linked to urinary tract issues, including the formation of crystals and kidney stones. By making hydration more attractive, palatable water helps to prevent these disorders and supports urinary and renal function. In dogs, especially during hot weather or physical activity, enhanced hydration is equally crucial.

Targeted nutritional supplementation: Creamy snacks and palatable water can be formulated with specific nutrients to match demands, such as immune system reinforcement, joint health maintenance, or improved coat and skin conditions. These products function as practical sources to supplement vitamins and minerals in animals with difficulties consuming pills or capsules.

High palatability: The attractiveness of these products is one of their greatest qualities. Their aromas and flavors are carefully developed to please the demanding palate of pets, which can be especially useful in post-operative

situations, illness, or periods of reduced appetite.

Practicality and benefits: Pet owners' routines sometimes do not allow them to prepare handmade food or administer traditional supplements. Creamy snacks and palatable water are easy to provide; they do not require preparation and can be easily added to daily diets without big changes in the pets' care routine.

Beyond their basic benefits, these innovative products can play a key role in several areas of companion animal nutrition. Palatable water is particularly useful in essential nutrient supplementation that may be lacking due to low intake. It also can be helpful in post-surgery recovery, helping regeneration by providing essential nutrients. They are also significant when managing diseases (renal or hepatic conditions) as **they can be used to satisfy specific nutritional needs and promote better life quality for pets.**

Challenges and Opportunities for the Industry

However, these new products can be challenging for industries in terms of regulations, quality control, and proper structure of the plant.

Animals' acceptance is also important. Cats and dogs have distinct sensory preferences, and acceptance of flavors, aromas, and textures can vary significantly between them.

Nevertheless, as innovation continues to be a central driver of the pet food market, the industry —together with animal nutrition experts— have been exploring new product formats, as well as quality and processing methods to enhance sensorial properties, odors, flavors, and textures.

Given these trends, the opportunities for innovation in dog and cat nutrition are significant. Developing new nutritional solutions with benefits, including hydration, nutritional supplementation, palatability, and convenience to offer consumers a wider range of choices in a market that seeks to address diverse nutritional needs, while improving palatability and health benefits.

Looking ahead, this category is expected to continue expanding and diversifying, aligning with broader trends in the pet food industry and contributing to healthier lives for companion animals.

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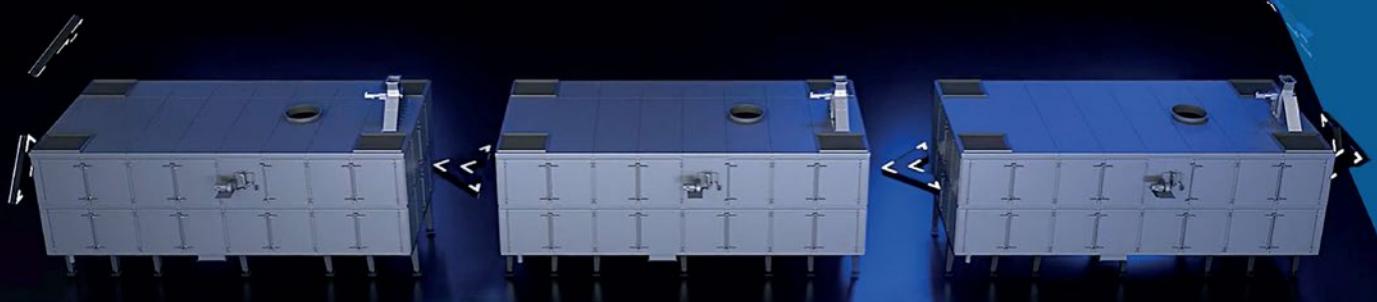

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BEYOND KIBBLE AND CANS: THE RISE OF INNOVATIVE PET FOOD TECHNOLOGIES

For decades, the pet food industry has been anchored by two dominant processing technologies: extrusion, used for dry kibbles, and retort sterilization, applied in wet canned foods. These methods have provided convenience, scalability, and long shelf life. Yet, as consumers demand more human-like, minimally processed, and functionally enriched diets for their pets, the industry is undergoing a transformative shift.

By Juan Gómez-Basauri, Ph.D.

Today, a new wave of technologies —ranging from freeze-drying and air-drying to high-pressure thermal pasteurization (HPTP), 3D printing, and fluid bed drying— is reshaping the production landscape. These innovations enable enhanced nutrient retention, food safety, customization, and alignment with evolving consumer values.

This article explores and briefly describes these emerging processing technologies and the underlying drivers pushing the pet food industry beyond its traditional boundaries.

Traditional Processing Methods: The Cornerstones

Extrusion (Dry Kibble)

The most common method, extrusion, involves cooking a dough mixture (typically proteins, grains, and functional additives) under high heat and pressure. This produces shelf-stable, uniform kibbles efficiently and at scale. However, the intense thermal process can degrade heat-sensitive nutrients like thiamin and riboflavin and limit format customization.

Retort Sterilization (Canned Food)

Used for wet foods, this method involves sealing ingredients in cans or pouches and sterilizing them at high temperatures (≥121°C). It ensures microbial safety and extended shelf life but can negatively affect texture, palatability, and nutrient bioavailability.

While effective, **both methods face challenges in meeting the rising demand for transparency, nutrient integrity, and personalization.**

Innovative Petfood Processing Technologies

Freeze-Drying

This method removes moisture via sublimation under vacuum at low temperatures, preserving texture, flavor, and heat-sensitive nutrients. While ideal for raw diets, freeze-drying is capital-intensive and poses risks of post-process contamination without additional safety interventions.

Air-Drying and Dehydration

It involves drying foods at moderate temperatures (60–90°C) to produce chewy, jerky-like products. It supports nutrient retention better than extrusion but requires strict moisture control to prevent microbial growth.

Cold Extrusion

A non-thermal technique for forming doughs into patties or treats. Cold extrusion is well-suited for incorporating probiotics, enzymes, and other heat-sensitive actives but requires refrigeration or secondary processing to ensure shelf stability.

Sous Vide (Gently Cooked)

Slow cooking in vacuum-sealed pouches in a water bath at precise low temperatures retains freshness and nutrient integrity. This method appeals to the humanization trend but demands cold-chain logistics and has a shorter shelf life than dry products.

High Pressure Processing (HPP)

HPP inactivates pathogens in packaged food using high pressure (400–600 MPa) without heat, preserving raw-like textures and nutrients. Though effective and clean-label friendly, it involves high costs and limited throughput due to batch processing.

High Pressure Thermal Pasteurization (HPTP)

HPTP combines high pressure with mild heat (70–90°C) to enhance microbial inactivation, including spores. It bridges the gap between raw nutrition and safety, making it a promising option for fresh-style diets. However, it requires careful control to avoid nutrient loss or product degradation.

3D Printing

Still, in the early stages of commercial application, 3D printing enables the layering of custom pastes into specific shapes, dosages, or nutrient profiles. It opens doors for hyper-personalized nutrition, functional layering, and portion-controlled diets, though production speeds remain a constraint.

Fluid Bed Drying

This precision drying method uses hot air to suspend and gently dry product particles in a fluidized state. It's ideal for preserving volatile nutrients and coating small kibbles or treats with functional additives or palatants. Although energy-efficient and precise, it carries higher capital costs.

Why the Shift Toward New Technologies?

Humanization and Premiumization

Modern pet parents expect their furry animals' food to mirror their own —clean-label, fresh, recognizable, and natural food. **This cultural shift is pushing brands to adopt more transparent and minimally processed formats.**

Functional Nutrition

Pet parents increasingly seek diets that support joint health, gut microbiota, immunity, skin, and coat condition. Many bioactives (e.g., omega-3s, vitamins, probiotics) are heat-sensitive and degrade during traditional processing, making gentle technologies more suitable.

Ingredient Transparency

Consumers want to "see the real food." Technologies like freeze-drying and sous vide better preserve the visual integrity of meats, vegetables, and superfoods, creating more trust in the product.

Food Safety: Evolving Risks and Responsibilities

Emerging technologies also introduce new safety considerations:

Non-thermal processes (e.g., freeze-drying, cold extrusion) do not eliminate pathogens unless paired with validated interventions like HPP/HPTP.

Water activity and shelf stability must be validated rigorously, especially in semi-moist or high-moisture products.

As fresh, raw, or gently processed foods grow in popularity, regulatory scrutiny will intensify. In the U.S.A., the Food and Drug Administration (FDA) regulates pet food similar to that for other animal foods.

Manufacturers must implement robust hazard analysis, kill-step validation, and post-process contamination controls to ensure food safety and compliance.

