

POTATO PROCESSING

I N T E R N A T I O N A L

Supporting the potato industry worldwide

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A Look at interpack's
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Taking the Pulse of the Industry

Tudor Vintiloiu - Editor in chief
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Industry trade shows - such as the recently wrapped up interpack - offer a multitude of benefits and provide an accurate snapshot of the current state of the industry, competition, and emerging trends. Networking opportunities facilitate the exchange of valuable insights, new ideas, and best practices, ultimately enhancing one's understanding of the industry landscape. This firsthand experience enables professionals to assess the competition, identify market trends, and stay ahead of the curve when it comes to new developments or emerging solutions.

Considering current market developments, the enormous challenges but also the even bigger opportunities, the industry needs as many 'check points' as possible to stay on track. And this interpack definitely proved to be an important pillar of the processing industry. The need to automate, the will to act sustainably and changed consumption habits are all expressions of transformation that were on everyone's mind.

This firsthand experience enables professionals to assess the competition, identify market trends, and stay ahead of the curve when it comes to new developments or emerging solutions.

The trade show's strategic orientation towards four Hot Topics: Circular Economy, Resource Management, Digital Technologies and Product Safety found concrete expression in numerous innovations that you can read about in our dedicated section. Exhibitors presented high-end technologies and holistic concepts that consider efficiency and sustainability along their entire production line. Many talks at interpack revolved around sustainability - climate protection and circular economy, environmentally friendly packaging solutions, reusable

packaging and recycling. Other topics focused specifically on the processing and packaging industry in different countries and regions. For example, the European Green Deal was a hot topic discussed by associations, politicians and companies. By acting on the lessons learned at this most recent industry gathering, visitors and exhibitors alike will be able to make informed decisions, strengthen relationships, and remain at the forefront of their field. ●

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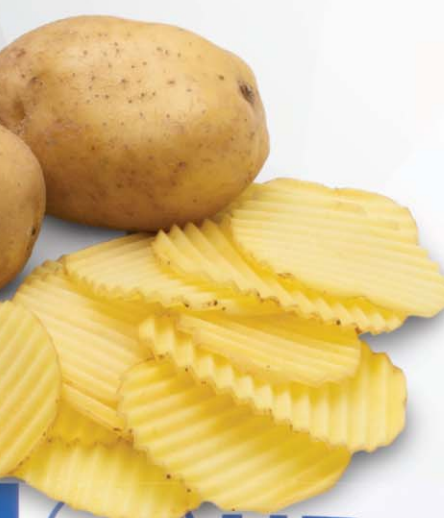
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Idaho Steel Supports Local College to Train Working Professionals

To assist regional initiatives for workforce development and education, Idaho Steel recently announced its relationship with the College of Eastern Idaho. The cooperation intends to highlight the potential in skilled trades and attract the upcoming generation of talented workers to the sector. There is a rising need for qualified professionals from a variety of

backgrounds as the food processing business develops. However, there is also a lack of people with the qualifications and experience needed to fill these positions. By exposing students to the knowledge and experiences required for success in the trades, the partnership between Idaho Steel and the College of Eastern Idaho seeks to address this problem. Heidi Oyola, Idaho Steel's Human Resource Director, said:



"The collaboration between Idaho Steel and the College of Eastern Idaho, as well as many others in the sector, demonstrates the value of investing in education and workforce development. With this collaboration, they hope to inspire other companies to do the same, resulting in a stronger workforce for years to come."

McCain Foods and NatWest Minimize the Producer's Financial Hurdles

McCain Foods and NatWest have developed an initiative to minimize financial hurdles for potato producers transitioning to sustainable agriculture techniques. NatWest will provide further financial help to McCain's potato growers through its asset financing business Lombard, in what the companies claim is a first-of-its-kind venture in the UK. McCain has also promised to pay a portion of the interest owed on investments that support regenerative farming practices. The company explained that farmers typically had to make upfront expenditures for new procedures and equipment, which could be a barrier to the adoption of more sustainable agricultural methods. "We know that switching to regenerative agriculture can come with financial implications, and this new partnership will be a part of the effort to alleviate those barriers," James Young, VP of agriculture at McCain GB&I, said.



Ashworth's CEO Set to Retire With Paul Nunes Appointed Successor

Vincent Moretti will step down as president and CEO on June 21, 2023, according to a recent statement from the board of directors of Ashworth International. Paul Nunes will be chosen by the board to succeed Moretti.

"I want to extend my sincere thanks to Vincent for his dedication and contributions to Ashworth over the last 35 years with the last 16 years as President and Chief Executive Officer. We are pleased to announce the appointment of Paul Nunes as President and Chief Executive Office upon Vincent's retirement. Paul has been with Ashworth for over 28 years which will provide leadership continuity. He offers extensive knowledge of Ashworth, its products, and the markets we serve. Paul's leadership and exceptional rapport with employees at all levels of the business will help maximize Ashworth's potential and accelerate the company's future profitable growth," David Marotta, Ashworth's presiding Chairman of the Board, mentioned. Since 1994, Nunes has been a part of Ashworth. He has held several positions over his tenure at the organization, including Controller and Vice President of Finance.



