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ANDRITZ

The December Edition of Food Marketing & Technology Magazine is the Mithai Namkeen Special Edition. One of the most versatile sectors in the Industry, the sweets market is set to boom in the coming years. As of 2024, the confectionery market in India stands at USD 4.46 billion. It is estimated to reach USD 7.02 billion by 2033.

The heart of these statics lie in the diversified palettes of the Indian consumer base. The Indian palate has always been deeply rooted in tradition. Over time, it has embraced Western flavours as well, creating a culture that prefers both rather than choosing one over the other. Today, we celebrate a dynamic blend of tastes, textures, and culinary experiments. Fusion flavours, innovative formats, new bases, and creative pairings have become the norm. There lies a co-exsitence between traditional and western flavours at status quo, where both worlds can collaborate and grow.

India's snacks and namkeen sector is one of the largest and fastest-growing food categories and it continues to redefine consumer behaviour. The Indian savoury snacks market was valued at approximately USD 6–7 billion in 2024, with strong double-digit growth driven by urbanisation, premiumisation, and rising on-the-go consumption.

Today, consumers are not just snacking, they are exploring. From classic bhujia, chivda, sev, and peanuts to baked snacks, millet-based options, regional specialties, and globally inspired formats - the category has expanded into a vast playground of possibilities. Health-oriented innovations such as low-oil, roasted, air-popped, and high-protein snacks are reshaping traditional choices. At the same time, premium namkeen and artisanal regional snacks are seeing renewed demand, reflecting India's growing pride in its culinary heritage.

Overall, this edition explores advancements and innovations in the confectionery and snacks market in India. We hope you enjoy the takeaways that come along the way!

Linda Brady Hawke

More AI in Sweets and Snacks Production

Every year we hear more about digitalisation, big data, the cloud or smart sensors in heavy industries like automobiles and precision equipment. Now AI has reached the food industry and is making a positive difference.

Even in a creative artisan industry like confectionery there are many challenges. Production schedules are getting faster, quantities have to be achieved and packaging lines have to be synchronised. This is all part of meeting consumer wishes and other market requirements. Soft and hard candies, crunchy, salty and other snacks, in mixed assortments or family packs, there are many variations which are sought.

The consequences are that processing and packaging systems often have to be retooled. Efficiency and flexibility are at the fore. Smaller companies have to adapt to survive and larger ones to maintain market share.

Production systems in sweets and snacks have long been highly automated, but it is more recently that they need to be data-supported. Process optimisation requires solutions which consume enormous quantities of data. As a first step, intelligent sensors are being integrated into existing systems and can record physical measured values, which help in forecasting the current operating conditions. In turn this is a start to improving equipment effectiveness.

Routine tasks can be monitored and automated in real time. Smart sensors can make data based decisions. We have seen this, for example in the packaging of chocolate multi-packs, where shape recognition helps to put the right products in the right boxes, or to remove damaged ones or foreign materials.

Artificial intelligence can go so much further by using sophisticated vision systems or imaging. Algorithms can determine the quality of cacao beans or other raw materials, and thus analyse inherent contents of confectionery products, as far as deciding whether a recipe is balanced or unhealthy.

This is just the start of what AI can do to support confectionery manufacturers. In an era where skilled workers are becoming fewer, it is especially relevant to release people from the many mundane tasks. The future may be looking more complicated with the required analyses, but at the same time, help is on its way.

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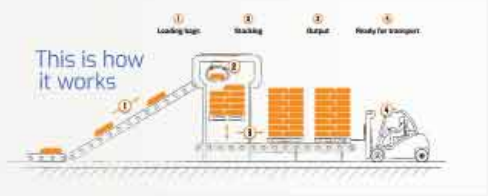

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December 2025

KHS

Filling and Packaging – Worldwide

ENGINEERED WITH HEART
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Apeda has Facilitated the First Export Consignment of 12 Metric Tonnes of Fortified Rice

The Agricultural and Processed Food Products Export Development Authority (APEDA), has facilitated the first export consignment of 12 metric tonnes of Fortified Rice Kernel (FRK) from Chhattisgarh to Costa Rica.

As per APEDA, the export of Fortified Rice Kernel marks a significant step in integrating India's domestic nutrition mission with global outreach.

Chairman, APEDA, Abhishek Dev, stated that the export of fortified rice from India not only strengthens the nation's agri-export portfolio but also reaffirms its commitment to addressing malnutrition through science-based and globally recognised food solutions. He assured APEDA's continued support to exporters in expanding markets for fortified and value-added food products.

Fortified Rice Kernel (FRK) is produced by blending rice flour with micronutrients such as iron, folic acid, and vitamin B12. These nutrients are extruded and shaped to resemble rice grains, which are then blended with regular rice at a predetermined ratio to enhance the nutritional value of the staple. The export of FRK underscores India's technological capability in food fortification and its commitment to global food security and nutrition improvement.

Syngenta Launches The Cropwise Open Platform to Democratize Agricultural Innovation

Syngenta has taken a bold step to democratize agricultural innovation by launching the Cropwise Open Platform, inviting third-party developers worldwide to build apps on its AI-powered digital farming system.

Cropwise, Syngenta's flagship digital platform, already supports over 70 million hectares of farmland across more than 30 countries, and the new open platform aims to expand its impact by giving developers access to agronomic models and AI tools.

The move comes at a critical time, backed by fresh IPSOS research (commissioned with Syngenta) that reveals an alarming "technology access gap" between large-scale and small-scale farms. While big farms are rapidly using AI and digital tools, small farmers are being left behind. The survey also showed that many older farmers distrust or misunderstand AI — even though they may already be using it via remote-sensing or drones. Trust, data ownership, and local proof-points emerged as key factors for adoption.

Feroz Sheikh, Syngenta's Chief Information & Digital Officer, described the open platform as a way to bridge this inequity. By opening its data and AI foundation, Syngenta is enabling developers to create solutions tailored to diverse farmer needs and giving farmers the power to pick tools that work for them, without giving up control of their data.

Through Cropwise Open Platform, developers can tap into Syngenta's agronomic algorithms and AI-driven insights to build customized applications for example, for weather monitoring, satellite-based crop health tracking, yield prediction, or pest management.

Importantly, Syngenta ensures that farmers' data remains under their control, no individual farm data is shared without consent.

By creating this open ecosystem, Syngenta hopes to foster a global network where innovation is more inclusive, scalable, and truly built for all farmers helping close the digital divide and driving sustainable, data-driven agriculture into the future.

Starbucks is Doubling Down on its Long-Term Growth Plans

Despite the increasingly crowded café landscape in India, Starbucks is doubling down on its long-term growth plans, signalling confidence in the country's rapidly expanding coffee culture. The company, which operates in India through a joint venture with Tata Consumer Products, remains committed to aggressive expansion even as new entrants and homegrown brands intensify the fight for market share.

India's coffee retail market has witnessed a surge in competition over the past two years. Global rival Tim Hortons, along with fast-growing local players like Third Wave Coffee, Blue Tokai, Barista, and several boutique roasteries, have accelerated store openings. Quick-service restaurants and bakeries are also expanding into the premium beverage space, creating pressure on pricing and customer retention.

However, Starbucks believes its strong brand recall, evolving menu, and focus on localised offerings give it an edge in the market. The company has been steadily introducing India-specific beverages, expanding its affordable product range, and strengthening its food partnerships to appeal to a wider consumer base. It has also invested heavily in improving café ambience, customer experience, and digital loyalty programmes.

Britannia Industries Ltd, A Leading Player in India's Biscuit and Packaged-Foods Industry, Plunged as Much as 6.7% on November 11, 2025

Shares of Britannia Industries Ltd, a leading player in India's biscuit and packaged-foods industry, plunged as much as 6.7% on November 11, 2025, following the unexpected resignation of its vice-chairman, managing director and chief executive officer Varun Berry.

Berry, who joined Britannia in 2013 and became MD in 2014, had steered the company through a period of transformation—sharpening its distribution, expanding into adjacent categories like dairy and snacks, and delivering consistent margin improvement. The board accepted his resignation effective immediately and waived his notice period, amplifying investor concerns.

In his place, Britannia has appointed Rakshit Hargave as new Managing Director & CEO, with effect from December 15, 2025. In the interim, CFO N. Venkataraman will take on additional charge as CEO.

Analysts pointed to the timing of Berry's exit without hand-over period and the gap before the new CEO formally takes charge as the key reasons behind the sharp market reaction. For instance, one note observed "The lack of overlap between the outgoing and incoming leadership could weigh on sentiment."

While Britannia's growth story under Berry was impressive—the company's revenue, profit margins and market reach all saw strong improvement—it now faces a pivotal leadership transition at a time of competitive pressures and margin headwinds in the FMCG sector.

For investors, the question now is whether the new leadership can maintain the momentum and reassure the market that strategic execution and operational excellence will continue seamlessly. In the short term, however, sentiment remains cautious as the stock weathers the fallout from the surprise exit.

FSSAI has Issued an Advisory on 'Environmentally Compliant Disposal of Seized, Rejected, and Expired Food Items

After reports surfacing about the incidents of improper disposal of seized, expired or rejected food items into natural water bodies, FSSAI has 'strictly' prohibited the disposal of seized, rejected, or expired food items, including their packaging, into rivers, lakes, natural water bodies, or open lands under any circumstances.

The food authority has directed the states to use methods including incineration, landfill or biodegradable facilities for the disposal of such food items.

FSSAI has issued an advisory on 'environmentally compliant disposal of seized, rejected and expired food items' and has directed the

Designated Officers, Food Safety Officials and enforcement teams under their respective jurisdiction to follow the procedure.

"The Approved Disposal Methods, which may be followed in coordination with the local municipal authority/ panchayat or any other statutory bodies, include but not limited to Incineration: use authorised incinerators compliant with Central Pollution Control Board (CPCB) norms, ensuring complete combustion and maintain records of the facility used, Landfill: only in designated sanitary landfills with leachate control; biodegradable waste should be segregated and composted where feasible and Biodegradable Waste: Compost or anaerobically digest organic matter through certified facilities," reads the advisory.

The advisory added that the disposal shall be supervised by the Food Safety O?cer (FSO) duly authorised by the Designated O?cer and disposals should be done under video documentation, in the presence of two independent witnesses.