Final Considerations

The evolution of pet food processing is being driven by intersecting trends in consumer demand, food science, and technology innovation. **While extrusion and retort sterilization will remain essential for many mainstream applications, they may not be sufficient to serve the growing market for premium, functional, and transparent pet nutrition.**

Brands have the opportunity for strategic diversification —leveraging traditional methods for staple products while incorporating alternative formats to meet specific consumer demands and positioning themselves at the forefront of pet food innovation. **The future will favor companies that combine scientific rigor, processing innovation, and a deep understanding of consumer insight** to deliver differentiated value across diverse product formats.

INNOVATION IN NATURAL EXTRACTS, PREBIOTICS & PARABIOTICS FOR PET NUTRITION

In today's global landscape —where sustainability, natural products, production efficiency and animal welfare are non-negotiable— the nutrition of livestock, aquaculture species and, of course, our companion animals is undergoing a profound transformation. Modern diets are more precisely formulated and optimised, deliver higher nutrient density, rely less on synthetic additives and ultimately enhance both life quality and productivity. Coupled with rapid advances in metataxonomic studies and a deeper understanding of the intestinal microbiota of humans and animals, a growing body of evidence shows that maintaining a balanced gut microbiome —our own and that of our animals— is critical for overall health.

By 3A BIOTECH

Within this context, several scientific terms have moved beyond academia and now feature prominently on health-oriented product labels, driving innovation in animal-feed formulations:

Prebiotics: substrates that are selectively utilised by host microorganisms, conferring a health benefit.

Probiotics: live microorganisms that, when administered in adequate amounts, confer a health benefit on the host.

Postbiotics: preparations of inanimate microorganisms and/or their components that confer a health benefit.

Parabiotics: non-viable microbial cells, cellular structures or fermentation extracts devoid of live organisms.

These functional ingredients not only promote gastrointestinal health but also reduce the need for antibiotic interventions, improve feed conversion ratios and potentiate immune responses —thereby lowering disease incidence. The upshot is higher productivity together with a growing consumer preference for safe, antibiotic-free, "naturally derived" animal products. **Pets likewise benefit from functional diets that support health, growth and longevity.**

At **3A BIOTECH**, we fully embrace this paradigm, designing natural extracts and formulations that safeguard the food chain and care for both livestock and companion animals. Our portfolio contains numerous prebiotic solutions. **Among the botanical extracts with proven prebiotic activity that we incorporate are rosemary,**

green-tea, olive-fruit (and co-products) and soybean extracts. Beyond their well-documented antioxidant properties, these materials supply prebiotic molecules and serve as natural alternatives to conventional aroma and fat stabilisers, preventing rancidity during drying processes and extending product shelf life.

A flagship example is our proprietary **Tocotyrosol™** range —an all-natural substitute for synthetic additives that unites technological functionality with prebiotic activity to support a balanced diet. The formulation synergises tocopherols from oilseeds, hydroxytyrosol and other olive derivatives, plus rosemary and green-tea extracts. Health benefits stem from the bioactive principles within these extracts. For instance, **rosemary-derived rosmarinic acid is metabolised by gut microbiota into compounds capable of suppressing pathogenic bacteria growth while stimulating beneficial microbes.**

Available in lipid- and water-soluble formats, both liquid and powder, these solutions extend the shelf life of dry pet food, stabilise organoleptic properties and texture, and enrich formulations with essential nutrients. **All products are backed by quality certifications such as GMP+, IP-Non-GMO, Kosher, Halal and CAAE.**

Beyond our current prebiotic portfolio, **3A BIOTECH** is actively developing parabiotic formulations derived from proprietary fermentative strains, with promising preliminary results. Parabiotics are particularly valuable where probiotic viability cannot be guaranteed —e.g., high-temperature pelleted feeds or products requiring long storage. Multiple studies demonstrate that **parabiotics fortify the intestinal barrier, attenuate inflammation and modulate both innate and adaptive immunity across animal species, thereby improving overall health status.**

The convergence of biotechnology and animal nutrition now enables unprecedented diet personalisation, lowering antimicrobial use and optimising resource efficiency. Microbiome sequencing, intestinal metagenome analysis, bespoke fermentation platforms and in-vitro digestive models are revealing intricate microbe–nutrient–host interactions. In this light, **our products are far more than "additives": they are microbial-engineering tools that help cut antibiotics, boost gut health, improve feed efficiency and shrink the environmental footprint of animal production.**

We invite industry partners to join us on this journey, embracing technological solutions that transform animal nutrition into a lever for value creation, sustainability and profitability. At **3A BIOTECH**, we remain committed to research, development and the transfer of innovations that make a tangible difference in the field.

EFFICIENCY, PRECISION, AND ADAPTABILITY: KEY FACTORS IN MODERN PET FOOD PACKAGING

The pet food industry has undergone a significant transformation in recent years, driven by increasingly sophisticated "pet parents", the rise of premium formulations, and the need to optimize resources across the production chain. Within this context, the packaging process has shifted from being a secondary task to playing a strategic role in operational efficiency and consumer perception of quality.

By Clivio Solutions

Packaging as a Critical Link in the Value Chain

In pet food production plants, the packaging area faces multiple challenges. It must accommodate a wide variety of presentation formats (ranging from small pouches to large bags), handle products with diverse physical characteristics (textures, particle sizes, oil content, densities), and comply with strict hygiene, safety, and traceability standards.

Moreover, in highly competitive markets, packaging becomes a key differentiator: the quality of the seal, the clarity of the labeling, and the overall appearance of the bag have a direct impact on consumer experience and brand loyalty.

Common Operational Challenges in Packaging Lines

Some of the most frequent challenges in pet food packaging operations include:

- Weighing errors, which reduce profitability (due to overfilling) or trigger complaints (due to underfilling).
- Lack of flexibility to switch formats without stopping the line or incurring long setup times.
- Speed limitations that compromise the overall plant performance.
- Inconsistent sealing, which can lead to leaks, contamination, or loss of modified atmosphere.

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- Poor integration with quality control and traceability systems.

Addressing these challenges requires a comprehensive approach that considers both the design of the equipment and its integration capabilities within the plant.

Technological Trends in Packaging Equipment

The most relevant advancements in the packaging sector are focused on three main areas:

1. Smart Automation

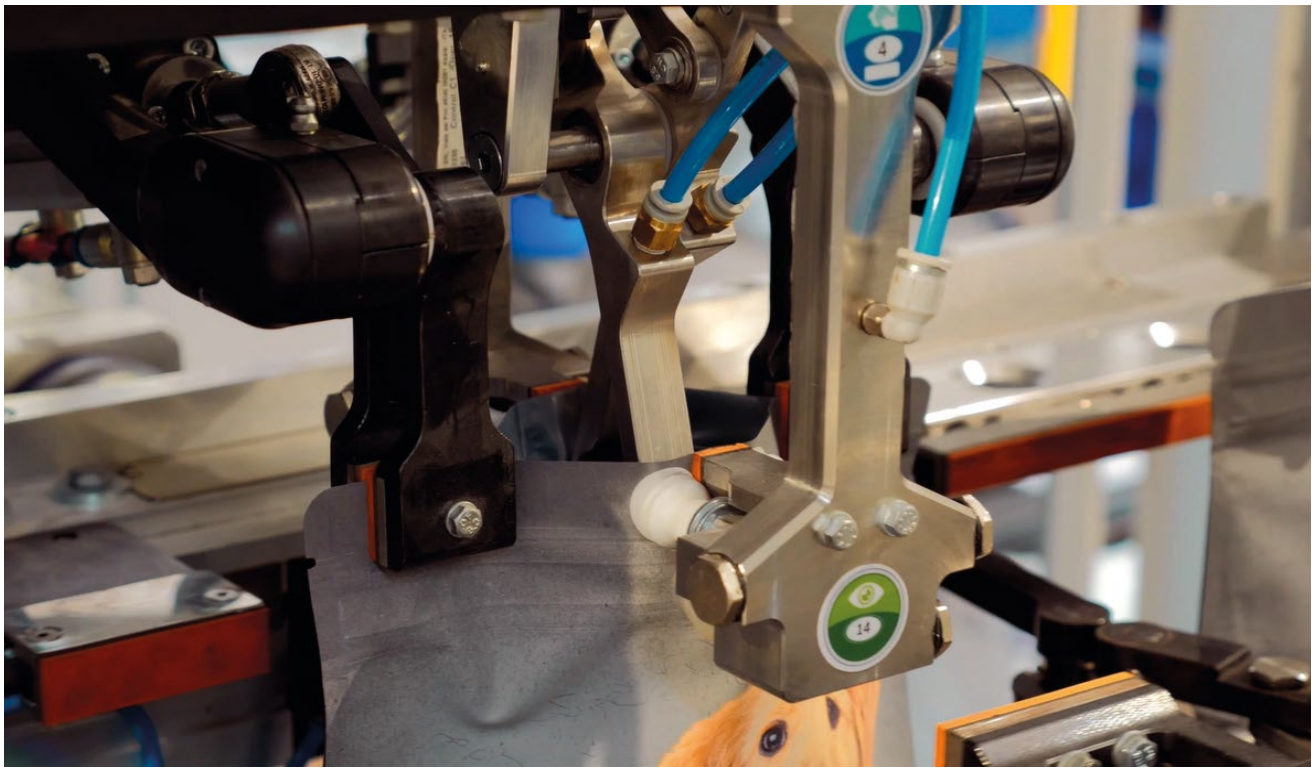
Modern systems feature advanced PLC controls, high-precision sensors, and the ability to integrate with MES or SCADA systems. These capabilities allow real-time monitoring of key parameters, such as net weight, production speed, sealing temperature, and residual oxygen levels —enhancing performance and minimizing manual intervention.