Novel Remote Platform for Potato Storage Management



Carrot Ventures is excited to introduce Cellar Insights. It is the second AgTech business to emerge through Carrot's company formation platform. Cellar Insights is a Canadian AgTech firm that uses sophisticated sensors and cloud-based algorithms to remotely monitor the health of potatoes in long-term storage. The system incorporates predictive algorithms and provides management with insights to maximize returns.

Millions of potatoes are stored in enormous climate-controlled buildings for up to 11 months. Farmers face an increased risk of loss due to shrinkage, quality reductions, disease, sprouting, or rotting during such long storage durations. "We're extremely pleased to be launching Cellar Insights. Reducing food loss and optimizing the quality of crops post-harvest is an issue of worldwide importance. [...] Effective storage management practices are vital, and we believe Cellar Insights offers a compelling solution," Martin Vetter, a venture partner with Carrot, mentioned.



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Investment Into the Development of Bluebird's Auckland Factory

With a USD26m or more equipment purchase currently under construction, Bluebird claims that its parent firm PepsiCo has committed over USD66m in the expansion of its Auckland factory. The maker of potato chips in Wiri, Auckland, says that since the Covid-19 pandemic began in early 2020, munching and consequently its sales have skyrocketed.

According to Michelle Cassetari, general manager of Bluebird, the company has spent over USD40m on facility and factory expansion over the previous three years and is continuing to make investments for the construction of an automated warehouse storage facility close to its production. Its automated storage and retrieval warehouse, which has a capacity of 13,500 chip pallets, cost USD26.5m to build.



Bluebird has plans to further streamline its operations, invest in regenerative agriculture, enhance its supply chain, and look into methods to make its snacks healthier. The company, which is now the top manufacturer of snack foods in New Zealand, was acquired by the multinational snack food juggernaut PepsiCo in 2007.

Heat and Control Opens New Mexico Facility

Heat and Control has expanded its operations in Mexico. The Jalisco plant, located between Guadalajara and Lake Chapala, is the largest of the Heat and Control properties and serves as the headquarters for Mexico and Latin American operations. The "Centro Técnico Andy Caridis" offers inspection, packaging, and access to six process production lines, including Masa Maker, taco/tostada, and other food equipment. The new location will greatly improve the company's ability to service both new and existing customers. "This new facility will benefit Heat and Control globally, provide additional support to our customers, and further reinforce our commitment to serving the industry," Tony Caridis, President of Heat and Control, mentioned.



New Smart Cooling Manager for Potato Cold Storages



The brand-new Smart Cooling Manager from Mooij Agro for potato cold storage interacts with cooling cells and units and regulates each unit's temperature autonomously. "The system knows the exact temperature per cell and the best storage temperature for each product. The Smart Cooling Manager

continuously coordinates this and regulates the ideal temperature and corresponding cooling capacity," a recent company press release reveals. The client is no longer required to run the cooling unit's screen because the software element has been incorporated into the Cromptimiz-r storage system. "Mechanical cooling is becoming increasingly important for potato growers and store managers, due to the disappearance of sprout inhibitors (CIPC)," according to a recent company press release.

Royal Avebe Focuses on Potato Starch and Protein Products

Royal Avebe intends to enhance its market share in plant-based markets by extending its product line, developing mixes of potato protein and potato starch, and making the Dallmin, Germany, production facility appropriate for human meals. This involves investigating how potato starch and protein constituents may be used as substitutes for animal, synthetic, and petrochemical goods. Production lines and capacity will be adjusted in response to increased demand for plant-based meat and dairy alternatives, as well as plant-based construction materials. Sustainability and innovation are critical motivators. The cooperative is thus entirely dedicated to lowering its carbon impact visibly.



"With the starch potato as the base, we want to create even more distinctive value for our members, employees, customers, and society. And thus accelerate the transition to a more plant-based world. We are also opening the door for other plant-based proteins, such as field beans and peas," Royal Avebe Chairman of the Board, David Fousert, said.

Grade 1 White Packing Potatoes EXW England Price Up Two Digits

In early May 2023, the Mintec Benchmark Price for Grade 1 White Packing Potatoes EXW England reached GBP330/mt, up 22% month on month (m-o-m). Prices have recently risen due to concerns that planting delays caused by excessive rain could delay the arrival of the early crop, putting extra pressure on limited free-buy supplies. The price increase for white packing

potatoes has not affected Maris Piper prices as much; on May 9, 2023, the Mintec Benchmark Prices for Grade 1 Packing Maris Piper EXW England were estimated at GBP300/mt, which is GBP30/mt less than the price for packing white potatoes. "Traditionally, packing Maris Piper would be priced at a premium over white potatoes. However, according to market sources, supermarkets



expanded the proportion of Maris Piper bought under contract this season, reducing demand for free-buy supplies and weighing on prices. As a result, growers have reportedly been selling Maris Piper as packing whites, as the traditional premium associated with the variety has not materialized this season," the Mintec experts explained.