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Maximising Sensory Understanding for Flavour Innovation in India

By **Palesa Mthiyane* and Margaux Ducatillon****

If you ask flavour developers what makes India such an intriguing market, most of them will say the same thing - it refuses to sit still. Consumers do not swap one preference for another. They add, layer, mix, and reinvent. A generation raised on homemade chutneys, now experiments with chilli-lime popcorn. College students drink cold coffee in the afternoon but crave traditional sweets by the evening. Even the humble spice blend has evolved into a playground of heat levels, aromatic lifts, and nostalgic cues.

This constant shape-shifting has pushed brands into unfamiliar territory, where great ideas now need more than just strong R&D. They need a clear understanding of how Indians taste, judge, and emotionally connect with flavour. That's where sensory science becomes the quiet force guiding the entire innovation process

Why Sensory Science Matters

Beyond Liking: Understanding What Really Wins Consumers Over

It's tempting to assume that if consumers like a product, it's ready for market. But liking barely scratches the surface. Repeat purchase, the real marker of success, comes from something far more layered. Sensory science uncovers the elements that shape those deeper connections: the intensity of flavour notes, the balance of basic tastes, the aftertaste that lingers just long enough and the tiny off-notes that can quietly ruin an otherwise promising idea.

These details help flavourists create products that don't just pass a taste test but build loyalty. That's the difference between a product consumers try once and one they reach for every week.

Reducing Development Risk Before It Becomes Expensive

Innovation is exciting, but it can be riskier than most teams realize. A minor ingredient change can flatten aroma. A cost-optimized formulation might compromise mouthfeel. A shelf-life extension can dull brightness over time.

Sensory testing acts as an early-warning system development teams rely on. It helps them avoid costly reformulations, ensure ingredient substitutions do not alter sensory quality, benchmark competitively, and validate stability before launch. In a market as competitive as India's, catching issues early protects timelines and reputation.

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Standing Out in a Crowded Market

Competition is intense in categories like ready-to-drink beverages, snacks, confectionery, and dairy alternatives. While brands might launch quickly, staying relevant requires a sensory signature - the unique combination of taste, aroma, and texture that become instantly recognizable.

Think of a jaggery-based snack with a roasted caramel note or a masala beverage with a balanced spice profile. These may sound like simple flavours, but they function as sensory identities. Sensory science helps brands refine these identities so products do not just blend in, but carve out their own space on the shelf.

Localisation: Tailoring Flavours for Indian Consumers

No two parts of India taste the same. Someone in the North may expect warmth and depth in a masala profile, while someone in the West prefers brightness and tang. Kokum carries emotional weight on the coast, while jamun signals familiarity in other regions. Even dairy notes shift depending on tradition.

Sensory science makes localisation far more precise. It helps teams adapt global frameworks for Indian palates without losing authenticity, ensuring products feel locally grounded while still innovative.

Sensory Science in Practice

This is where sensory science shifts from theory to action. Flavour houses that treat sensory science as a core business asset tend to move faster and make better decisions. They rely on tools that translate subjective experiences into objective guidance:

- **Descriptive Sensory Analysis:** Trained panels create an objective sensory map, helping flavourists understand where to refine or differentiate.
- **Discrimination Testing:** Triangle or duo–trio tests confirm whether formulation changes are perceptible, a key part of quality control.
- **Preference Mapping:** By pairing sensory profiles with consumer liking, teams uncover what drives choice.
- **Chemical–Sensory Integration:** By linking instrumental data (GC–MS, e-nose) with sensory observations, developers achieve consistency even with variable raw materials.

This blend of human insight and scientific measurement gives brands insights for shaping products with more accuracy than intuition alone can offer.

Case Study: Launching a Masala Beverage

A leading beverage brand recently tapped into sensory science while developing a new masala drink for the Indian market. Early prototypes tasted promising, but something felt incomplete. Through descriptive analysis and consumer testing, the team discovered that the spice heat needed softening and the sweetness required a subtle shift to balance the flavour.

By refining these sensory cues rather than overhauling the concept, the final product struck the perfect chord. Consumers responded immediately, and the drink quickly carved out market share.

Its success came from understanding the sensory details that shape emotional connection.

Emerging Trends: Sustainability and Natural Flavours

As consumers grow more mindful of what goes into their food, natural ingredients and sustainable sourcing are becoming stronger purchase drivers. Yet natural ingredients react differently in formulations, vary seasonally, express aroma differently and can introduce sensory challenges.

Sensory science helps brands navigate these shifts. By measuring how natural ingredients behave over time and across batches, teams can build clean-label products that still deliver the experience consumers expect.

The Point to Remember

India is one of the most dynamic flavour markets in the world. Consumers are curious, informed, and quick to decide what earns their loyalty. Sensory science helps brands keep pace by sharpening understanding of what consumers want, not just in taste, but in experience.

For flavour houses and food and beverage teams, it is more than a scientific discipline. It is a strategic advantage, a way to design products that resonate deeply, differentiate clearly and succeed sustainably in a market where taste is both personal and powerful.

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Sensory Commercial

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Festive Flavours, Modern Twist: The Rise of Fusion Mithai in India

By **Chef Ishijyot Surri***

Every December, as I walk through the bustling lanes of India's sweet and snack markets—from the heritage mithai shops of Mumbai to the polished counters in five-star hotels—I'm reminded of how deeply sweets are woven into our emotions. Mithai is not just food; it is memory, celebration, identity. Yet over the last decade, something remarkable has happened. India hasn't just preserved its mithai culture; it has reinvented it. And I have had the privilege of witnessing, cooking, and shaping this evolution first-hand.

Image Source: www.femina.in

Rasmalai Tres Leches

Why Fusion Mithai Makes Sense Today

In my culinary journey across India and internationally, one truth stands out: our palate is expanding faster than ever. Today's diner whether Gen Z, millennial, or even the traditionalist is more exposed, more experimental, and more health-conscious. They want the nostalgia of kaju katli, but with the sophistication of a French entremet. They want the comfort of peda, but with flavours they have grown to love while travelling—matcha, biscoff, yuzu, pistachio cream, hazelnut praline.

This shift is not driven by trends alone; it reflects a deeper cultural evolution. Fusion mithai is the natural next step in India's food story. It carries the soul of tradition but speaks a modern language. It's an amalgamation of sorts as it carries both nostalgia and a modern creativity. For me as a chef i look at it as

"When technique meets emotion, new classics are born."

That is exactly what fusion mithai is to me today.

Whey Protein Ladoos

Image Source: www.patilkaki.com

Thandai Cheesecake Entremet

Image Source: www.mygingergarlickitchen.com

What India Wants Today

Standing at the intersection of culinary innovation and consumer behavior, I see strong market patterns:

1. Premiumisation Is Booming

Consumers view mithai like fine chocolates. Boutique brands and artisanal sweets are becoming festive essentials.

2. Health-Conscious Category Is Exploding

Demand for sugar-free, vegan, gluten-free, and jaggery-based mithai is rising. Brands now offer options like jaggery pistachio paté and whey protein ladoos.

3. Fusion Sweets Outperform Traditional Categories in Gifting

Gifting has shifted to modern, Instagram-worthy mithai. Bestsellers include Rasmalai Tres Leches and Gulkand Pistachio Bonbons.

4. Technology Is Transforming Production

Advanced methods are improving consistency and shelf life, enabling national-level brands in the fusion mithai sector.

5. Consumers Seek Experience, Not Just Product

The focus is on curated tasting experiences with story-led products rather than traditional boxes.

Tradition Meets Technique

Elevating traditional Indian sweets while retaining their essence, creating dishes like Thandai Cheesecake Entremet and Mishti Doi Mousse Cups that balance memory with surprise.

The next phase of fusion mithai will focus on:

- Ingredient purity (single-origin chocolates, A2 ghee, artisanal jaggery)
- Gourmet textures (mousses, pralines, ganaches, slow-cooked reductions)
- Global inspiration (Japanese, Turkish, Mediterranean, Latin American)
- Scalable technology (rapid freezing, cold-infusion aromatics, controlled humidity storage)
- Chef-driven brands that bring credibility and craftsmanship

India's mithai industry is poised for a renaissance led by innovation, with a tremendous opportunity ahead.

Fusion mithai is more than a trend.

It is the future of festive flavours.

It is the bridge between generations.

It is the canvas where tradition and creativity coexist beautifully.

From my experience, the only rule is this:

Never forget the emotion behind mithai, even when you reshape it for the modern world.

About the author:
* Chef Ishijyot Surri, Executive Chef & Founder of Mulk & SJI Gourmet

Aroma Explosion: Gently Drying Highly Functional Foods

Plant manufacturer Devex supports companies in the food industry from the product idea to the customized drying plant

"Since Corona, end consumers have been buying food differently," says Christoph Markmann, managing director at plant manufacturer Devex. "On the one hand, food should have a long shelf life, but on the other hand, it should also be healthy and taste good." This is where Devex comes in with its drying systems for the gentle drying of food, in which natural color, taste, and all nutrients are retained.

"Since the pandemic, the shelf life of food has played a role in preparing for shortages if necessary. And just as important: since then, there has been a new awareness of healthy eating." And Markmann should know, because his company Devex builds drying systems for the food industry. "Since 2020, demand has noticeably increased; we have installed massive new capacities for our customers worldwide to dry every conceivable type of food." This makes sense, as nutritional trends toward enjoyment, health, and longevity are rapidly spreading via social media. "What used to take 20 years to go from the upper crust to the common citizen is now passed on in less than a year," Markmann satirizes.

Highly functional foods as tasty snacks

A glance at supermarket and drugstore shelves shows that while the selection of dried fruit was still quite limited before the pandemic, today you can find everything from local apples to exotic mangoes and everything in between. End consumers eat dried fruit as an addition to healthy muesli, for example, but also simply as a snack between meals. "The development in the drying of fruit and vegetables has not only preserved all the nutrients, but also has an aesthetic component," says Devex's MD Markmann.