2. Hygienic Design and Simplified Maintenance

With growing concern for food safety, equipment manufacturers have adopted modular structures with smooth surfaces, no residue-accumulating zones, and easy access for cleaning and preventive maintenance. This is especially critical for high-fat or oily products, which are prone to contamination and buildup.

3. Versatility and Quick Format Changeover

Packaging systems are increasingly designed to handle a variety of bag styles (flat-bottom, resealable zippers, velcro closures, pouring spouts, various widths), adapting to the needs of multi-product lines, which add to their main product other secondary products, such as snacks, freeze-dried items, or even gadgets. These features allow format changes without replacing filling cones, ensuring high operating speeds —especially important for plants producing both their own brands and private labels.



Key Considerations When Selecting a Packaging Solution

Choosing the right packaging system involves more than just evaluating the machine's nominal speed. **Other critical factors to consider include:**

- Weighing accuracy and consistency, especially for lightweight or heterogeneous products.
- Seal integrity and modified atmosphere capabilities, if extended shelf life is desired.
- User-friendliness and training requirements for operating personnel.
- Energy consumption and overall system efficiency.
- Technical support, spare parts availability, and upgrade potential.

Each of these aspects directly influences the system's OEE (Overall Equipment Effectiveness), impacting availability, performance, and quality.

A proper evaluation of these variables —ideally with specialized technical support from the project design phase— can determine whether the result is a robust, productive line or an ongoing bottleneck.

Sustainability and Packaging: A Necessary Convergence

New regulations and growing consumer pressure for sustainable practices are also reshaping packaging processes. Equipment must now be able to work with recyclable films, mono-material solutions, or even compostable materials—without compromising seal integrity or production speed.

At the same time, reducing product waste, minimizing film scrap, and ensuring energy-efficient operation have become increasingly important factors in capital investment decisions.

Conclusion: Packaging as a Strategic Investment

In an environment where efficiency and quality are non-negotiable, a modern, flexible, and reliable packaging solution is no longer a luxury —it's a necessity. Beyond the initial investment, benefits in productivity, raw material savings, and improved consumer experience position packaging as a high-return strategic asset.

For manufacturers aiming to stay competitive, it is essential to evaluate their current packaging lines and consider improvements that enable them to meet market demands with agility.

Interested in Optimizing Your Packaging Line?

There are solutions tailored to every need, including equipment specifically designed for the pet food industry. If you'd like to explore your options in more detail, we can help you assess your specific case.

TAILORED FIBER SOLUTIONS: HOW FUNCTIONAL FIBERS FIT YOUR PROCESS NEEDS

As the pet industry continues to demand innovative solutions, manufacturers are increasingly seeking distinctive, functional, and marketable ingredients. Specialized plant fibers have emerged as a valuable resource in the pet food technologist's toolkit, offering versatile functionality across all types of pet food —from dry kibble to wet formulas, and frozen products to sterilized meals.

By Dr. Astrid Bosse - Scientific Advisor - JRS Petfood & Aquafeed

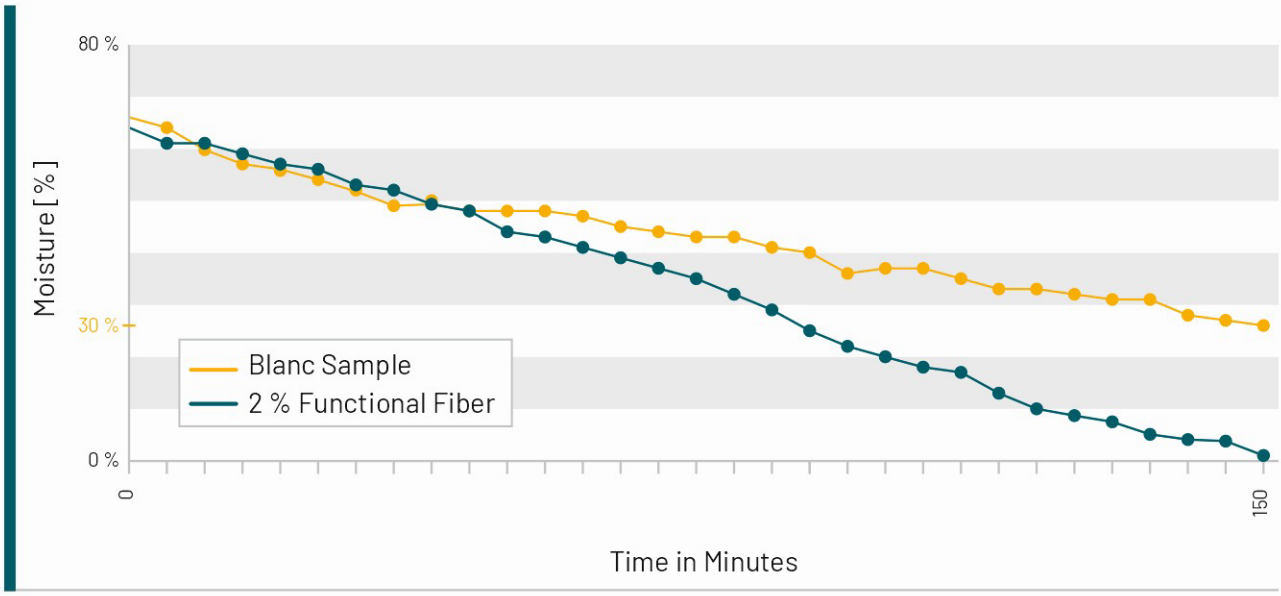
JRS provides an extensive portfolio of fiber ingredients compatible with a wide variety of manufacturing processes and formulation needs. These fibers support the development of more sustainable, health-focused pet food products that stand out in the market and promote better pet well-being.

Consistency, texture, and uniformity are critical quality parameters in pet food products that directly affect consumer acceptance but can be challenging to control. Due to the inherent variability of raw materials and the complexities involved in manufacturing processes, achieving optimal product consistency requires precise formulation and process control. Commonly utilized binders —including spray-dried plasma, wheat gluten, and albumin— are widely employed in restructured meat products such as chunks, as well as across various meat applications. These binders are valued for their superior swelling properties, water-binding capacity, and emulsification performance, which contribute significantly to the structural integrity and textural quality of the final product.

A series of pilot-scale trials conducted at JRS's Technical Competence Center in Rosenberg, Germany, demonstrated that partial substitution of conventional binders with a functional long cellulose fiber delivers a favorable cost-benefit outcome. Across wet pet food and other high moisture applications, replacing spray-dried plasma with cellulose fiber at a ratio of 2/1 optimizes critical process parameters during steam tunnel cooking and enhances the textural properties of chunks both before and after the retorting step. **However, not only does the long fiber perform as chunk solidifier it also accelerates the cooking in the steam tunnel contributing to energy savings.**

Pet food manufacturers and entrepreneurs focus on optimizing operations and enhancing sustainability to protect and increase their revenue. Typically, every pet food and treat format offers opportunities to lower costs, boost production efficiency, and realize energy savings. In dry pet foods with high fresh meat inclusion and snacks, specialized long cellulose fibers contribute to high structural connectivity, improved texture, and

Residual Moisture Trial Results



minimized shrinkage after drying.

In addition to these quality and processing benefits, these functional fibers support greater sustainability in production. Trials with meat-based snacks have demonstrated that incorporating long cellulose fibers can reduce drying times by up to 50% (see diagram 1), resulting in significant energy savings and relieving capacity constraints in the drying process. Together, these improvements support increased product throughput and manufacturing operations that are more efficient.

Recently, the JRS portfolio has been expanded to include a natural plant fiber with unique fat-binding properties. Fat loss is a common challenge, particularly under high-temperature conditions such as those encountered during storage, transport, or production. These losses can compromise product quality and consistency.