Agrico Announced a EUR35.50 /100 kg of Potato Seeds Crop



The potato cooperative Agrico recently informed its members of an average price indication of EUR35.50 per 100 kg for all provided kilograms of potato seeds with a diameter of 28 mm or greater beginning with the harvest in 2022. The cost is an average of all supplied types, sizes, and classes. To reach 42,900 kilos in 2022, the total output per hectare increased by 4,400 kg in comparison to 2021.

Additionally, the sizes were better than in 2021, so

55,000 more tons of seed potatoes were available. In 2022, Agrico invested to make sure there will be enough seed potatoes available to meet the demand for early export. As a result, the potato cooperative was able to export significantly more goods to this market. "The market has changed significantly both nationally and internationally during the past season. We are happy that Agrico was able to respond well to this, with a good result because of that," General Director Jan van Hoogen said, adding that he is satisfied with the substantially higher level of the grower's price in comparison to last year. Agrico will announce the final grower's prices in July.

GEA's Circular Economy Focus on Material Use and Plant Operations

GEA is meeting the current market challenge by producing increasingly resource-conserving and energy-efficient products and processes for a wide range of industries. With new circular processes, the company improves its sustainability while also assisting customers in achieving their own sustainability goals.

The introduction of the "Circular Economy" procedure serves as the foundation for GEA's answer for the material level. Adopting a circular economy for all machine service parts and packaging materials by 2026, this approach helps achieve the strategic goal. The implementation of an R strategy, which operationalizes the five R's of Reduce, Reuse, Repair, Remanufacture, and Recycle, is at the core of the process.

GEA is concentrating on the circular economy as a future model for running machinery and equipment in a circular, and thus more sustainable, way at every stage of its lifecycle, in addition to applying a circular strategy based on the five R's to replacement parts and packaging materials. This methodology puts a strong emphasis on "Design to Sustainability" (D2S), intending to optimize lifespan and sustainable productivity optimization.



The Demand for Mashed Potatoes is Expected to Expand

According to preliminary data, in 2022, the market for mashed potatoes was projected to be worth USD2,46bn. The entire demand for mashed potatoes is expected to expand due to the expansion of the food industry between 2022 and 2032, growing at a CAGR of 4.7%, reaching a value of over USD3,9bn.

The European and American markets account for the majority of the demand for mashed potatoes, and businesses are responding to this growing customer demand by introducing new and varied mashed potato products.

"Factors driving the demand of mashed potatoes market is from both demand as well as from supply side," a recent Future Market Insights report reveals. In addition to this, mashed potatoes are also getting popularity because of their demand from health-conscious customers. As companies are offering healthy mashed potatoes which have low sodium, free from fats, the report summed up.



A New Project to Improve Food Safety in Potato Chips Manufacture

Abertay University and Perthshire-based Taylors Snacks have launched a new project to improve food safety in potato chip manufacture. The research's findings, which center on reducing acrylamide, will help the entire sector as it strives to fulfill the most recent guidelines that the European Commission (EC) will set later this year.

An online monitoring system to measure and control levels of acrylamide in chip production in real-time is being researched and developed by Abertay University, one of the top centers for acrylamide research in the UK. The research will also include the development of inline monitoring technology. Professor Fiore's research and collaborative work to date have



included looking at all variables from plant varieties to the radio frequency of ovens, introducing new technology or naturally occurring antioxidants, and developing recipes.

Flying Sensors From Potato Starch and Wood Waste

Empa researchers at the Sustainability Robotics laboratory in Dübendorf are developing low-cost, sustainable sensors and flying devices, known as bio-gliders, which can collect environmental data in an energy-efficient, close-meshed, and autonomous way even in inaccessible regions. Their ingredients include potatoes, wood refuse, and dyer's lichen. The innovative devices are inspired by biology, as they are modeled on the flying seeds of the Java cucumber, yet they are also biodegradable. Once a drone has released the smart sensor seeds, they report data on, say, soil moisture and acidity until they eventually decay and become one with the forest floor. The biosensor's transport vehicle is a glider made of regular potato starch, which is similar to edible paper. This means that the glider may be easily printed and pressed into the shape of a Java cucumber seed. The glider, with the sensor, weighs only 1.5 grams and has a wingspan of 14 cm.



Improving Rubisco, the Enzyme that Converts CO₂ Into Energy

A study led by academics from the University of Liverpool has identified a novel method for improving crop growth. With global CO₂ levels rising and the population expected to reach over 10bn by 2050, Professor Luning Liu's team employed synthetic biology and plant engineering approaches to improve photosynthesis, developing a template that may be applied on a large scale. The newly released report describes how the researchers improved Rubisco, a critical enzyme in photosynthesis that turns CO₂ into energy. A team of researchers led by Tahnee Manning dug deep into the first transplastomic modification of photosynthesis in a crop by replacing the native Rubisco in potato with the faster, but lower CO₂-affinity and poorer CO₂/O₂ specificity Rubisco from the bacterium *Rhodospirillum rubrum*. "Here, we develop the first photosynthetically modified plastome transformed food crop by substituting the native CO₂-fixing enzyme, Rubisco, in potato with a faster primitive variant from the bacterium *Rhodospirillum rubrum*. Our data support observations that the sink strength in the potato will allow for up to approximately 30% improvements over current tuber yields via enhancing photosynthate production (source strength)," the experts say.