"In the past, all dried fruits looked like raisins. Thanks to our gentle drying concepts, however, our systems preserve the shape and color of the original product. We

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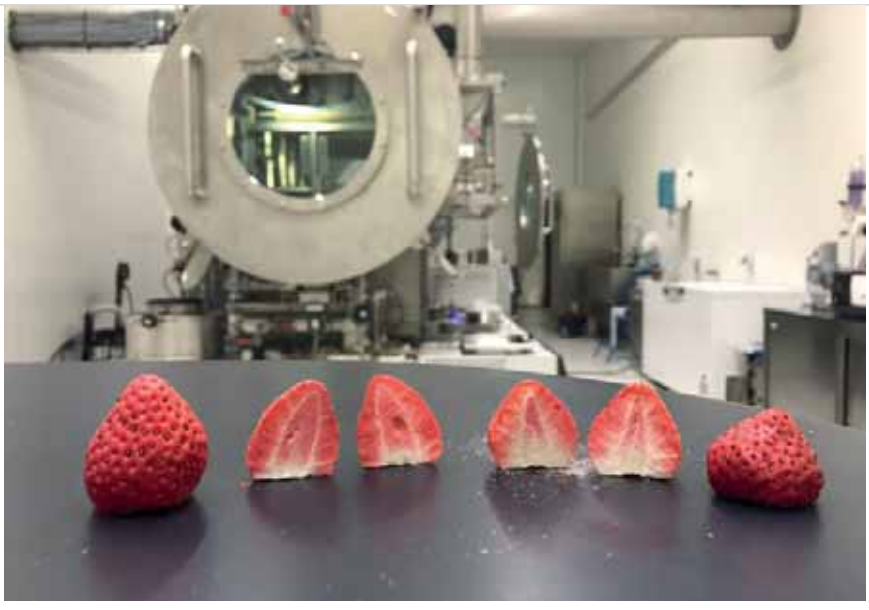
only remove the water from the raw materials. This makes the products look almost as good as fresh." The gentle drying processes used in Devex systems preserve almost all vitamins, antioxidants, and especially the polyphenols in the product. "Dried fruit provides a real explosion of flavor for consumers, as it is concentrated by the removal of water, but still fresh and fruity," says Christoph Markmann.



"Unlimited shelf life" – drying at room temperature

Devex dries food using vacuum dryers and freeze dryers. Vacuum drying is a process used to manufacture ready to eat products such as instant soups or instant drinks – from classic peach iced tea to trendy matcha lattes. But Devex can also dry a wide variety of fruits and vegetables using vacuum drying to increase their shelf life. "'Highest shelf life' is a slogan we always like to give our customers," says Markmann. "It is always very well received in all areas of the food industry." The drying process works as follows: The product is placed under vacuum in the chamber of the drying system. Due to the reduced air pressure (10–20 mbar), the vapor pressure within the water in the product, becomes greater than the pressure in the chamber. This causes it to evaporate – even below room temperature. As a result, the valuable constituents are not destroyed, as is the case with conventional spray dryers.

Gold standard freeze drying: hardly distinguishable from freshly harvested fruit

Freeze drying is a special type of vacuum drying and is even gentler than pure vacuum drying. Markmann explains the advantage as follows: "The very careful pre-freezing of the product causes tiny ice crystals to form. These ensure that the cell structure and color are completely preserved after drying. As a result, the product is visually almost indistinguishable from its freshly harvested counterparts after drying." In the drying chamber, which is evacuated to around 1 mbar, the water in the raw material changes its state at around minus 20 degrees Celsius through sublimation, the transition of water from ice to

gas. The water vapor is extracted from the chamber. What remains is visually appealing dried material.

“Freeze drying is the gold standard for preserving important properties of a product. Our customers want to preserve the nutritional properties of their fruit, vegetables, or other raw materials at reasonable costs. Because that's what the end consumer appreciates when buying a high-valued product,” says drying expert Markmann. "In addition, fruit juice concentrates from the freeze dryer can be perfectly reconstituted. This is particularly important for beverages so that consumption by the end consumer is as easy as simply adding water.

Exotic applications possible in addition to foodstuffs

Devex drying systems are also used in exotic applications. “We are currently working on using the slightly less-expensive vacuum drying process to dry plant components from which our customer wants to produce a sustainable adhesive that is virtually chemical-free,” reveals Markmann.

About DEVEX

DEVEX Verfahrenstechnik GmbH is a global provider of process engineering solutions with a focus on extraction, evaporation, and drying. The company's areas of expertise are already reflected in its name: Drying – Evaporation – Extraction – DEVEX. DEVEX services and DEVEX systems are used in a wide variety of industries and companies, particularly in the food and pharmaceutical industries. For many years, DEVEX has been supporting its customers with tailor-made solutions for all requirements relating to thermal process engineering.

For further information:
www.devex-gmbh.de

How Metal Detection Is Helping Frozen Food Producers Cut Waste and Boost Productivity

By **Rob Stevens***

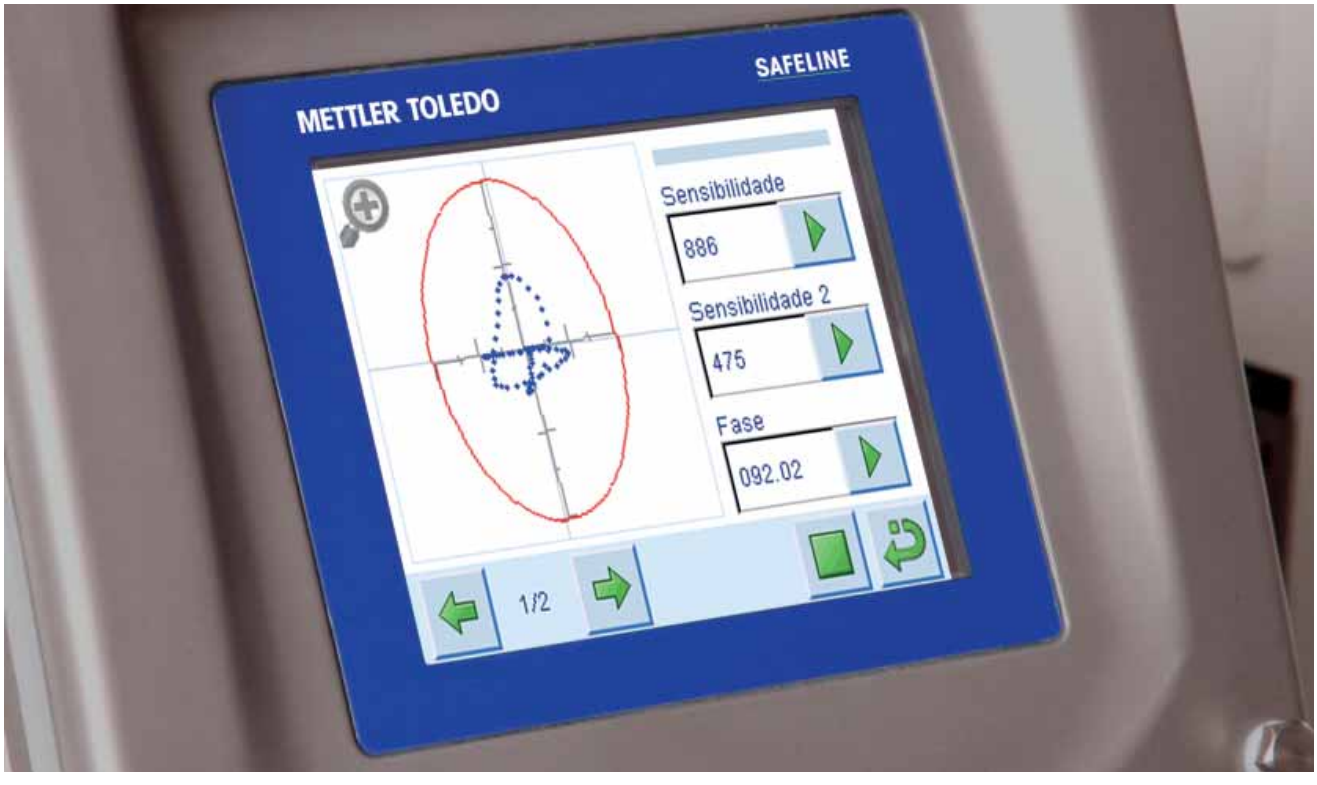
Frozen food production is a high volume, high speed business. Pizzas, ready meals, chips and vegetables all travel quickly from processing to packing, destined for cold storage and supermarket freezers. But along this fast-paced journey, one small variable can have a big impact: temperature. As frozen products move through production lines and can begin to thaw, even slightly, their behaviour in metal detection fields can change. This often results in false rejects or a loss of sensitivity. The consequences are not just technical. They are commercial. Wasted product, rework and unnecessary downtime all hurt the bottom line.

False rejects remain one of the most persistent and expensive problems in frozen food inspection. While the products themselves may be perfectly safe, small temperature shifts alter the products signal when passing through the metal detector which can trigger unnecessary rejections. This does not reflect a fault in the metal detector but a mismatch between changing conditions and the normal inspection parameters.

Advanced metal detection systems with adaptive signal processing are changing this. Systems like the Profile Advantage from Mettler-Toledo use Multi-Simultaneous Frequency technology with multiple inspection modes and an intelligent inspection algorithm (3S) which eliminates the active product signal in real time. This enables the metal detector to maintain accurate detection sensitivity without increasing false reject rates. The result is increased brand protection, less waste, more reliability and improved productivity.

Reducing giveaway in frozen fries

One frozen French fries manufacturer faced exactly this issue. Running at a rate of one hundred packs per minute, they needed to detect all metals down to two millimetres or less while minimising false rejects



to a level of less than 1 in a million. Temperature fluctuations caused by occasional line stoppages were interfering with detection levels and increasing waste.

To tackle the challenge, the manufacturer installed the Mettler-Toledo Profile Advantage metal detection system and trialled the unit over a 4-week period to assess how the technology handled signal variation. One of the Multi-Simultaneous Frequency modes proved most effective, achieving detection levels of 1.4 millimetres for ferrous, 1.8 millimetres for non-ferrous and 2.0 millimetres for stainless steel with zero false rejects.

A key factor for the customer was the system's built in histogram screen, which displays the product signal in real time. This feature helped operators visualise the product signal and track changes and respond quickly if required. The system also includes a thawing product alarm feature that triggers an alarm should signal levels move outside expected parameters, allowing the team to intervene before waste occurs.

Smarter technology for a changing environment

Frozen food production is subject to a wide range of variables.

Moisture levels, packaging formats and environmental conditions all influence how products interact with metal detection equipment. Today's metal detection systems are built to manage these changes.

Automatic moisture monitoring, Multi-Simultaneous Frequency that incorporates high frequency operation and adaptive signal processing help manufacturers maintain high levels of sensitivity across varying conditions. This reduces the risk of over rejection and supports a more stable production process.