Products like licks and pastes, which often contain around 30% fat, benefit significantly from the inclusion of this fiber. It helps prevent the separation of fat and solids, thereby enhancing homogeneity.

Similarly, snacks and treats with high meat content can experience substantial fat loss during drying. This issue is also relevant in plant-based products that include vegetable oils (e.g., sunflower oil), which have a low melting point and are prone to separation.

In trials with beef jerky-style snacks —where fat losses of up to 20% were observed during drying— the addition of the fat-binding fiber resulted in non-detectable fat losses.

In commercial production, this innovation can help optimize operations by increasing product yield and minimizing downtime required for cleaning.

Conclusion

Integrating specialized fibers into pet food formulations exemplifies how targeted ingredient innovations can drive advances in manufacturing efficiency, product quality, and sustainability in the evolving pet food landscape.

RELIABLE PACKAGING & PALLETIZING OF BULK MATERIALS WITH STATEC BINDER MACHINES

STATEC BINDER can look back on more than 45 years of experience in packaging technology and has already installed more than 1,900 machines worldwide. The company stands for the development of high-quality machines, as well as individual and customized systems.

By STATEC BINDER

The customer-oriented company philosophy and the worldwide customer service ensure first-class customer support before, during and after the purchase of a system. Whether free-flowing or powdery products, open-mouth or FFS packaging machines —STATEC BINDER specializes in developing the right solution for each customer. **The history of STATEC BINDER goes back to 1978, when the first packaging system of the parent company Binder+Co AG was realized.** In 2008, the joint venture was founded under the name STATEC BINDER. Thanks to the continuous optimization and further development of proven technology since then, the company is now one of the leading suppliers in the high-performance packaging industry.

Packaging Systems from STATEC BINDER

The company's product portfolio ranges from packaging systems for open-mouth bags, FFS packaging machines, BIG-BAG filling stations, bag closing systems and scales to palletizing systems for free-flowing bulk goods. Products from a wide range of industries can be processed, such as the petrochemical, chemical, agricultural, food, animal feed, minerals and fuel industry. The proven packaging systems impress with their high efficiency and performance and contribute to greater value retention, cost-effectiveness, and optimization of the customer's packaging process. The systems are also of high quality and reliable; the use of high-quality materials and the possibility of modernizing all machines means that they have a very long service life. **During construction, STATEC BINDER focuses on implementing state-of-the-art technology and individual and high-quality all-in-one concepts**, which are tailored to the individual product requirements and plant conditions of the various customers.

Perfect Packaging Machines for the Animal Feed and Pet Food Industry

STATEC BINDER packaging machines can efficiently package pet food, animal feed, and feed additives in a wide variety of shapes and consistencies. Whether filling pre-made open-mouth bags in different capacities or a machine that forms and fills the bags from a film roll —the perfect solution depends on the customer's specific product.

Advantages of STATEC BINDER packaging systems:

High flexibility: Suitable for different bag materials and sizes.

Precise dosing: Ensures that each package contains the exact amount of feed. The high-quality packaging machines can easily process a filling weight of 5-50 kg.

Energy efficiency and productivity: Optimized processes reduce energy consumption. The machines are available in different versions and for various capacities to perfectly match your production expectations.

Durability: Robust machines and high-quality components made in Austria ensure minimal maintenance requirements.

Automated Palletizing Systems for Safe and Fast Onward Transport

An efficient palletizing process is essential for the safe storage and transport of packaged animal feed and pet food. **STATEC BINDER offers both robotic and conventional palletizing systems for this purpose.** A prime example is the high-quality, high-level palletizer **PRINCIPAL-H**, a versatile and powerful system that can be configured for different applications.

Main features of the STATEC BINDER palletizing systems:

High stacking quality: For stable and space-saving pallets.

Speed: Depending on the machine type, the palletizers can process up to 3,000 bags per hour.

Intelligent control: Simple operation via touchscreens and the option of integration into existing systems.

Modular design: Depending on customer requirements, STATEC BINDER additionally offers complete solutions with, for example, a stretch hooder or a truck loader system.

Customer Service

In addition to the high-quality and efficient high-performance machines, **the packaging specialist is also characterized by its unique, worldwide customer service after the purchase of a system**. Complete customer satisfaction is the top priority here. Customers should be able to rely on being well looked after not only before and during the purchase, but also after the delivery of a machine. Customers receive sound advice, a high level of service expertise and support in all areas. **STATEC BINDER's global Customer Service team supports them with the highest level of expertise and impresses with many different services**, such as spare parts delivery, modernization & optimization of machines, customer training, and much more.

"STATEC BINDER's philosophy is clear. Even though we primarily deal with packaging and palletizing systems, our aim is to provide our customers with the best possible advice, to find the perfect solution for them and to provide them with the best possible support even after they have purchased the system. This is the only way we can be a strong and reliable partner." -
Josef Lorger, Managing Director

PALATABILITY & MANUFACTURING: IMPACT ON PET PREFERENCES

The growth of the pet food market has intensified the need to offer highly palatable products. Understanding the behaviors and needs of cats and dogs is fundamental to developing foods that are irresistible to them.

By Maïlys Le Thiec - Kemin Nutrisurance

Differences Between Cats and Dogs

To begin the discussion on palatability, we must first understand our main customers: cats and dogs. The variability between these companions —their behavior, eating habits, and nutritional needs— must be considered to satisfy them and encourage pet owners to repurchase their food. **Understanding what makes cats and dogs want to eat will help optimize feed manufacturing and achieve greater palatability.**

A key difference between cats and dogs is their feeding behavior. Cats are carnivores, while dogs are omnivores, which leads to different nutritional needs and formulas. For example, cats require higher levels and better quality of proteins compared to dogs. FEDIAF recommends between 18% and 25% protein for dogs and between 25% and 33% for cats, which affects the starch content in their recipes and the nutritional values of the food. These differences require adjustments in production parameters to improve palatability.

The sense of taste in cats and dogs, although both are based on a carnivorous pattern, varies significantly. Dogs enjoy sweet and sour flavors, such as carboxylic and phosphoric acids, while cats prefer bitter flavors and are not sensitive to sweetness. Dogs generally consume large meals quickly, possibly due to their pack heritage, and tend to take the food with their teeth and crush it, preferring softer foods. On the other

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hand, cats eat several small meals a day, mimicking their hunting habits, and use their tongues and molars to break the food, preferring harder and drier foods.

Finally, **the sense of smell is a critical factor in palatability for both cats and dogs, with their sense of smell being much more sensitive than that of humans.** Cats have twice as many sensory olfactory cells as humans, and dogs may have up to 300 million olfactory receptors compared to about 5 million in humans.

Importance of Ingredients

Improved palatability begins with the proper selection of raw materials. Factors, such as protein quality, freshness, lipid oxidation, and ingredient proportions directly influence the texture and flavor of the food.

In one trial, chicken meal and chicken liver were replaced with hydrolyzed chicken liver in a standard recipe. "Versus" tests showed a clear preference for diets that included the hydrolyzed liver, even with 5% and 10% inclusion rates. **Choosing the right protein is, therefore, the first step toward higher food acceptance.**

Processing: From Grinding to Drying

The initial processing stages, such as grinding and mixing, affect particle size and product homogeneity. **Improper grinding can cause irregularities that negatively impact texture.**

In extrusion, starch gelatinization is critical. This process, which begins with the preconditioner, improves food cohesion. Insufficient starch content can cause kibble to disintegrate, while excess increases density. **For cats in particular, kibble hardness influences acceptance: they prefer more compact products.**

A common challenge is balancing protein and fat levels in cat foods without compromising product expansion. The key is adjusting ingredients to achieve both the appropriate nutritional profile and an attractive texture.

Coating Optimization

Coating is one of the most decisive steps to achieve superior palatability. It is done by applying fat and liquid and/or powdered palatants. Fat, used at levels from 1% to 15%, serves nutritional functions and acts as an adhesive base for palatants. However, fat alone is not enough to ensure high acceptance.

Liquid palatants (1% to 4%) enhance aroma and are more used in dog foods, where higher moisture and softness are sought. On the other hand, powdered palatants (0.5% to 3%) add flavor and moisture control, being common in cat foods, which require low moisture content and high protein levels.

To maximize coating effectiveness, it is recommended to apply fat first, then the liquid palatant, and finally the powder. This ensures better adhesion and homogeneity.

Technical Factors of Coating

Nozzles: The diameter and pressure of the nozzles affect coating quality. Very low pressure generates large droplets that do not disperse well, while excessive pressure produces a mist that can be lost in the air. Proper positioning and spacing ensure uniform coverage.