Syntegon Launches Innovative SVX VFFS Series



With its brand-new SVX series, Syntegon launches four machines for the most common vertical form, fill and seal applications in different food industries. "The new VFFS machine series combines high pack style flexibility with intuitive functionalities, giving frozen food, bakery, confectionery, and snacks producers a leg up on competition," says Martin Boutkan, product manager at Syntegon. The SVX Agile forms the basis for all single tube applications. The machine covers all basic tubular bag styles and can be upgraded with modules for corner sealed bags, 3-sided seal bags, doy-style, and doy zip bags. In contrast, the SVX Duplex features two film lanes on the same 1,220 mm wide frame, leading to higher output rates for basic bag styles such as pillow, gusseted and block bottom bags.



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Potato Cutting: Boosting Precision, Efficiency, and Quality

The potato processing industry relies heavily on efficient and precise cutting technology to produce high-quality products with minimal waste. This is especially true for the production of potato chips, which require consistent thickness and shape for optimal frying and packaging.

By Tudor Vintiloiu

With a primary focus on chip production, cutting technology has undergone significant improvements to enhance precision, reduce food waste, improve energy efficiency, increase speed and productivity, while ensuring maintenance and hygiene standards are met. **Potato Processing International** reached out to leading cutting experts **Urschel** and **FAM STUMABO** to better understand the challenges and the requirements of building modern cutting equipment for the potato industry. Obviously, cutting precision plays a crucial role in determining the quality and consistency of potato





chips. Traditional cutting methods often resulted in variations in thickness, leading to inconsistent frying times and an uneven texture. However, modern cutting equipment incorporates advanced technologies such as laser sensors, computer vision, and automated control systems to achieve unparalleled precision. Laser sensors are sometimes utilized to measure the size, shape, and moisture content of potatoes before the cutting process. This data can then be analyzed by the control system, which adjusts the cutting parameters in real-time to ensure precise and uniform chip thickness. By minimizing variations, cutting precision enhances product quality and reduces processing waste.

SPEED AND PRODUCTIVITY

Enhancing production speed and productivity is another key objective for potato processing companies. Cutting machinery has been designed to handle large volumes of potatoes efficiently, ensuring high throughput while maintaining cutting precision. Multi-lane cutting systems, featuring parallel cutting mechanisms, enable simultaneous processing of multiple potatoes. This approach significantly increases productivity, reducing processing time and meeting the demands of the fast-paced industry. Furthermore, automatic feeding systems and conveyors facilitate a continuous flow of potatoes,

“Small niche products can evolve into big sellers. A processor knows that developing a specific shape gives them an advantage by helping them stand out from the pack.”

Urschel



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“The benefits of having the right potato-cutting equipment, tailored to a company’s needs, are undeniable. The waste reduction can add up to 5 to 15%.”

FAM STUMABO

minimizing downtime and maximizing output. When talking about potato slicing, **Urschel** observed their customers are transitioning to the newer technology of the MicroAdjustable® CC SL-14 Heads. “The feedback we are getting is very positive. Faster everything. Sanitation. Adjustments. Blade and head changeovers. Less operator engagement needed. Less labor costs. Increased yield and increased customer satisfaction,” says Mike Jacko, Vice President of Applications & Product Development.

The DiversaCut® Series remains the company’s mainstay making crinkle and deep crinkle fries, skillet dices, halved/quartered baby potatoes, and flat fries, while the Comitrol® Processor Series is used for bits and piece used in tator tots, hash brown patties, and big in dehydrated flakes. The E TranSlicer® Cutter is common also for sliced products, even wedge cuts cut into triangular pieces.

“We periodically have customers ask for something new, something unique. We welcome it. Sometimes the request is for a similar product to what’s out there already. It could be patented already or exclusive for use by a particular customer or industry. [...] Some new cuts are adaptable to current machines and could be relatively easy and inexpensive to make, while others may be very complicated and costly especially with the unknowns,” Jacko explains.

Small niche products can evolve into big sellers. A processor knows that developing a specific shape gives them an advantage by helping them stand out from the pack.

“What we are seeing is a blurring of the lines between what used to be



clearly potato slices for crisps/chips and clearly potato fries. We are working under exclusivity agreements to pioneer some great hybrid potato consumer products,” Urschel’s specialist said.