In many facilities, metal detection is integrated into a wider product inspection strategy. Combination inspection systems combine metal detection with weight verification, label checks and package integrity inspection. This provides a compact, multi-function solution well suited to frozen food lines with limited space or varied packaging formats.

Accurate reject mechanisms are also critical. Audible and visual signals guide teams to the affected product quickly, reducing the time and disruption caused by contaminant events. These systems make it easier to keep lines moving and focus interventions where they are needed.

Real world impact

Across frozen categories from bakery to vegetables, inspection control is evolving. Metal detection is no longer just about removing risk. It is about creating a more efficient, consistent and profitable operation. Sensitivity remains important, but consistency and adaptability are now just as critical. Systems that adjust to thawing and other environmental changes without compromising performance are key to helping manufacturers stay ahead.

False rejects do more than waste product. They demand more from staff, slow down production and create unnecessary cost. Better signal processing reduces the number of good packs mistakenly rejected, supporting both yield and sustainability.

Frozen lines often run multiple product types. The ability to switch quickly between settings while maintaining high performance is essential. Metal detection solutions like the Profile Advantage offer flexible setup, intuitive controls and detailed reporting tools. This supports traceability, continuous improvement and performance benchmarking across sites.

Conclusion

In an industry where margins are tight and speed is critical, the right inspection technology delivers more than compliance. It supports uptime, quality and smarter decision making. Frozen products will always be subject to temperature changes. But with adaptive metal detection, false rejects do not have to follow. This offers manufacturers a clear way to combat rising costs, boost productivity and protect brand reputation with confidence.

For further information:
www.mt.com/pi-profile-pr

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Fats and Shortenings in Baking and Frying

By **Dr. Ruchi Verma and Dr. Asha Kumari**

Fats and shortenings are essential components used extensively in baking and frying because they significantly influence the texture, flavor, mouthfeel, and structural properties of food products. These ingredients function not only as sources of energy but also as key technological agents that determine product quality. Their behavior during processing depends on their chemical composition and physical properties, such as melting point, plasticity, oxidative stability, and thermal resistance. Understanding these properties allows food technologists to select the right fat for a specific application and to improve product performance in both home and industrial settings.

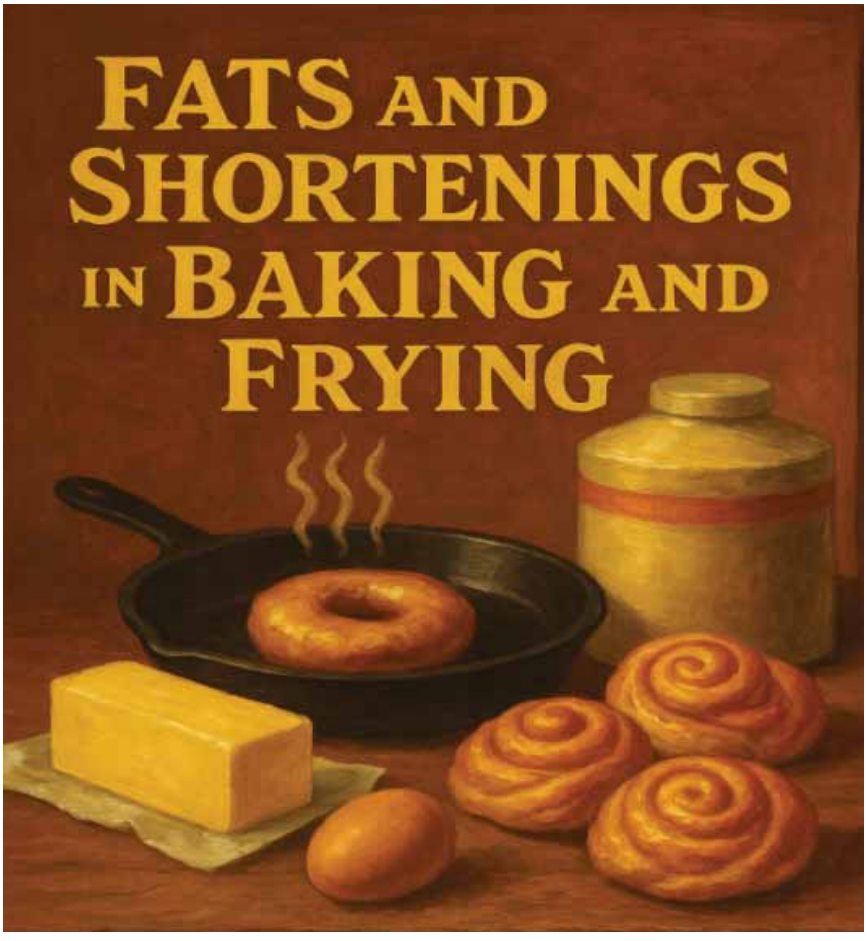

Figure 1. Role of Fats and Shortenings in Baking and Frying

Chemical Nature and Properties of Fats

Fats primarily consist of triacylglycerols, in which a glycerol backbone is esterified with three fatty acids. The nature of these fatty acids whether saturated, monounsaturated, or polyunsaturated directly affects how the fat behaves during heating, mixing, and storage. For instance, fats with a higher saturation level usually have a higher melting point, making them suitable for products requiring firmness. Meanwhile, fats rich in unsaturated fatty acids may offer better mouthfeel but can be more prone to oxidation. Other important properties such as solid fat content, smoke point, and oxidative stability help determine whether a fat is ideal for frying, baking, or creaming applications.

Types of Fats and Shortenings Used in the Food Industry

Various types of fats and shortenings are used in baking and frying, each offering unique functional benefits. Butter is widely appreciated for its characteristic flavor and its ability to aerate batters during the creaming process, although its relatively low melting point limits its use in continuous frying. Margarine, which is made from vegetable oils, is formulated to mimic butter while offering better stability and plasticity. Vegetable oils such as sunflower, soybean, canola, and groundnut oil are commonly used in frying due to their higher smoke point and neutral flavor. Shortenings, whether hydrogenated or interesterified, are specially designed to provide excellent plasticity and shortening power, making them suitable for pastries, cookies, and laminated doughs. Animal fats like lard and tallow remain traditional options valued for their flavor and stability, though their use has declined in some markets.

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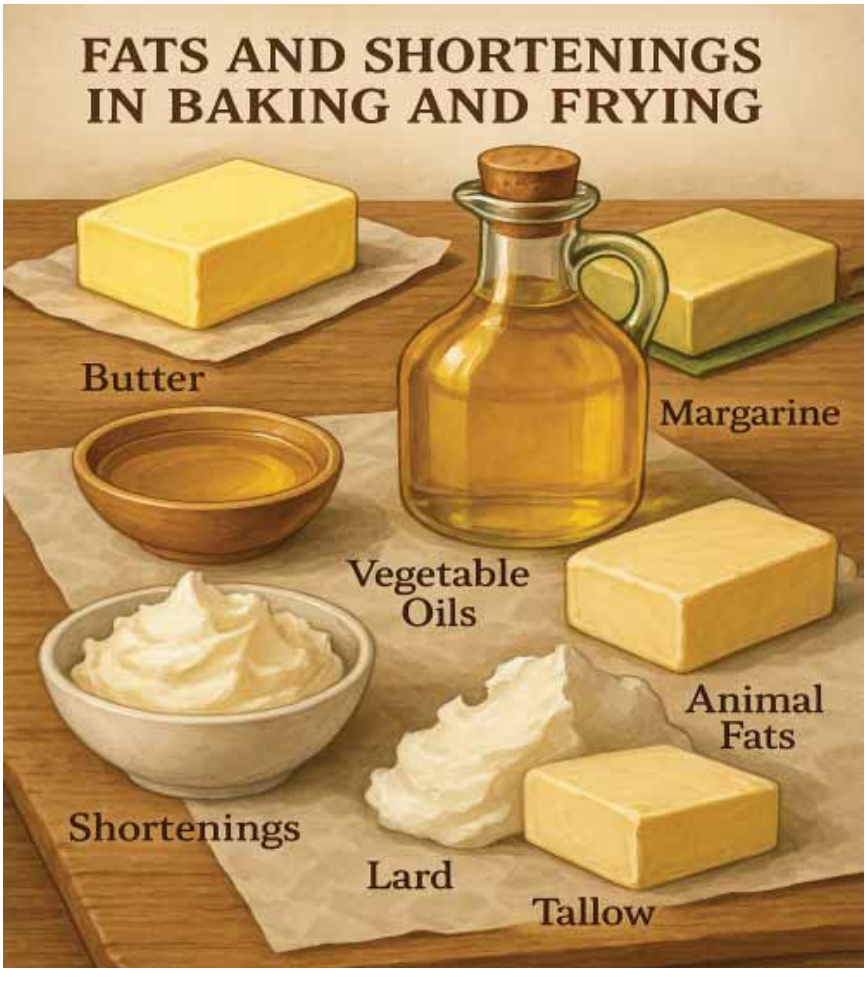
Functional Roles of Fats in Baking

In baking, fats perform several critical functions that determine the final texture and structural quality of the product. One of their primary roles is tenderization, where fats coat flour particles and limit gluten formation, creating a softer, flakier texture. This is especially important in pastries, biscuits, and cookies. Fats also contribute to aeration during the creaming process, where they help trap air bubbles, increasing the volume and lightness of cakes. Another key role is moisture retention, which helps baked goods remain soft and fresh for longer periods. Additionally, the melting behavior of fats influences mouthfeel, flavor release, and the perceived moistness of the product. The type of fat used also affects spread, structure, and appearance, especially in cookies and laminated doughs.

Figure 2. Common Fats & Shortenings in Culinary Applications



Functional Roles of Fats in Frying

During frying, fats act primarily as heat-transfer media, allowing food to cook rapidly and evenly as high temperatures cause moisture evaporation and crust formation. The type of fat used in frying significantly affects oil uptake, surface crispness, and overall product quality. Ideal frying fats must withstand high temperatures without breaking down, meaning they should have a high smoke point and good oxidative stability. As frying progresses, fats can degrade due to oxidation, hydrolysis, and polymerization, resulting in rancid flavors, darkening, foaming, and increased viscosity. These changes compromise both the safety and quality of fried foods. Therefore, regular monitoring and proper management of frying oils are critical in maintaining product standards.

Fat Deterioration and Stability During Frying

Frying exposes fats to heat, moisture, oxygen, and food particulates, which accelerate deterioration.