Mixing: In batch systems, the mixing direction influences homogeneity. Mixing from the outside inward improves palatant distribution, while the opposite creates clumps. Optimizing this process enhances the sensory experience of the food.

Types of applicators: Batch applicators allow greater control, better homogeneity, and adjustments per batch, ideal for super-premium products. Although slower and more expensive, their efficacy in palatability terms makes them preferable in high-end segments. In contrast, continuous applicators are faster and more economical but may have lower precision.

Conclusion

Understanding the unique needs and behaviors of cats and dogs is fundamental to optimizing the palatability of pet foods. Given their distinct feeding habits, nutritional requirements, and sensory preferences, it is clear that a one-size-fits-all approach is ineffective.

The manufacturing process, from grinding to drying, plays a crucial role in determining the texture and palatability of the final product. Proper starch gelatinization, precise mixing, and controlled extrusion and drying processes are essential to achieve the desired consistency and flavor of the food. Each stage must be carefully adjusted to maintain the integrity and appeal of the product, responding to the specific preferences of cats and dogs. Coating, one of the most critical stages to improve palatability, requires careful ingredient selection and application techniques. By optimizing fat and palatant use and ensuring both efficient application and homogeneous mixing, it is possible to develop a much more attractive product.

In conclusion**, improving the palatability of pet foods involves a multifaceted approach that encompasses ingredient selection, precise manufacturing processes, and effective coating techniques.** By addressing these factors, we can ensure that both cats and dogs receive foods that satisfy their flavor preferences.

THE GUT-SKIN AXIS: A POSTBIOTIC STRATEGY

The gastrointestinal tract (GIT) is the largest interface between the internal body and the external environment, making its structural and functional efficacy crucial for overall health. The gut-brain axis has been extensively researched, but less attention has been given to other gut-organ axes like the gut-skin axis, despite evidence confirming its presence. Both the skin and gut share key features due to their external barrier functions, essential for homeostasis and well-being.

By Lallemand

The Gut Barrier

The gut barrier relies on specialised epithelial cells, the generation of protective mucus, and tight junctions to:

- Facilitate nutrient absorption and digestion,
- Regulate immune responses,
- Support microbial balance within the intestine,
- Protect the body from any ingested threats.

The three gut barrier layers (Figure 1): the microbiological barrier (microbiome), the chemical barrier (mucous layer), and the physical barrier (intestinal epithelial cells) require continuous regeneration to maintain their integrity against constant pressures. **Factors like poor nutrition, infection, or illness can compromise gut barrier integrity, leading to increased "intestinal permeability,"** which can cause inflammation, food allergies, nutrient malabsorption, a compromised immune system, and disease (Wells et al., 2017).

The Skin Barrier

Like the gut barrier, the skin is also a complex organ with multiple layers, each serving a unique function. Its microbiota is a dynamic community of trillions of bacteria, yeasts, fungi, viruses, and other microorganisms residing within the epidermis, dermis, and associated glands and follicles. This community's balance evolves constantly, influenced by the host and environment. Research shows a close relationship between the skin's physical, immunological, and biological properties and its microflora. **Several skin conditions, from dry and aging skin to inflammatory issues like atopic dermatitis, psoriasis, and acne, are linked to alterations in the cutaneous microbial ecosystem** (Elias & Choi, 2005).

Like the gut, the skin uses various defense mechanisms to protect against infection, including physical integrity and regulation of pH. Healthy skin typically has a slightly acidic surface pH, creating an unfavourable environment for pathogenic bacteria (Chikakane & Takahashi, 1995). The skin and its microbiome produce antimicrobial peptides (AMPs) that target skin pathogens. **Antibiotics are commonly used for skin conditions but can disrupt the skin's microflora and the gut if taken orally (Gallo & Nakatsuji, 2011). The skin's innate immune system collaborates with the cutaneous microbiota to act as a barrier against pathogens.** It differentiates between probiotics and pathogens, triggering pathways to reduce inflammation and stimulate the production of anti-inflammatory cytokines and chemokines, as well as natural AMPs (Wang et al., 2012; Lew & Liong, 2013).

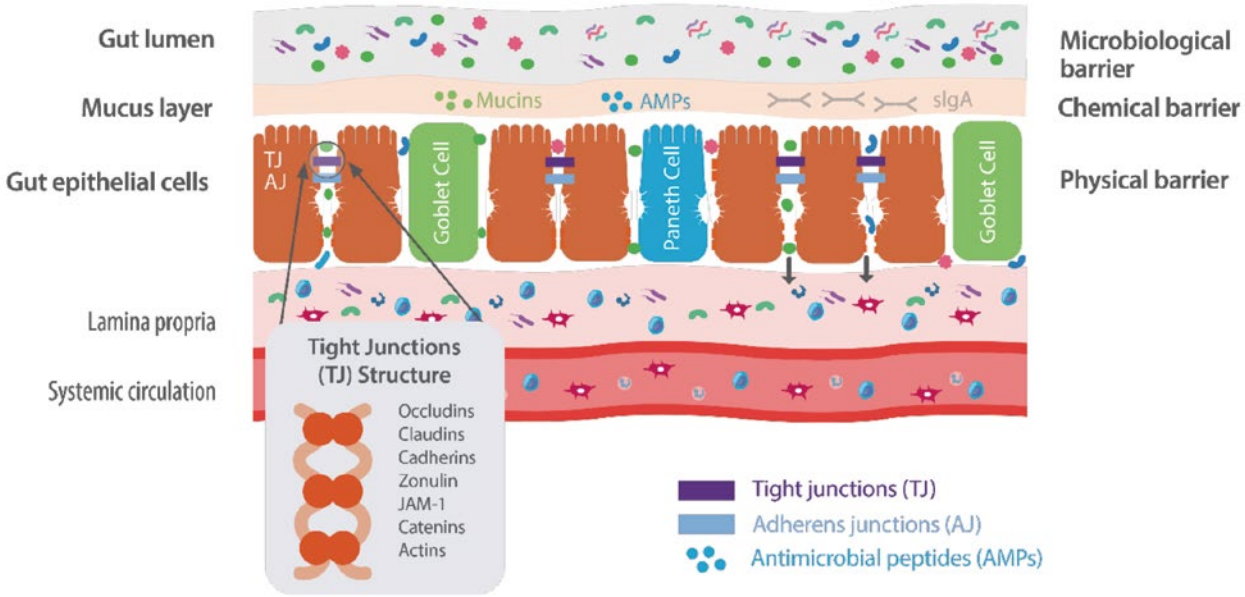


Figure 1. Schematic representation of the main components of the gut barrier, adapted from Vancamelbeke & Vermeire, 2017 and Samaxmi et al., 2023.

Traumatic or surgical wounds compromise skin integrity and function. Efficient skin care is essential to restore the skin to its physiological state and limit secondary infections. Factors like metabolic conditions, temperature, stress, and nutrition impact skin health. The wound healing process, conserved across vertebrates, aims to produce tissue at the injury site that resembles existing tissue and protects the body. There are three major stages of wound healing:

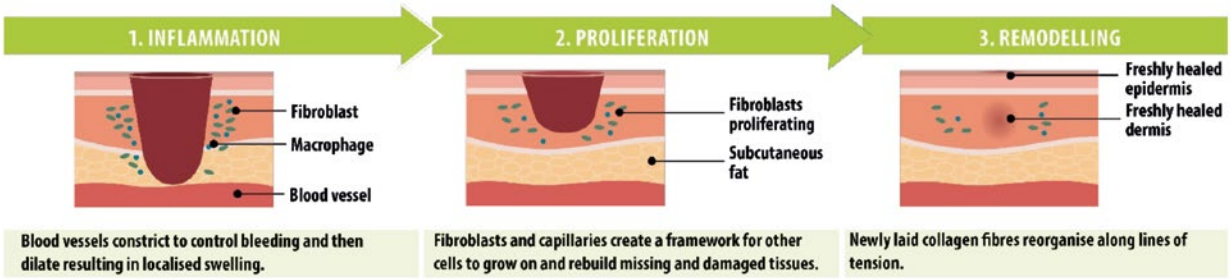


Figure 2. The three stages of wound healing from a penetrative skin wound.

Microbial Interventions for Skin

Microbials are increasingly utilised in human skin health products to modulate cutaneous microflora, support lipid barrier function, and enhance the immune system to maintain homeostasis (Cinque et al., 2011). In addition to topical applications, **the beneficial effects of orally administered bacterial and/or yeast-based solutions have also been demonstrated, likely mediated through the gut–skin axis: a bidirectional communication pathway linking gastrointestinal and dermal health.**

Interestingly, recently scientists have been able to prove that microbes don't necessarily need to be alive to be effective (Kataria et al., 2009).