WASTE REDUCTION

Reducing food waste is a pressing concern in the food processing industry, and cutting technology has made significant contributions in this regard. Advanced cutting machinery employs intelligent algorithms and optimization techniques to maximize the yield from each potato, minimizing waste. Worldwide, a third of all produced food is wasted. Food loss occurs in every link of the chain, from production to the consumer. It represents an economic loss because it equates to the loss of high-quality and increasingly scarce raw materials.

Investing in better and more efficient technology can greatly reduce waste. The benefits of having the right potato-cutting equipment, tailored to a company’s needs, are undeniable. The waste reduction can add up to 5 to 15%.



“At **FAM STUMABO**, we are dedicated to engineering machines that promote efficiency, sustainability, and waste reduction in the food industry. By investing in these machines, food processors can significantly reduce energy costs and water consumption. Our cutting-edge equipment is designed to help food processors minimize their environmental impact at every stage of the food processing cycle.

The use of high-quality cutting equipment leads to less product on the floor, less breakage, tearing or feathering. There are also fewer off-cuts, again resulting in less product waste,” a FAM STUMABO expert told us.

According to the company, one of the primary benefits of using FAM STUMABO’s cutting equipment is the accuracy and consistency of cuts. The uniform cut size achieved through the high-performing dicer from the FAM Tridis™ range or a FAM Centris™ slicer/shredder can minimize food waste by reducing undesired cuts and fines. A uniform cut size also ensures that products are well-cooked without being burnt. “The Set & Forget feature on the FAM Tridis™ 240P and FAM Tridis™ 180P allows cutting tools to be replaced and adjusted effortlessly. This guarantees product quality consistency across all production runs. In addition, the curved infeed chute of these machines allows potatoes to align parallel to the slicing knife to maximize the length of French fries, also reducing waste. [...] Sharp STUMABO stainless blades, combined with the advantages of a hydrocutter (high

capacity), produce a very clean cut with an optimized length and high efficiency at the highest volumes. It delivers consistent cut quality, regardless of whether you cut slices, fries, or wedges," the expert added. By utilizing precise cutting parameters, equipment can extract the maximum number of chips from each potato, leaving minimal residual material. Additionally, advanced technologies like near-infrared (NIR) spectroscopy are increasingly being used to detect internal defects and remove defective portions of the potato before cutting, further reducing waste and enhancing product quality.

ENERGY EFFICIENCY

Efficient energy utilization is essential for sustainable and cost-effective potato processing operations. Modern cutting

equipment incorporates energy-saving features and technologies to minimize power consumption without compromising productivity. Variable frequency drives (VFDs) are commonly employed to regulate the speed of cutting machines, enabling operators to adjust cutting parameters based on the potato variety, size, and desired chip thickness. By optimizing cutting speeds and reducing unnecessary power consumption, VFDs contribute to energy efficiency.

MAINTENANCE AND HYGIENE

To ensure optimal performance and food safety, cutting equipment must be designed with maintenance and hygiene in mind. Smooth surfaces, easily removable parts, and access points for cleaning and inspection are crucial features of modern cutting machinery.

Materials used in construction are

carefully selected to be corrosion-resistant, ensuring durability and facilitating thorough cleaning. Additionally, automated cleaning systems, such as high-pressure water jets and self-cleaning mechanisms, eliminate debris and microbial contamination, minimizing the risk of cross-contamination.

CONCLUSION

Cutting technology in the potato processing industry has advanced significantly, revolutionizing chip production and other cutting applications. By embracing these cutting advancements, professionals in the industry can achieve higher quality products, reduced waste, improved sustainability, and increased overall profitability. As the industry continues to evolve, we can anticipate further breakthroughs that will further optimize the potato processing landscape. •



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Functional Coatings to Reduce Oil Uptake and Increase Shelf Life

The industrial processing of potato products, such as potato chips and French fries, involves deep-frying, resulting in delicious crispy snacks. However, depending on potato varieties and processing method, frying can lead to increased fat content and reduced shelf life. To address these challenges, researchers and food technologists have developed functional coatings that can prevent these problems and improve overall product quality.

By Tudor Vintiloiu

Excessive oil uptake during frying can result in greasy and calorie-dense potato products. Functional coatings have been developed to mitigate this issue and create healthier snacks. These coatings act as barriers that prevent oil penetration into the potato matrix, reducing oil uptake without compromising the desired texture and flavor. One such coating is based on modified starches, which form a thin film around the potato surface during frying, inhibiting oil absorption. Coatings are commonly used in the production of par-fried and frozen French fries to provide their staple texture and color. However, the use of these coatings also influences the oil uptake and the buildup of acrylamide, which is a chemical compound that can form

during high-temperature cooking of certain foods. Oil uptake is an important consideration in the production of French fries because it directly affects the overall quality and taste of the final product. When fries are cooked in oil, the starch in the potatoes absorbs the oil, leading to an increase in their overall fat content. Batter coatings can play a role in reducing the oil uptake of fries by providing a barrier that slows down the absorption of oil. The use of certain types of starches, such as pre-gelatinized starches, can also be effective in reducing oil uptake. Additionally, using a two-stage frying process, where the fries are first par-fried at a lower temperature and then finished at a higher temperature, can also help to reduce oil uptake.