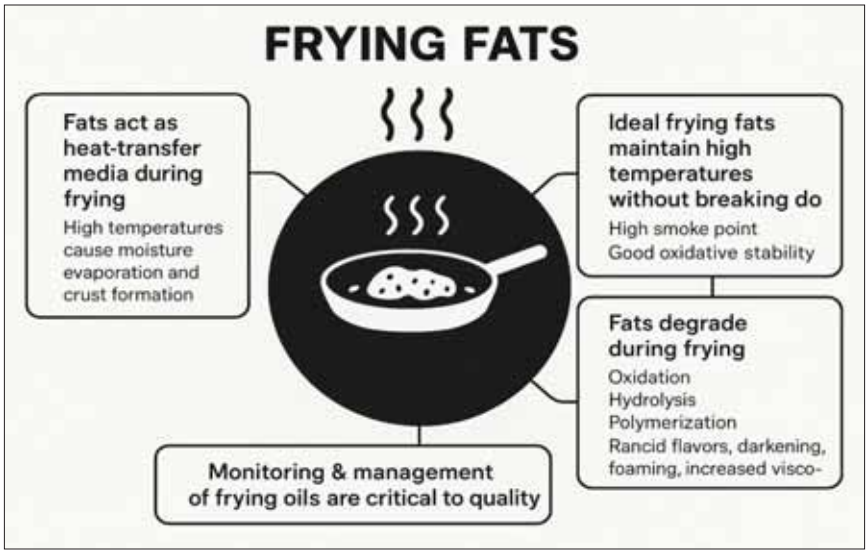


Figure 3. Functions and Stability of Frying Fats

Oxidation produces hydroperoxides, aldehydes, and ketones that lead to rancid flavors and unpleasant odors. Hydrolysis occurs when water from the food reacts with the fat to produce free fatty acids, which reduce the smoke point and contribute to off-flavors. Polymerization results in the formation of sticky, viscous compounds that darken the oil and reduce heat transfer efficiency. The extent of deterioration depends on the type of fat, frying temperature, and length of use. Maintaining good oil quality through controlled temperature, filtration, and timely replacement is essential for consistent frying performance.

Modern Trends: Zero-Trans and Low-Trans Fats

With increasing awareness of the health risks associated with trans fatty acids, the food industry has shifted toward developing healthier alternatives that still deliver desirable functional properties. Modern fat modification techniques, such as interesterification, fractionation, and enzymatic modification, allow processors to produce fats with improved plasticity, melting profiles, and oxidative stability without generating harmful trans fats. High-oleic oils and specialty shortenings are now widely used in commercial baking and frying to ensure stability and performance while meeting nutritional guidelines.

Conclusion

Fats and shortenings are indispensable ingredients in baking and frying due to their ability to influence texture, mouthfeel, structure, and flavor. Their chemical composition and physical characteristics determine how they behave during heating, mixing, and storage. By understanding the functional roles and stability requirements of different fats, food technologists and bakers can make informed choices that optimize product quality, enhance consumer satisfaction, and ensure safe food production. As industry trends move toward healthier and more stable fat systems, the application of modified and zero-trans fats continues to expand, offering improved solutions for both baking and frying.

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The Role of UPS Systems in Reducing Food Waste and Production Losses

By **Arunabh Ghosh***

Why power reliability is the hidden key to quality assurance in food processing

India has one of the fastest growing sectors in the world—the food processing industry, with significant contributions towards export, employment and rural development. Despite its huge potential, the sector still struggles with high levels food production and wastage inefficiencies. The FAO (Food and Agriculture Organization of the United Nations) estimates a loss of around 30-40% of India's food output due to post-harvest and infrastructure challenges – and a main but often underestimated contributor to this loss is uninterrupted power supply.

In a regular food processing unit, refrigeration, pasteurization, drying, packaging and quality control are undoubtedly dependent on stable electricity, a small disruption in power supply can pause the operations, damage the raw materials and even compromise food safety standards.

MODULYS GP

As digital control and robotics become the norm across production lines, ensuring reliable energy supply is vital for maintaining the continuity of the process. Using advanced UPS systems to ensure continuous power supply can be pivotal in reducing waste, maintaining quality along with promoting sustainability across the food ecosystem.

MODULYS XM

The Challenge: Impact of Power Instability

Power disturbances are not just workflow interruptions; they give way to production failures and resource wastage. In sectors like dairy, bakery, beverages, frozen foods, and ready-to-eat meals, timing and temperature precision are critical. Outages lasting seconds can disrupt fermentation cycles, alter chiller temperatures, or interrupt automated filling lines. Restarting these systems often takes hours, causing extended downtime and batch losses.

Voltage fluctuations and frequency irregularities can damage sensitive equipment such as programmable logic controllers (PLCs), chillers, and sterilization systems. Frequent restarts accelerate wear and tear, increase maintenance costs, and reduce plant efficiency.

The Solution: UPS Systems as a Shield Against Power Disruption

Uninterruptible Power Supply (UPS) systems act as the first line of defence against power disruptions. They ensure seamless transitions during outages, bridging the gap until generator backup kicks in, while protecting equipment from voltage and frequency anomalies.

Modern UPS solutions, like those from Socomec, go beyond backup. They deliver clean, regulated power, shielding equipment from spikes, drops, and harmonics that compromise product quality. With modular designs and energy-efficient

architectures, these systems adapt to diverse environments, including cold storage and automated packaging lines.

Advanced UPS systems integrate IoT connectivity and digital monitoring, enabling real-time load analysis, predictive maintenance, and remote diagnostics. This proactive approach minimizes downtime and ensures compliance with stringent food safety standards.

Reducing Waste and Driving Sustainability

A UPS system does far more than prevent interruptions, it plays a critical role in promoting sustainability and responsible production. Every minute of halted production results in wasted raw materials, energy, and water. By maintaining continuity, UPS solutions reduce reprocessing needs and lower carbon emissions associated with wasted production cycles.

Energy optimization is another advantage. Facilities with high energy demands, such as frozen food plants, benefit from improved power factors and reduced electrical losses, translating into significant operational savings.

From a sustainability perspective, reliable energy forms the backbone of a circular, low-waste production ecosystem, aligning with global objectives like Net Zero and SDG 12 (Responsible Consumption and Production). In essence, uninterrupted power becomes the bridge that connects profitability with environmental responsibility.

Smarter Power for Industry 4.0

As food manufacturing embraces Industry 4.0, UPS technology is evolving. IoT-enabled UPS systems

MASTERYS GP4

offer predictive analytics, advanced load management, and remote diagnostics, allowing operators to anticipate issues and make data-driven decisions. Integration with automation and energy management platforms ensures visibility across multiple sites, standardizing energy efficiency and strengthening resilience.

Socomec exemplifies this vision with UPS solutions tailored for energy-sensitive industries. By combining power reliability with digital intelligence, these systems help food processors maintain production continuity, extend equipment life, and uphold quality—even under challenging grid conditions.

Recommended UPS Solutions for Food Processing

- **MODULYS RM GP & GP 2.0 (25–200 kVA):** Modular, hot-swappable design for packaging lines and control systems.
- **MODULYS XM (up to 2 MW):** Ultra-modular architecture for large-scale plants with sustainability goals.
- **MASTERYS GP4 (10–160 kVA):** Compact, double-conversion technology for mid-sized operations.
- **DELPHYS MX Elite+ (60–600 kVA):** Transformer-based design with galvanic isolation for critical sterilization and refrigeration processes.

Complementing hardware, Socomec offers connected services like SoLive UPS for real-time monitoring and SoLink for predictive maintenance, ensuring maximum uptime and compliance.

Conclusion

Power reliability is the cornerstone of modern food processing. It safeguards quality, ensures compliance, and supports sustainability. For manufacturers striving to reduce waste, optimize resources, and meet growing consumer demands, investing in advanced UPS systems is not just a technical choice but a strategic move toward operational excellence and environmental responsibility.

Reliable energy today means reliable food tomorrow. In the journey toward zero waste and high efficiency, uninterrupted power is where it all begins.

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For further information:
www.socomec.co.in/en-in

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Beyond Maintenance: How Outcome-based Partnerships are redefining F&B Manufacturing

By **Sasha Ilyukhin***

The food and beverage manufacturing industry is in a period of transition. Inflationary pressures and global supply chain volatility are forcing manufacturers to reassess how they run their operations. When resources are stretched, outcomes such as improved efficiency and reduced total cost of ownership rise to the top of the agenda.

Traditionally, manufacturers have responded to these changing environments with short-term fixes. This includes upgrading equipment components, scheduling one-off service interventions or implementing localized process improvements. While these actions are essential to maintaining day-to-day operations, they don't tend to support long-term outcomes. And within a marketplace that is complex and rapidly evolving, these one-off, incremental improvements simply aren't enough. Food and beverage manufacturers must adopt a more strategic approach that addresses operational challenges while also delivering measurable outcomes.

From products to outcomes

One way in which this can be achieved is through servitization, a business model that moves the focus from specific products to delivering results through collaborative, outcome-based partnerships.

Servitization builds a partnership where both the manufacturer and service provider are aligned to common goals and share responsibility for performance. Both sides agree to deliver measurable results, whether that's minimizing product loss, optimizing energy use or increasing overall line efficiency.

To put this approach into practice, manufacturers need to create a partnership that aligns on objectives, distributes risk fairly and establishes clear accountability. At Tetra Pak we are embracing servitization by working with customers to do exactly that: build long-term partnerships based on shared objectives. This means supplying food and beverage manufacturers with equipment and services but also committing to deliver performance improvements together over time. Our Advanced Agreements are one way we put this into practice, with structured partnerships that create clear accountability and focus on measurable outcomes.

Embracing the servitization mindset

Servitization requires a mindset shift. For decades, the industry has viewed the sale of products and the delivery of services as transactions and has structured itself accordingly. But these traditional manufacturing methods cannot keep pace with the current rate of change.

Supply chains are fragile, there are new regulatory pressures, and consumers are expecting greater transparency and responsibility from the brands they buy. Manufacturers can no longer afford to treat efficiency, cost control and sustainability as separate priorities. They do not all need to be tackled at once, but they must be addressed as part of one connected strategy so that progress in one area reinforces gains in the others.

Al Rabie Saudi Foods Company, one of Saudi Arabia's largest dairy and juice companies, is testament to the benefits of such integration. By optimizing plant-wide processes under a long-term agreement, the company improved line efficiency by 13%, saved €300,000 annually, cut water usage by 14,000 liters and reduced CO_2 emissions by 19,000 tons. All of these outcomes combined delivered financial returns for the company, while embedding better environmental performance into its core operations.