The Gut-Skin Axis in Action

The gut-skin axis reflects the relationship between the gut and skin, often reflecting the integrity and health of each barrier system. It is a bidirectional interaction, controlled by the immune system and influenced by gut microbiome metabolites. The postbiotic yeast YANG, made of three specifically selected yeast fractions with synergistic properties, has been used as an in-feed treatment for skin health and wound healing in a zebrafish model. Macroscopic evaluation of wound healing closure was significantly more advanced at 16 days post-wound (dpw) in the YANG-fed group compared to the control group, meaning YANG promoted a quicker onset of wound closure and faster tissue rebuilding.

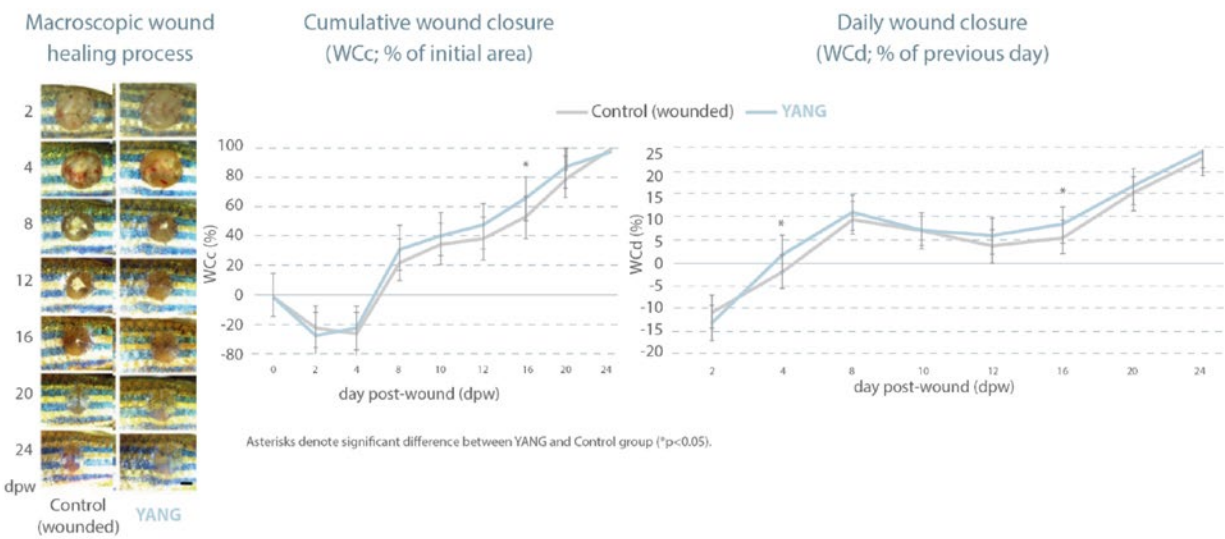


Figure 3. Macroscopic wound closure evaluation of a 3mm biopsy made on zebrafish fed a control diet, or YANG at 1.5kg/t. WCc; wound closure cumulative as a percentage of the initial wound. WCd; wound closure daily as a percentage of the previous day's closure.

The quality of the healing process was also evaluated at 4 dpw by analysing the granulation of tissue, revealing significantly enhanced thickness and transversal surface area for the YANG group. This indicates an earlier entry into the proliferative phase of wound healing for the YANG-fed group as a result of a faster inflammatory phase resolution.

These findings indicate that oral supplementation with YANG can enhance skin health by accelerating wound healing and closure, primarily through the strengthening of natural defenses. Enhanced total microbial population and decreased pH, as well as increased levels of *Bifidobacterium* species and *Lactobacillus* species have also been demonstrated as results of YANG oral supplementation in previous studies in dogs, supporting the two-way interaction theory for the gut-skin axis.

Implications for pet health

The findings from zebrafish models offer valuable insights for companion animal care, particularly regarding the integrity of the gut and skin barriers. In pets, disruptions in the balance of gut and skin microbiomes are increasingly associated with chronic inflammation, weakened immunity, and conditions, such as atopic dermatitis, gastrointestinal sensitivities, and poor wound healing.

The demonstrated benefits of YANG highlight the potential of targeted microbial interventions. **It would not only support gut health—by enhancing microbial diversity and immune markers like faecal IgA—but also promote faster and more effective skin repair.** This dual action reinforces the concept of the gut-skin axis as a two-way communication system, where improving gut health can directly benefit skin resilience and recovery.

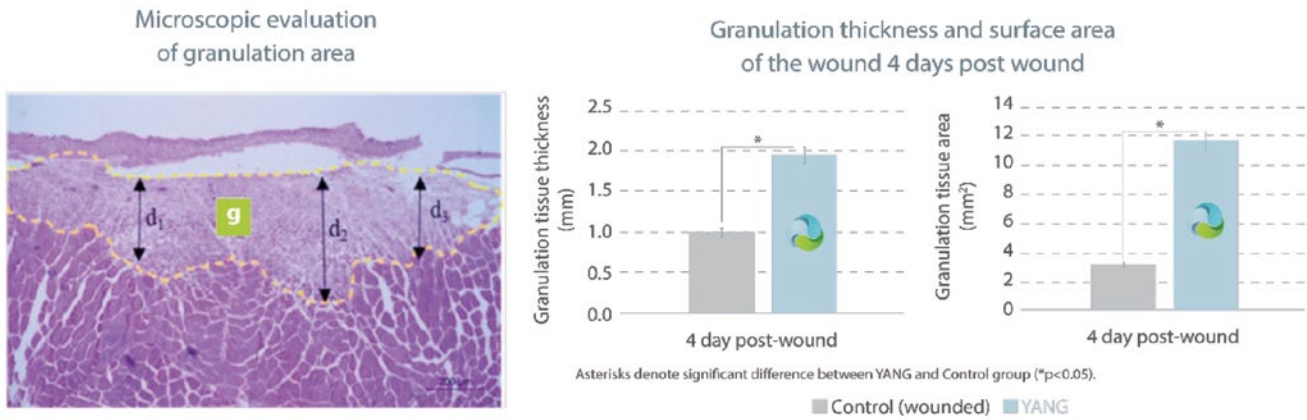


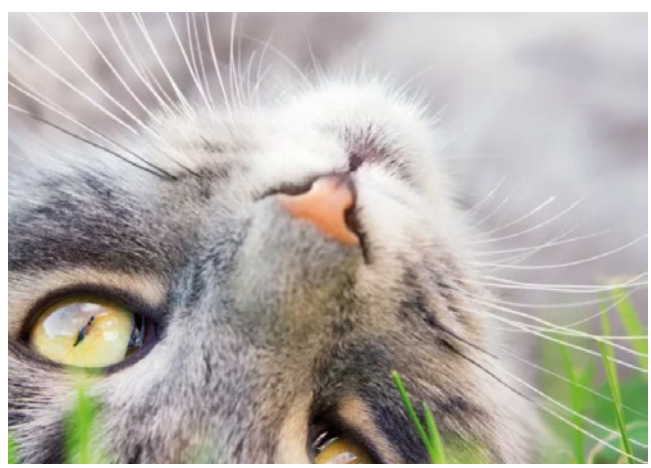
Figure 4. Microscopic wound closure evaluation of a 3mm biopsy made on zebrafish fed a control diet, or YANG at 1.5kg/t, evaluating the degree of wound granulation.

For pets prone to digestive disorders or chronic skin conditions, the inclusion of specific and proven microbial solutions into their diet offers a holistic approach to support their health and well-being. As the pet food industry continues to evolve toward functional nutrition, leveraging the gut-skin axis opens new opportunities for innovation in dietary formulations.

What is LALPROBIOME?

LALPROBIOME is Lallemand Animal Nutrition's platform of innovative microbial solutions that leverage the natural power of yeast and bacteria to support pet health and well-being. Lallemand's decades of yeast and bacteria strain selection, development, and application in human and animal nutrition, enables LALPROBIOME to offer a broad range of microbial solutions to meet the needs of pets and their owners today and for the future. From digestive care to immune support, antioxidant optimisation to cognitive function, LALPROBIOME pet solutions can help you elevate and differentiate your brands with novel ingredients that support unique and specific benefits.

For more information about LALPROBIOME pet solutions visit https://lalprobiome.lallemandanimalnutrition.com/en/rest-of-the-world
Connect with us at pet@lallemand.com



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We present our new **drying tunnel for Doypack packaging**, an ideal solution for companies seeking to optimize their packaging processes. Compact, silent, and made of stainless steel. This equipment offers drying from all angles (top, lateral, low) and is adaptable to different bags.