Modified Starch Coatings

Modified starches, derived from native starches, have gained considerable attention as effective oil barrier coatings. These starches are chemically or physically modified to enhance their functional properties. For example, hydroxypropylated starches have been used as coatings on potato products to reduce oil uptake. These starches form a protective layer during frying, limiting oil penetration into the potato cells. Additionally, modified starches can also contribute to the crispiness and texture of the final product.

Cellulose Derivatives

Cellulose derivatives, such as methylcellulose and hydroxypropyl methylcellulose (HPMC), have shown promising results in reducing oil uptake. HPMC-based coatings have been found to significantly reduce oil uptake in potato products, resulting in healthier and less greasy snacks. These coatings not only reduce oil content but also enhance the overall sensory quality and prolong the shelf life of potato products.

Microencapsulation

Another innovative approach to reduce oil uptake in potato products is through the use of microencapsulation. Microencapsulation involves entrapping oil within a protective coating material, such as proteins or carbohydrates. During frying, the microcapsules release oil gradually, reducing the overall oil uptake. This technique not only controls the oil content but also enhances flavor release and provides a longer-lasting crispy texture.

IMPACT ON SHELF LIFE

Functional coatings not only address the oil uptake issue but also play a crucial role in extending the shelf life of potato products. Oxidative deterioration caused by exposure to air and light is a major factor contributing to the reduced shelf life of fried snacks. Coatings with antioxidant properties can help delay lipid oxidation, thus preserving the product's freshness and extending its shelf life. Natural antioxidants, such as tocopherols (vitamin E), phenolic compounds, and essential oils, can be incorporated into the coating formulations. These antioxidants scavenge free radicals and inhibit lipid oxidation, reducing the

development of off-flavors, rancidity, and color changes in potato products. By protecting the fried snacks from oxidative deterioration, the shelf life can be significantly prolonged.

RESEARCH AND INNOVATION

Experimental coatings, such as those incorporating Rosemary extract or Aloe Vera, are being actively researched for their potential to improve the shelf life of potato chips. These natural ingredients possess inherent antimicrobial and antioxidant properties, making them promising candidates for extending the freshness and quality of fried snacks. Potato chips' shelf life can be doubled with a new 100% natural antioxidant made from Rosemary extract made by ingredient specialist Kancor's.

Rosemary extracts are used to naturally extend the shelf life of food products. However, its flavor, aroma and color pose a challenge in application. OxiKan CL, which is the fully decolorized and deodorized extract of Rosemary, has been specially developed to solve this problem. OxiKan CL, is a major breakthrough in the field of natural extracts that help prolong the shelf life without imparting any color or aroma to the end product. Kancor's OxiKan CL is a completely refined extract, consisting of selective non-polar anti-oxidant molecules from Rosemary, uniquely formulated at Kancor. The absence of unwanted molecules such as chlorophyll, carotenoids, xanthophylls and other less oil soluble non-anti-oxidant molecules makes OxiKan CL stand out. Kancor's technical team revealed to PotatoBusiness, that it took a year to develop the concept, but they still improving the variants. As a specification for using the antioxidant in potato chip production, the OxiKan needs to be blended with the oil used for frying. The antioxidants present in Rosemary extract scavenge free radicals and inhibit lipid oxidation, thereby reducing the development of off-flavors, rancidity, and color





changes. Additionally, the antimicrobial properties of Rosemary extract help inhibit the growth of bacteria, fungi, and other microorganisms that can contribute to spoilage. The application of Aloe Vera gel as a hydrocolloid compound has also been reported to reduce oil uptake and maintain moderate moisture retention in the processed potato chips and retain appreciable color and textural qualities in the end product. Aloe Vera is increasingly being used as a functional ingredient in food industries for ice creams, beverages and dessert production. It is reported to carry specific barrier properties and is used as post-harvest edible coating to increase the shelf life of cherries and table grapes.

The utilization of Rosemary extract or Aloe Vera in experimental coatings for potato chips represents a natural and potentially safer alternative to synthetic additives. These natural ingredients not only provide shelf life extension benefits but also offer potential health-related advantages due to their bioactive compounds. It's important to note that while the research on these experimental coatings is promising, further studies are still needed to determine the optimal concentrations, application methods, and compatibility with the sensory attributes of potato chips. Regulatory considerations and consumer acceptance also play a significant role in the practical implementation of such coatings in the food industry. Nonetheless, the

exploration of natural ingredients like Rosemary extract and Aloe Vera opens up exciting possibilities for enhancing the shelf life and quality of potato chips while meeting consumer demands for cleaner and healthier food options. Coatings based on modified starches, cellulose derivatives, and microencapsulation techniques have demonstrated their effectiveness in creating healthier snacks with reduced oil content and improved sensory quality. Incorporating natural antioxidants into the coatings further enhances the shelf life by preventing oxidative deterioration. Continued research and development in this field will contribute to the production of healthier and longer-lasting potato products, meeting consumer expectations for quality and convenience. ●