To put it plainly, servitization transforms a transactional relationship into a two-way partnership where success is based on delivering outcomes. It requires a unified ambition, agreement on measurable targets and collaboration to achieve them.

How does servistization work in practice?

Outcome-based agreements are flexible by design: they focus on the outcomes that matter most to each manufacturer, whether that is improving operational reliability, ensuring cost predictability or advancing sustainability targets. Over time, these priorities may overlap. For instance, cutting waste lowers costs, while also reducing environmental impact - but the starting point depends on the customer's primary needs.

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The shift to servitization requires a whole-plant perspective. Instead of optimizing single machines in isolation, servitization looks at the entire plant lifecycle, from equipment availability to process efficiency, energy use and product loss. By leveraging advanced analytics, remote monitoring and predictive maintenance, manufacturers can move from being reactive to proactive and ultimately, strategic.

The difference this makes is clear in practice. In Mexico, one of the country's largest juice producers, Jumex was struggling with declining equipment efficiency at a time when demand for its products was rising. By entering into an outcome-based agreement with us, Jumex increased overall equipment effectiveness by more than 11% and cut operational costs by 7%. That allowed the business to meet consumer demand profitably, while building a more resilient production system for the future.

The future of F&B manufacturing is outcome-based

Ultimately, servitization represents more than a service offering. It signals a fundamental change in how value is created and shared in the food and beverage industry. By moving beyond maintenance and embracing outcome-based partnerships, manufacturers can unlock cost savings and operational improvements alongside long-term resilience and competitive advantage. In an industry where 9 in 10 supply chain executives report ongoing supply chain challenges, servitization provides the key differentiator of adaptability and resilience, leading to greater efficiency, reduced business risk and a stronger foundation for growth.

For further information: www.tetrapak.com

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Speed to Shelf and Consumer Engagement – The Rise of Digital Corrugated Packaging Printing

Shifts in consumer habits continue to have a considerable impact on FMCG brands and their supply chains. From the continuing rise of ecommerce and personalisation to product diversification in response to a more health-conscious, environmentally aware, and socially responsible demographic, brands are continually adapting, and agility is key.

Digitally-printed packaging not only supports brand storytelling and consumer personalization but also enhances supply chain efficiency through shorter lead times, reduced waste, and improved inventory management.

Michael Strehlow, Account Manager – Corrugated EMEA, Domino Printing Sciences, explores the value-added, digitally enabled corrugated packaging that converters can offer brands – boosting speed to shelf and driving consumer engagement.

Innovative corrugated packaging – more than just a box

One could be forgiven for having a somewhat staid view of corrugated packaging. It's easy to think of it as simply protecting products in transit, but today, full-color printed corrugated packaging is proving to be a powerful asset in terms of efficiency, branding, and sustainability.

Corrugated packaging has evolved significantly beyond its traditional application, enabled by technological advancements in areas such as design software and QR codes, with corrugated packaging printing driving a change in mindset for brand owners.

Indeed, brands are now recognizing corrugated packaging's potential to enhance brand image, improve customer experience, and provide agility and efficiency within supply chain management.

The blank canvas of corrugated packaging is ideal for transforming into stunning, brand-defining designs that provide a unique and

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engaging unboxing experience. Designs can be customized to particular market segments or customers, as well as adapted into a multitude of shapes, sizes, and models, for eye-catching, innovative corrugated packaging solutions. And, of course, for those brands still seeking durable packaging, corrugated packaging offers almost unparalleled benefits over other materials, with high levels of cost-effectiveness and sustainability.

Michael Strehlow, Domino Printing Sciences

Speed to shelf – how digital printing supports responsive packaging

In today's hyper-competitive consumer landscape, speed to shelf is a crucial factor in achieving brand success. As highlighted by McKinsey's "State of the Consumer 2025" report, consumers are demanding more personalized, timely experiences, and brands must be able to adapt swiftly to shifting preferences and trends. For converters, digital corrugated packaging printing is emerging as a key differentiator, empowering brands to respond with unprecedented agility.

Unlike traditional methods, digital printing significantly reduces lead times and eliminates the need for costly setup processes, such as plate making. This means that a run can be composed of many variations or even personalized boxes, without additional printing costs. This enables converters to streamline workflows and move packaging from concept to shelf more rapidly than ever before, in as little as a week. The result is a faster go-to-market strategy, allowing brands to capitalize on time-sensitive campaigns or seasonal opportunities with minimal delay.

Speed to shelf isn't just about urgency – it's also about precision. Digital printing enables small-batch customization, allowing for the creation of shelf-ready packaging, point-of-sale displays, and ecommerce-ready boxes that visually and emotionally appeal to target consumers. This flexibility helps brands test designs, update messaging, and roll out campaign-specific packaging – all while reducing waste and inventory costs.

Furthermore, digital presses offer "just-in-time" production capabilities, ensuring converters can meet tight deadlines without overstocking or disrupting traditional production. Even for conventional corrugated producers, digital capabilities can be integrated to absorb short runs, manage late-stage edits, or fulfil last-minute promotional pushes.

Consumer engagement – packaging as a conversation enabler

Packaging often provides the first physical interaction between brand and consumer, and first impressions are everything. Corrugated packaging, particularly in retail and ecommerce settings, has become a crucial touchpoint for consumer engagement.

For brands seeking to stand out on crowded shelves or create memorable unboxing experiences at home, digital printing provides a dynamic and versatile solution. The combination of corrugated packaging and digital printing enables not only high-resolution, eye-catching designs that elevate the consumer experience but also quick and cost-effective production of packaging variations, empowering brands to tell their unique stories. Limited-edition designs, for example, add a sense of exclusivity and collectability, which can strengthen emotional connections with consumers and inspire brand loyalty.

Moreover, digital technology enables the integration of connected packaging through features like 2D codes. These digitally printed QR codes serve as gateways to an extended brand experience, guiding consumers to interactive and informative digital content. As Merkle's 2025 Connected Experience Research report highlights, QR code engagement has surged – 87% of consumers now interact with them, up from 64% in 2024. Many do so out of curiosity, seeking deeper insights into the product.

Through QR codes powered by GS1 or augmented reality (AR), consumers can access a wide range of content – from promotional games to vital information on provenance, sustainability, and recycling. This interactive bridge between the physical and digital realms enhances brand storytelling,

offers a platform for brands to gather vital consumer feedback, and builds lasting relationships.

Finally, digital presses with variable data printing and late-stage customization capabilities enable converters to help brands provide better distinction of product variants, delivering additional shelf impact and enabling more efficient picking. Messaging can be tailored to specific customer segments for a localized or even personalized experience, boosting relevance and engagement. For converters, embracing digital print to produce innovative corrugated packaging is not just an upgrade; it's a strategic tool enabling the next level of consumer connection in a more sustainable and efficient process.

Conclusion

In-store and at home, packaging is the silent salesperson – the first touchpoint that shapes consumer perception – and in an era of personalization and speed, it's about connecting when it matters most.

Digital corrugated packaging print not only complements traditional analogue solutions but also unlocks new value for converters, giving brands the tools to accelerate shelf presence, stay relevant, react in real time to market dynamics, and facilitate consumer loyalty. In a world where speed and accuracy define success, digital's role in enabling faster, more flexible, and more relevant packaging solutions is a powerful competitive advantage.

By embracing digital corrugated packaging printing as a value-added service, converters can offer their brand partners more than speed – they can deliver measurable savings, reduced waste, and packaging that truly engages.

To bring their interactive packaging ambitions to life, converters should look to a digital press partner with proven expertise in advanced variable data printing – a partner who can help them elevate the consumer experience and stay ahead of the competition in a continuously evolving market.

For further information:
www.domino-printing.com

Premium Packaging is the Silent Proof that the Product is Worth Choosing

By **Kinnari Gala***

Image Source: www.firefly.adobe.com

What comes to your mind when someone says premium packaging? Maybe you picture a luxurious matte box that feels luxurious in your hands, a gentle magnetic click that whispers accuracy, gold foil that shimmers without exerting too much effort, or textures so exquisite that throwing them away seems almost unethical. Packaging that causes you to pause; not because you have to, but because you want to.

Indeed, that picture is accurate. However, premium packaging is not determined by its visual extravagance, finishes, or price. The experience that premium packaging creates, defines it. It is not about the frills, it is about emotion. It is how it makes the consumer feel; respected, understood, valued.

Premium Packaging is emotional engineering.

It is psychology, strategy, and sensory understanding woven together with intention. The human brain forms its first perception within few seconds, and packaging is where that perception begins. Touch, sound, texture, and even the pace at which a box opens; communicates value and sets expectation.

These are carefully designed signals that say:

- This matters. You matter.

Premium packaging creates anticipation, and anticipation is powerful. It transforms opening a box into a moment like a small celebration, a sensory pause in a world that is constantly rushing. These days, those moments become marketing content because they are captured on camera, shared, and appreciated. Unboxing is no longer merely unwrapping but it is storytelling, community, and free marketing powered entirely by emotion.

Consumers do not just purchase products today.

- They buy how those products make them feel.

Think about Forest Essentials, a company with roots in traditional beauty practices and ingredient purity. The same dedication that goes into their formulations is reflected in their packaging. Every detail right from heritage-inspired colour palettes to refined illustrations and gold-finished accents confidently communicates care and reverence. You feel the story before you read it, and you trust the price before you check it. The customer chooses premium pricing voluntarily rather than being forced to.

Another completely different example of Pride of Cows, a premium brand with high quality product compared to its competitors transformed something as routine as dairy into a premium experience. Almost every Indian home has these daily necessities: milk, paneer, curd, and ghee. However, their packaging dispels all preconceived notions about commodity dairy. The best quality is communicated long before the product is tasted thanks to its clean, modern design, luxurious feel, elegant structure, and distinctly elevated aesthetics. The packaging itself declares, this is not a ordinary brand.

Consumers respond. They do not question the price in fact, they embrace the value.

Premium packaging in everyday-use categories is an opportunity

many still ignore, and yet it is where impact is the strongest because expectations are lowest.