It has a strong air generator, double filters, and adjustable distribution for precise control. Moreover, **its structure with lateral entries facilitates its maintenance, improving operational efficiency.**

Find out how to add this system to your production line to take your performance to the next level.

This development provides a robust, efficient, and adaptable solution for different packaging formats, which is key in sectors where precision and hygiene are the priority.

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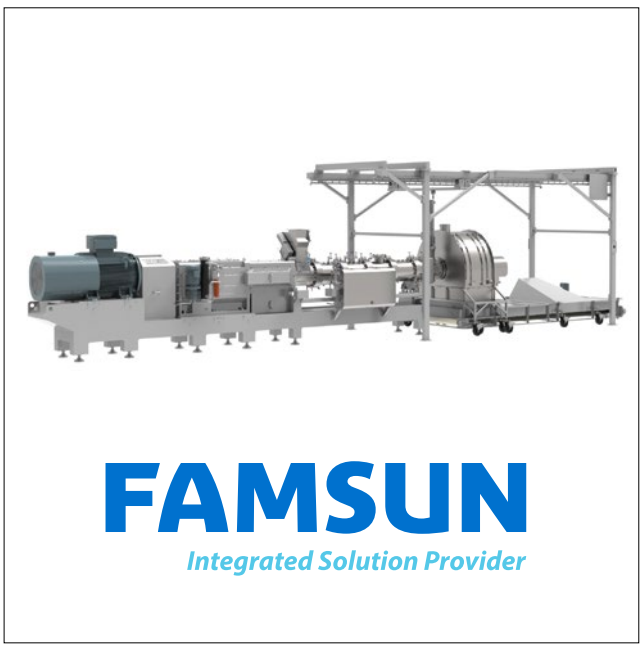
In this All Pet Food Magazine section we highlight the latest innovations to optimize pet food production.
Let's take a look at the solutions proposed by different supplier and market leader companies.



Twim-Screw Pet Food Extruder

FAMSUN is leading the development in high fresh meat extruded pet food solution.

More than 90% of extruded high fresh meat product in China are produced with **FAMSUN's** equipments.

This Extruder is suitable for pet food and is able to reach 140%, 100% and 40% fresh meat slurry direct addition in the extrusion system (ratio to DMR).

Advantages:

1. **Stable:** advanced European gearbox/ bear/ oil seal with torque limiter to ensure smooth, safe and reliable transmission.
1. **Sanitary:** design with hollow bottom, simple and reliable operation. At the same time, no leakage of particles and steam, and the operating environment is clean and hygienic.
1. **Quality Control:** the kibbles are uniform, stable and efficient. The fully meshed, zero-gap twin-screw stabilized screw configuration leads the extruder especially suitable for super-premium pet food production with top quality requirements.
1. **Intelligence:** the automatic control system accurately controls the flow and flow ratio of various materials and quickly adjusts the amount of steam and water added; automatically controls the pneumatic bypass, high precision auger ensures accurate feeding amount.

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THE INTERVIEW

SANTIAGO DE ANDRÉS JUÁREZ

General Secretary of ANFAAC

*In this issue of All Pet Food Magazine, we talked with **Santiago De Andrés Juárez**, who explains his role in ANFAAC, the organization's objectives, and his perspective on the industry.*

How was your professional journey leading up to your current role as the General Secretary of ANFAAC?

Throughout my career, I have collaborated with various business organizations in the sector, always aiming to create value and support the development of key sectors, including health, animal nutrition, and pet nutrition, among others.

This experience has also enabled me to work in multiple European federations, where I confirmed the growing influence of EU institutions in regulating all economic sectors, as well as the great influence Spain has in the field of international relations. I believe **this global outlook is fundamental to understanding current changes and preparing us for the challenges ahead.**

How is ANFAAC involved in the development of the pet food industry in Spain?

Our association currently represents over 90% of pet food manufacturing companies in Spain. However, we have come a long way to leverage this reach. ANFAAC was founded in May 1980, and since 1987, we have been active members of the European Pet Food Industry Federation (FEDIAF), participating in its executive bodies and working committees. We were proud to host the 2025 FEDIAF Annual Congress in Madrid, which was a great success. We have also been members of the Spanish Federation of Food and Drink Industries (FIAB) since 1996.

Nowadays, ANFAAC serves as the industry's voice in the presence of national, regional, and local administrations, and it is a key player in developing large-scale projects with various organizations and agencies. A clear example is the agreement on responsible ownership that we signed with the Ministry of Social Rights, Consumer Affairs and 2030 Agenda, as well as our ongoing work on pet welfare regulations at both the EU and national levels.

We are proud not only to be a reference in the sector but also to work every day to ensure that pets in Spain receive safe, innovative, and high-quality food. **Our mission is to continue promoting a dynamic, responsible industry —one in which collaboration among companies, institutions, and society is the key to a sustainable, opportunity-driven future.**

From your point of view, what are the main challenges and opportunities the pet food sector faces in Spain and Europe today?

The first challenge of our company is to ensure continuity in production and trade in a complex geopolitical context.

We are committed to reinforcing our competitiveness through ongoing innovation both in products (offering healthier and more sustainable food) and processes (efficiency and digitalization). **The key is to turn market demands into opportunities, leveraging the industry's strengths. Relying on innovation is not just necessary —it is a tool for growth and differentiation in a more dynamic and demanding market.**

We must continue to develop safe, high-quality pet food by having processes with the latest scientific advancements in animal nutrition and ingredients that support pet health.

Also, to highlight the importance of reauthorizing additive processes in animal nutrition with different objectives: 1) provide nutritional benefits in vitamin formats; 2) ensure food safety and maintain desirable texture, stability, and wear resistance; 3) and from the organoleptic view, to provide different colors and flavors.

Another challenge is to progressively adapt to new policies about sustainability, which involve important topics —from raw materials supply (such as fats) to pet welfare, always in collaboration with proper authorities.

As an association, our goal is to continue advocating for the interests of our member companies and promoting sector-wide development, while also ensuring the proper care and well-being of companion animals in coordination with the relevant authorities.

In addition, we will support the strong export vocation of our companies and help promote their development into foreign markets by eliminating bureaucratic barriers in existing markets and facilitating access to new ones.

How has the relationship between families and their pets evolved in recent years? How has it impacted on pet food demand and formulation?

One key moment came nearly five years ago with the onset of the COVID-19 pandemic. It had a major impact on the market —the pet food sector became essential. During this period, Spanish society grew awareness about the advantages of pet ownership, benefits that have been confirmed by several scientific research in the last years.

It became clear that pets play a vital role in reducing feelings of loneliness and isolation —the most concerning problem nowadays because it affects all sectors and ages of society. These effects were magnified during the pandemic, making pets essential companions in millions of homes.

The rise of remote work also allowed many people to spend more time at home, making it easier to care for their pets.

Demographic changes also influenced —with life expectancy increasing, elderly people are choosing to have pets for companionship and to stay active.

At ANFAAC, we also recognize the importance of cultural shifts. Since pets are considered full members of the family, there is a greater interest in having and providing them with proper care.

What role does innovation play in the sector's growth? How is it driven by joint work between industry, academia, and regulatory entities?

Innovation plays a central role. The pet food industry is inherently innovative. Companies in this sector are constantly developing safe and healthy foods for our pets, incorporating the latest scientific advances in animal nutrition and ingredients that support animal health into their production processes.

Our member companies work with nutritionists, veterinarians, biochemists, and animal behavior researchers. They ensure safety and quality throughout the entire process —from manufacturing to bringing the product to markets— including clear and appropriate communication with pet owners. They lead the way in research, development, and innovation, and are strongly committed to environmental sustainability.

A key milestone in collaboration with the academic sector has been the development of the FEDIAF Nutritional Guidelines for Cats and Dogs. These comprehensive documents provide essential information on recommended nutrient levels in pet food based on life stage, health condition, and activity level. The guidelines are prepared by FEDIAF's Nutrition Working Group and Scientific Advisory Board (SAB), a group of freelance scientists from academic institutions across Europe. These guidelines have become the primary reference for companion animal nutrition in Europe —for EU authorities, consumer organizations, professionals, and pet owners alike.

Similarly, FEDIAF has recently updated its Nutritional Guidelines for Feeding Pet Rabbits. This extensive document offers scientifically based recommendations to ensure the health and well-being of pet rabbits through balanced, appropriate diets.

Regarding collaboration with regulatory authorities, I would highlight the productive relationship between ANFAAC and the Spanish Ministry of Agriculture, Fisheries, and Food (MAPA) and the control authorities of various autonomous communities. This is reflected in our participation in the National Animal Supplement Council (NASC), where we address regulatory developments. The sector is highly regulated in all aspects, from ingredients to manufacturing and commercialization.