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EUROPE



Belgian Potato Concepts Shaping Britain's Breakfast

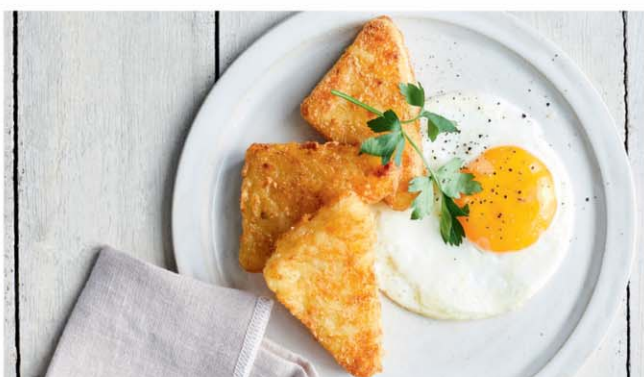
Belgian Potatoes

Loved in Britain
Made in Europe

Across at home and on-trade channels, we know that inflation is sending both consumers and professional chefs to seek out value and quality when sourcing ingredients. Looking to minimise prep time and food waste, there is a huge growth opportunity for quality prepared chilled and frozen food items to build dishes around.

For producers in Belgium, the UK has been identified as a market presenting significant opportunity for growth in the processed potato category, and breakfast, an occasion highly suited for hashbrowns and other prepared products on offer.

Belgian producers have been innovating a huge range of delicious, quick and convenient potato products that are ideal for breakfast such as waffles, hash browns and sliced potatoes, all of which are time efficient and cost-effective items, which still deliver on quality, that are ideal to add some experimentation in the morning be it when eating out or at home. Offering on-trade customers and grocery buyers a diverse range of products will no doubt translate into sales.



Consumers Still Keen on Reducing Meat Intake

The combination of human and planetary health is a key consumer trend and one that will no doubt continue this year, with 67% of UK adults stating it is important that their diet is healthy for both themselves and the planet¹.

Reduction in meat intake has been a primary vector by which consumers are shifting their diet to align more with their goal of achieving better personal and planetary health. In fact, half of Brits are now actively eating less meat². This will no doubt impact the breakfast market as UK consumers increasingly look for tasty, filling and convenient dishes made without meat. There is every expectation that potato products will become an even more important breakfast item as consumers reduce their meat intake.

This trend is particularly true for consumers preparing breakfast at home as the lasting impact of the lockdowns and working from home have caused people to cook more and explore at-home alternatives, which has resulted in consumption of innovative potato products to rise sharply. Offering customers in both the convenience and grocery channel a diverse range of products will no doubt translate into sales.

A Hand for the Chefs

On-trade businesses are facing a daunting summer, squeezed from both consumer spend and sustained energy costs, all the while a crisis in staffing continues. Business operators, buyers and chefs will be looking for time efficient and cost-effective solutions in the kitchen, without sacrificing on quality.

As with at home cooking, consumers eating breakfast and brunch out are seen to want more potato products on the menu as a general trend toward meat reduction continues, and hashbrowns and other great prepared potato items have all been widely introduced in to the offer of many Belgian potato processors and are available to hospitality buyers. These products are packed with flavour and can be prepared in the oven, airfryer, microwave or deep fryer, offering chefs great quality stars to breakfast dishes, with significantly reduced prep time and minimal waste.



Funded by
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¹ UK Attitudes Towards Eating Healthy Market Report 2022

² Mintel, Half of Brits limit their meat intake or don't eat meat – as processed meat sales shrink back, Jan22



Technology Paralysis? Remove the Roadblocks to Optimization

Technology and automation are transforming potato processing. Digital technologies are disrupting all parts of the value chain and optimization is becoming increasingly important for businesses as they try to stay profitable and remain competitive.

By Heat and Control

For those considering optimization - choosing the right equipment for your process - will be crucial to the success of your investment. And, while the concept of optimization may sound daunting - the timing has never been better. Years of research and development have led to many new (and emerging) technologies for the potato processing industry. There are fast, high performance and sustainable processing solutions now available, for just about every area of your line, and we have new approaches to old problems. Digital technologies are paving the way for a new era of customization,

and we have a range of exciting innovations - both small and large operations can benefit from. As technology and automation continues to evolve at a rapid pace, and as we truly begin to move into industry 4.0, working with an experienced optimization partner is a strategic decision that will pay big dividends. So, what is optimization and why does it matter for my operation now? At Heat and Control, we've been engineering and building customized process and packaging lines for over 70 years. We invest significantly in our own research and development, and we've pioneered many of the industry changing solutions used

by the leading brands today. The idea of 'optimization' isn't new. In most general terms; it's a concept that can be applied across multiple areas of a business to achieve any number of desired outcomes - usually by identifying inefficiencies and fixing them - to keep things running smoothly. While it may sound simple, anyone who's had any type of experience with optimization, will attest, it usually isn't. Despite significant benefits on offer - like more automation, higher capacity, bigger yields, increased efficiency, better use of raw materials, less waste, better products and sizable cost savings - many believe optimization will be either too



Complete Potato Chip Solutions designed for your business

- Potato Handling & Storage
- Peeling, Grading, Washing
- Electroporation
- Frying & Oil Management
- Salt & Seasoning Application
- Conveying, Sizing & Accumulation
- Energy & Pollution Control



Across industries and applications, we design specialised solutions.