There's a lot of room for innovation and developing that premium edge in a category like alcohol where money is not a problem. I was looking at some international brands when I came across this UK-based company called Circus Gin; they're redefining what premium means in the spirits industry. In a category dominated by predictable labels and minimalist craft aesthetics, Circus Gin dares to be theatrical, nostalgic, bold. Their packaging is a show; it is eye-catching, joyous, and memorable. Long after the last drop is poured, it remains memorable and commands attention even on a crowded shelf.

Premium is not always minimal or quiet.

- Sometimes premium is fearless.
- But beyond the beauty and poetry, there is undeniable business logic.

Premium packaging is not indulgence — it is strategy. It improves recall of the brand. It increases perceived worth. Premium pricing is supported by it. Because people go back to what made them feel something, it encourages repeat purchases. Long before logical comparison starts, it fortifies emotional loyalty.

Today's consumers don't just pay for the product.

- They are paying for the consideration that goes into it.
- They are paying for the feeling of being valued.
- They are paying for an enjoyable experience.

And companies that understand this are making more money through improved perception and stronger relationships.

The truth is simple:

- People are willing to pay for premium.
- They always have been.
- The real question is - are brands willing to go that extra mile?

Here is the truth brands must embrace: premium packaging design and manufacturing is not an expense but it is an investment. An investment that consistently delivers returns, both financial and emotional. When a brand truly cares about its customers and chooses to give them more than what they expect, loyalty is no longer a challenge but it becomes a natural outcome.

Image Source: www.firefly.adobe.com

Think about your own choices for a moment. Aren't you loyal to certain brands because of how they make you feel? Because owning them makes you feel proud, confident, seen? Because they represent who you are or who you aspire to be? Whether it is a fragrance you display, a bottle you pour from at a celebration, or even a daily essential you place on your breakfast table; the emotion behind ownership matters. It shapes perception. It elevates identity. It makes you feel special. And yes, it gives you a certain edge.

So whether we talk about high-end categories like perfumes and spirits, or everyday essentials like dairy, skincare, or home care; if brands invest in exceptional quality and thoughtful craftsmanship, premium packaging becomes the quiet assurance that the value inside is real. It builds confidence, reinforces value and turns first-time buyers into repeat customers, because people return to what makes them feel good about themselves.

image Source: www.firefly.adobe.com

About the author:
* Kinnari Gala, Founder of All About Packaging

HRS process systems

HRS: Engineering the Next Era of Dairy Processing

INTERVIEW

*In conversation with **Mr. TK Radhakrishnan, Vice President – Food Systems Business Unit at HRS Process Systems Ltd.,** he delves into the nuances of HRS heat exchangers, how they function in the dairy sector, and the future of dairy processing*

Q1. HOW HAVE YOUR HEAT EXCHANGERS BEEN SPECIFICALLY ADAPTED OR OPTIMIZED FOR DAIRY APPLICATIONS LIKE YOGURT AND CHEESE PRODUCTION, WHERE TEMPERATURE CONTROL IS CRITICAL?

A. In dairy processing, temperature precision determines product quality. Our corrugated tube heat exchangers (CTHEs) are engineered to deliver highly stable thermal performance with fast response times, making them ideal for yogurt, cultured milk and cheese applications. The corrugation pattern enhances turbulence even at low velocities, ensuring uniform heat transfer and minimising the risk of burn-on or thermal stress to sensitive dairy proteins.

For yogurt and fermented products, we optimise exchanger geometry to allow gentle handling and controlled heating profiles, which are essential for maintaining culture viability and consistent coagulation. In cheese processing, our systems deliver precise temperature control during milk standardisation, enzyme addition and curd formation, enabling consistent yields and improved textural stability.

Q2. MAINTAINING CONSISTENT TEXTURE AND FLAVOR IN DAIRY PRODUCTS IS KEY. HOW DO YOUR SYSTEMS HELP PROCESSORS MAINTAIN UNIFORM PRODUCT QUALITY DURING PASTEURIZATION, FERMENTATION, AND COOLING?

A: Dairy processors rely on repeatability, and this is where our thermal systems excel. Our CTHE-based pasteurizers provide accurate temperature hold, minimal thermal gradients and smooth product pathways that preserve fat globule structure and protein integrity. The result is a more stable body, texture and mouthfeel.

During fermentation, our process modules ensure a controlled heating and cooling ramp, supporting predictable culture activity and acidification curves. For final chilling, the corrugated design enhances heat transfer even with viscous or partially fermented products, ensuring rapid and uniform cooling that locks in flavour and prevents syneresis. This integrated approach ensures processors achieve consistent quality across batches and across product categories.

Q3. ENERGY COSTS ARE A MAJOR CONCERN FOR DAIRY PROCESSORS. COULD YOU SHARE HOW YOUR HEAT RECOVERY OR REGENERATIVE SYSTEMS CONTRIBUTE TO LOWERING ENERGY CONSUMPTION AND OPERATIONAL COSTS?

A: Energy optimisation is integral to HRS design philosophy. Our regenerative systems use counter-current corrugated tube exchangers that achieve very high thermal efficiency, enabling processors to save

energy during pasteurisation and cooling cycles. In a typical dairy pasteurizer regeneration efficiencies can reach 93% or more, which directly translates into substantial energy savings.

This recovered energy reduces boiler load, cuts refrigeration requirements and significantly decreases steam and electrical consumption. For dairy plants running multiple skids—milk heating, yogurt incubation, whey concentration—we integrate these modules to maximise heat reuse across the line. Many of our clients have seen measurable reductions in utility consumption and operational costs, directly strengthening their bottom line.

Q4. HYGIENE IS PARAMOUNT IN DAIRY. WHAT DESIGN INNOVATIONS IN HRS EQUIPMENT ENSURE EFFECTIVE CLEANING, MINIMAL CONTAMINATION RISK, AND REDUCED DOWNTIME BETWEEN PRODUCTION BATCHES?

A: Our systems design adherence to EHEDG design principles and 3A sanitary standards, incorporating polished internal surfaces, minimal dead zones and hygienic welds. The natural turbulence created by corrugated tubes reduces fouling, making cleaning easier and faster.

For high-viscosity dairy products such as yogurt, processed cheese or paneer slurries, we use our UNICUS® scraped surface heat exchanger. Its unique reciprocating scrapers prevent product build-up while maintaining gentle handling. This not only improves heat transfer but also reduces the frequency and duration of CIP cycles.

Our CIP-ready designs, automated valve manifolds and real-time monitoring of flow, temperature and pressure ensure consistent cleaning, reduced product carryover risks and lower downtime between batches.

Q 5. HOW ARE HRS SOLUTIONS INTEGRATING WITH MODERN AUTOMATION AND DIGITAL MONITORING SYSTEMS TO ENSURE PROCESS PRECISION AND TRACEABILITY IN DAIRY PROCESSING LINES?

A: Automation has become a necessity for dairy processors, not a luxury. Our systems come equipped with SCADA-enabled controls, PLC automation, recipe management and batch tracking capabilities. This ensures that pasteurisation temperature, fermentation time, cooling curves and CIP cycles are monitored and logged in real time.

We also support integration with DCS, IOT and other related systems, enabling processors to achieve full traceability from raw milk to finished yogurt or cheese. Predictive maintenance sensors on critical components help avoid unexpected downtime, ensuring more stable production and leaner operations.

Q 6. DAIRY PROCESSORS RANGE FROM SMALL ARTISANAL PRODUCERS TO LARGE INDUSTRIAL PLANTS. HOW DOES HRS TAILOR ITS TECHNOLOGY FOR DIFFERENT PRODUCTION SCALES, ESPECIALLY FOR PRODUCTS LIKE GREEK YOGURT OR PROCESSED CHEESE?

A: Flexibility is one of our strongest advantages. For small and medium producers, we offer modular, skid-mounted units that are easy to install, operate and scale. These are ideal for artisanal yogurt, regional specialty dairy products or niche cheese varieties.

For large industrial plants, we design fully integrated processing lines with high-capacity corrugated tube modules, UNICUS® scraped surface systems and energy-efficient heat recovery networks. Whether the requirement is yogurt, high-protein formulations, flavored dairy drinks or processed cheese, we tailor exchanger geometry, scraper speed, automation level and CIP configuration to match production volumes, rheology and process goals.

Q 7. WHAT MAJOR TRENDS DO YOU FORESEE SHAPING THE FUTURE OF DAIRY PROCESSING, SUCH AS PLANT-BASED ALTERNATIVES, ENERGY-EFFICIENT SYSTEMS, OR CIRCULAR ECONOMY PRINCIPLES—AND HOW IS HRS PREPARING TO MEET THOSE DEMANDS?

A: The dairy industry is moving in multiple strategic directions. First, the demand for value-added dairy, yogurt, probiotic drinks, whey-based beverages and cheese variants—is increasing rapidly. Second, energy-efficient and sustainable processing is becoming central to capital investment decisions. Third, plant-based and hybrid dairy alternatives are expanding the category, requiring equipment that can handle diverse viscosities and ingredient systems.

HRS is responding to these trends with next-generation corrugated tube technology, enhanced regenerative modules, low-waste CIP designs and automation-ready dairy skids. We are also developing solutions suitable for plant-based formulations, where thermal sensitivity and texture preservation are key. Our goal is to provide processors with future-ready systems that maximise efficiency, support sustainability targets and enable innovation across both traditional and emerging dairy categories.

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Zonu Reddy, Co- Founder of Spago Foods, Magnolia Bakery, India

Magnolia Bakery: Blending Heritage with Contemporary Adaptability

*In conversation with **Zonu Reddy, Co- Founder of Spago Foods, Magnolia Bakery, India,** she delves into the journey of bringing Magnolia Bakery to India, their operational challenges, unique identity, plans for the future, and more.*

INTERVIEW

Q1. MAGNOLIA BAKERY HAS A RENOWNED GLOBAL IDENTITY. WHAT NOTIONS DID YOU HAVE IN MIND WHILE ESTABLISHING IT IN THE INDIAN TERRITORY?

A: When we brought Magnolia Bakery to India, our focus was to maintain the brand's original standards while adapting it thoughtfully to the local market. Magnolia is known globally for its fresh, handcrafted products, and we wanted to offer that same experience here - clear, consistent, and true to the brand.

We also understood that Indian customers value authenticity and quality, so keeping our processes transparent and baking fresh daily were key priorities. Our goal was to introduce an international bakery experience that feels straightforward, reliable, and aligned with what Magnolia Bakery represents worldwide, while still fitting naturally into the Indian food landscape.