After all, **our mission is to provide pets with safe, high-quality, varied, and palatable food that helps them live long, healthy lives, enabling us to share and enjoy with them.**

Which technological, sustainable, or consumer trends are shaping the future of the pet food sector? How is the industry adapting to them?

Consumer trends are closely linked to the growing importance of pets in our households. Specialized products remain in high demand —especially those targeting specific health benefits. The most cutting-edge offerings from our companies are moving in that direction, although innovation is a defining characteristic across the entire industry.

Premium, dietary, and functional pet food is becoming mainstream.

Circularity is a top priority for our sector. We are committed to promoting responsible pet ownership while supporting the essential role pets play in society. In Europe, it is estimated that the pet food supply chain directly employs 280,000 people and indirectly supports another 2.3 million jobs.

Finally, what message would you like to share with industry players working toward a sustainable, responsible, and high-quality pet food market?

My message to all industry players is clear: let's continue working together so that the pet food sector not only grows but so does responsibly —driven by innovation and committed to animal welfare and the planet.

Thank you, Santiago, for talking with the All Pet Food team!

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FROM THE CORE

PEOPLE, PROCESSES, AND PASSION FOR THE INDUSTRY

For All Pet Food, visiting clients is an enriching experience. In these encounters, we strengthen relationships and become familiar with the equipment, workspaces, and production processes, enabling us to support and accompany them effectively.

We get pictures of each visit to share the experience with the community. In this way, they can understand how these leading companies start their days to meet the demands of the pet food market.

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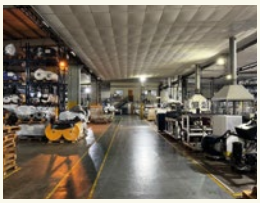

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PLP Systems is an italian based company, specializing in the handling of liquids and powders, with deep expertise in technologies for the pet food and feed sectors.

The company stands out for its strong commitment to technological excellence, focusing on automation, reliability and high-precision processes.

How It All Started

PLP was founded in 1980 by three friends, whose desire was to bring innovative technologies into the livestock segment, a sector that they had seen first-hand because they were born into families of farmers.

Through technological studies in Italy and abroad, comes the desire and foresight to specialize in liquid and powder dosing systems.

Over the years, in response to evolving market demands, **PLP** developed advanced solutions for coating, greasing, micro-dosing, homogenization, and spraying, helping manufacturers meet the highest standards of quality and efficiency.

Industry Solutions

PLP offers tailored systems for liquid dosing throughout the entire production line –from raw ingredient intake to the final final processing.
The company also supplies micro-dosing systems for powders, enabling the precise addition of valuable components such as vitamins, enzymes, and amino acids into batch mixers.

One of PLP's key area is post-pellet coating, where it delivers some of the most advanced and reliable technologies currently available in the pet food and feed industries.

Research and Development

Innovation lies at the core of PLP's approach. The company continuously adapts to market trends and customer needs with flexible, forward-thinking engineering.

PLP Systems' focus is to create customized dosing units tailored to each client's needs, designing unique solutions for every project. For this reason, **PLP** invests significantly

each year in **R&D**, developing new and innovative concepts while continuously improving and advancing existing technologies.

In an industry increasingly focused on automation and traceability, **PLP** is investing in technologies that ensure every ingredient is handled with precision and accountability.

PLP invests as well in technologies that guarantee precision dosing and full accountability across every stage of production.

Expanding Markets

PLP is growing its presence in fast-growing regions such as **Southeast Asia** and **Latin America**, where the demand for advanced processing plants is rapidly increasing. Meanwhile, in Europe, the company supports producers in updating their processes to meet stringent quality requirements.

Commitment to Sustainability

Sustainability is a fundamental part of PLP's production model. *"We always do our best to optimize production changes and localize operations to minimize environmental impact,"* Marco Prati, Managing Director, noted.

This environmentally conscious approach influences both the design of PLP's machinery and its operational decisions across global markets.

Institutional video

https://allpetfood.net/videos/plp-systems-571/

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A MEETING AN EXPERIENCE

For All Pet Food, industry events create bridges for sector training and networking. Getting to know each other is an opportunity to connect and exchange knowledge, news, and trends.

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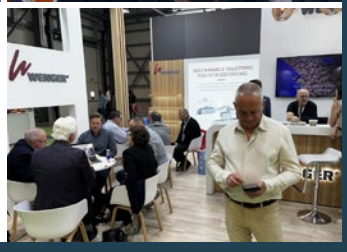

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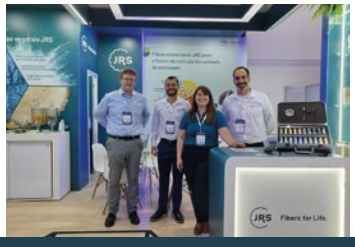

SEMINARIO DE EXTRUSIÓN EXTRU-TECH Puerto Vallarta 2025

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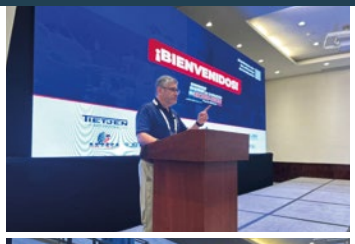
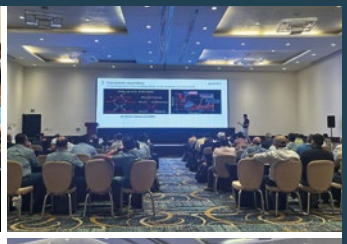
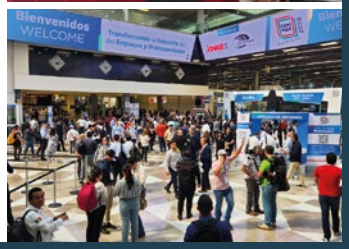




Here, we treasure some fragments of moments we have shared with the entire industry community. Relive the experience with us!

EXPO PACK



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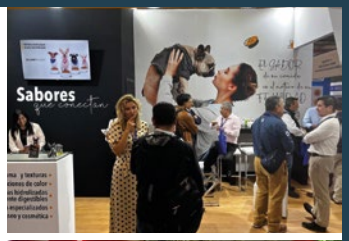


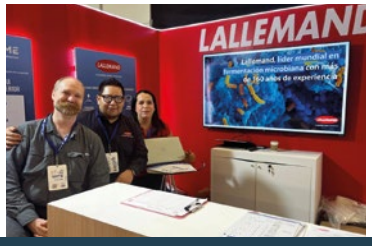

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JULY Issue

Topic: ***Manufacturing Innovations and Pet Food Processing.***

- **Victam Latam 2025, São Paulo, Brazil.**
- **Expo Envase 2025, Buenos Aires, Argentina.**
- **CIPEU 2025, Zaragoza, Spain.**

OCTOBER Issue

Topic: ***Artificial Intelligence in Pet Food .***

- **PET FAIR SOUTH EAST ASIA – VNU, Bankgok, Thailand.**
- **AllPetFood Day 2025, Santiago de Chile, Chile.**

Editorial solutions

- **Technology Showcase**
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NOURISHING FLAVORS: EVOLUTION AND TRENDS

In each All Pet Food Magazine issue, we share recognized products and new launches from prominent worldwide pet food manufacturing companies.
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KEMIN INDUSTRIES EXPANDS INNOVATION IN INTESTINAL HEALTH WITH STRATEGIC ACQUISITION

The global ingredient manufacturer, committed to sustainably improving the quality of life for 80% of the world, has announced its acquisition of Bactana®, a research-driven company specializing in intestinal health and fermentation technology.

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Lesaffre has acquired a 70% stake in Biorigin, a business unit of Brazilian company Zilor, forming a new joint venture. This partnership will combine the strengths of Biospringer by Lesaffre and Biorigin to deliver advanced yeast-derived and savory ingredient solutions for both food and feed markets.

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WENGER AND EXTRU-TECH LAUNCH EXPRO AI

Wenger® and Extru-Tech® have launched EXPRO AI™, a next-generation software powered by TwinThread that uses artificial intelligence to optimize extrusion processes. This new tool enables real-time predictions, setpoint optimization, and improved product quality and operational efficiency.

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ZEOTALKS: SCIENCE, CONNECTION, AND APPLIED KNOWLEDGE IN ANIMAL NUTRITION

ZeoTalks is an educational initiative by ZeoGroup that brings together experts, clients, and industry voices to share science-based knowledge in animal nutrition. With 26 years of experience, ZeoGroup created this platform to foster informed decisions through accurate and up-to-date information.

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All Pet Food Magazine publishes content of high academic interest created by editors, who bring prestige to each issue and valuable knowledge to the entire pet food industry.
In this section, we are pleased to share the professional profiles of our guest editors, their country of residence, and their main phrase.

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