Q2. WHAT INSPIRED YOU TO CHOOSE GURUGRAM AS MAGNOLIA'S FIRST NORTH INDIA LOCATION AND HOW ARE YOU POSITIONING MAGNOLIA BAKERY WITHIN INDIA'S RAPIDLY GROWING PREMIUM DESSERT AND CAFÉ MARKET?

A: Gurugram offers the right mix of urban energy, strong purchasing power, and an audience that seeks global quality and distinctive food experiences. The city has a young and discerning consumer base that responds well to dessert offerings. We saw an opportunity to introduce a dedicated dessert space that focuses entirely on freshly prepared American style sweets.

Our positioning in India centers on being a premium dessert first brand- where freshness, craftsmanship, and the joy of indulgence are at the heart of the experience. With growing interest in gourmet desserts and social dining moments, we believe Magnolia Bakery is well placed to serve this evolving market.

Q3. WHAT TRENDS DO YOU FORESEE IN THE INDIAN CONSUMER- BASE? ARE YOU OPEN TO MENU ADAPTATIONS OR DO YOU PREFER STICKING TO THE BAKERY'S LONG STANDING HERITAGE?

A: Indian consumers are increasingly open to global flavors and are seeking desserts that offer both quality and novelty. We are seeing a strong shift towards experiential dining - where desserts are treated as a standalone outing rather than an after thought. While we remain committed to Magnolia Bakery's heritage, we understand the importance of adapting to local tastes. This is why we created an eggless dessert range that has been very well received. We also explore seasonal fruit and ingredients that allow us to offer products suited to the Indian palate without compromising the brand's identity.

Q4. MAGNOLIA IS KNOWN FOR BAKING EVERYTHING FRESH IN-HOUSE DAILY. WHAT OPERATIONAL CHALLENGES DOES THIS MODEL POSE IN INDIA, ESPECIALLY AS YOU SCALE?

A: The commitment to fresh daily baking requires a supply chain that is reliable and capable of delivering consistent quality across cities. Sourcing ingredients that match global standards was one of our earliest challenges and required months of development and testing. Training local teams to follow exact processes and maintain the same level of precision as the original bakery was also a major focus. As we expand, each new location brings its own operational needs such as kitchen layout, storage, staff training, and coordination with suppliers. Despite these challenges we consider daily fresh baking essential because it defines the Magnolia Bakery experience.

Q5. WHICH CORE INGREDIENTS ARE IMPORTED, AND HOW HAVE YOU BUILT A RELIABLE LOCAL SUPPLY CHAIN TO ENSURE GLOBAL PRODUCT CONSISTENCY?

A: A few essential ingredients that are central to the taste and texture of Magnolia Bakery desserts continue to be imported to maintain global consistency. For all other components, we worked closely with suppliers to identify high quality local options. This process included repeated trials and reviews with the international culinary team to ensure every ingredient met our standards. We built relationships with trusted vendors who understand the precision required for a brand like Magnolia. This combined approach allows us to maintain authenticity while ensuring efficient operations across stores in India.

Q6. BANANA PUDDING IS MAGNOLIA'S GLOBAL ICON. HOW IS IT PERFORMING IN INDIA, AND DO YOU SEE IT BECOMING THE STANDOUT PRODUCT HERE AS WELL?

A: The Banana Pudding has been very well received in India and is already one of our most popular desserts. Many customers come in specifically for it, which shows how strongly it resonates across different cities and age groups.

We also offer a wide menu - including eggless options, so there's something for everyone. But based on its current performance, we do see the Banana Pudding continuing to be a standout product for us in India.

Q7. WHAT ARE YOUR EXPANSION PLANS FOR THE FUTURE?

A: We plan to strengthen our presence in cities where we already operate while evaluating opportunities for additional stores in new markets. Cities such as Chennai and Pune are on our long term road-map based on customer interest and market potential. Every new store involves careful planning around training, supply chain management and quality control to ensure consistency. Our priority is to expand at a pace that allows us to maintain the standards that define Magnolia Bakery. We will continue to balance global recipes with thoughtful local adaptations that keep the brand relevant and loved across India.

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2.		19-21 December 2025	Yashobhoomi, Dwarka Delhi
3.	INDUS:FOOD MANUFACTURING	6-8 January 2026	Yahobhoomi, IICE, New Delhi
4.	INDUS:FOOD	8-10 January 2026	India Exposition Mart, Greater Noida
5.	FOOD & DRINK PROCESSING EXPO	20-22 January 2026	Tripura Vasini - Palace Ground Bengaluru
6.	BAKERS	20-22 January 2026	Tripura Vasini - Palace Ground Bengaluru
7.	INDIA DAIRY PROCESSING EXPO 2023	20-22 January 2026	Tripura Vasini - Palace Ground Bengaluru
8.	INDIA FOOD PACK EXPO	20-22 January 2026	Tripura Vasini - Palace Ground Bengaluru
9.	AAHAR	4-8 March 2026	Bharat Mandapam, New Delhi
10.	ANUGA FOOD TEC INDIA	22-24 April 2026	Bharat Mandapam, New Delhi
11.	Fi	26-28 August 2026	Bombay Exhibition Centre
12.	anuga	29 Sept 01 Oct 2026	Bombay Exhibition Centre
13.	ANUGA FOOD TEC INDIA	29 Sept 01 Oct 2026	Bombay Exhibition Centre

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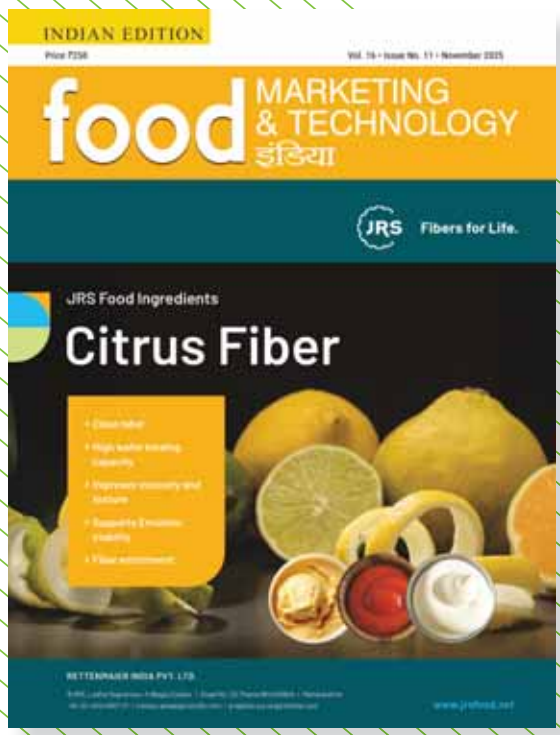

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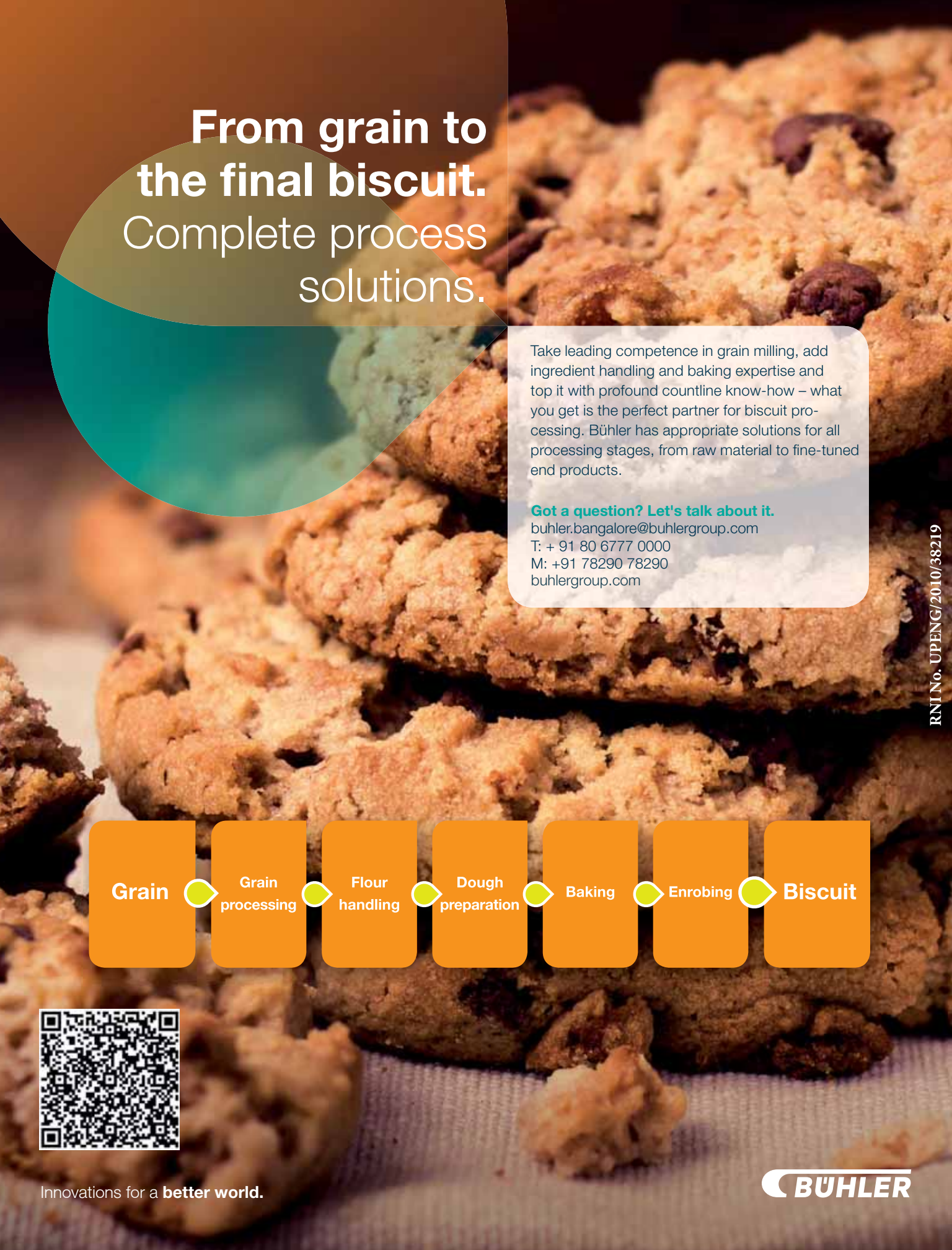
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