Bringing together leading brands in processing and packaging equipment for the potato chip industry. Our solutions set the standard for yield, efficiency, and safety while producing the highest quality potato chips. Whatever your product needs, we can meet it with precision and passion.



expensive, or too time consuming. But, as industry continues to deal with high energy costs, increasing commodity prices, seemingly never-ending inflation, and adoption of sustainability practices - the perceived pain of optimization is lessening. As each of these areas gets harder to manage with in-house strategies, and continues to put pressure on your ability to be profitable and stay competitive - we start to see why optimization is so important.

For many potato processors, an excessive amount of options, lack of familiarity with the new and emerging technologies and/or associated processes, lack of time to investigate, and perceived time to implement - become very real roadblocks, in the way of much needed upgrades and improvements. Technology paralysis is identified as one of the biggest barriers to growth in the coming years - but it shouldn't be - the right optimization partner should be able to understand your needs now, and in the years ahead.

For some - optimization can be achieved with the adoption of a single piece of new equipment, or with an upgrade to some existing equipment. For others, it might involve design, manufacture and delivery of a completely new and fully customised solution. But,

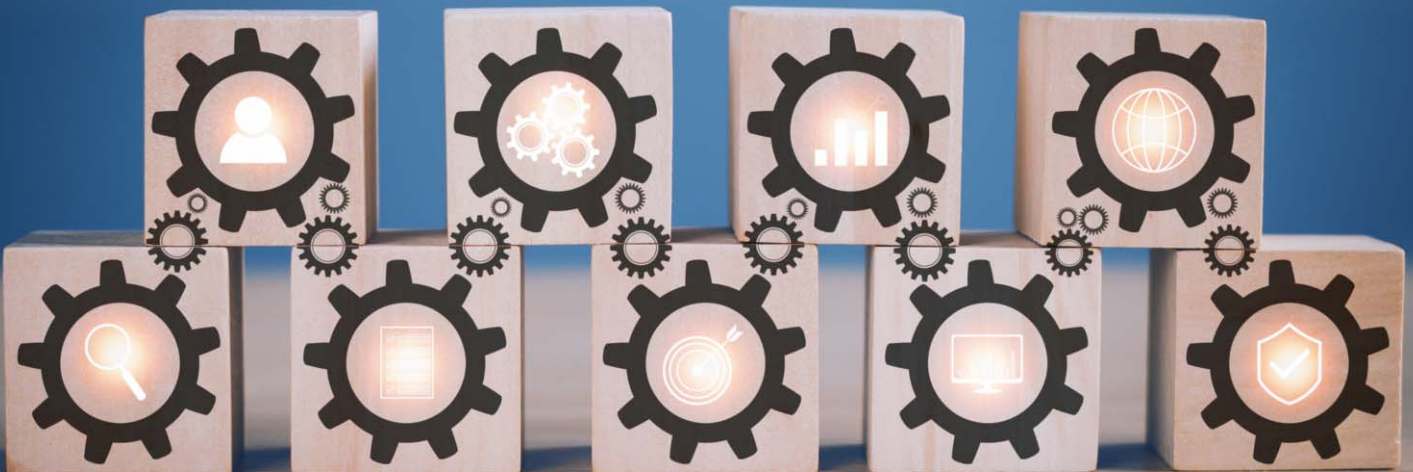
regardless of scale; effective optimization is only achieved when all the various processes, resources, and systems of your organisation are integrated through a consolidated approach. Sure, you can improve production with a new piece of cutting-edge equipment, or a fancy new software package. But, it is only by understanding these acquisitions - in the full context of your product/s, their application/s and the unique requirements of your business - that true optimization is achieved. At Heat and Control, we specialize in customization to suit every customer's unique and individual needs.

We start by seeking to understand your needs and required outcomes, or what challenges you're currently facing. We then move on to benchmarking all the available solutions, before recommending the most optimal setup for your specific goals. A quality optimization partner will be able to map your return on investment, so you can feel confident in your decision to optimize.

While focus areas for optimization of a French fry line vs a potato chip line are different; many of the overarching themes are the same. At the moment, we have customers interested in automation, energy efficiency, resource management, and

sustainability; key talking points include water savings, CO₂ reduction, energy savings, oil savings, improving product quality, increasing yield, and reducing labour.

We understand - adapting or upgrading new equipment and/or technology can be a significant investment, but it shouldn't be a daunting one. Perhaps you have a problem with some existing equipment, or it's a challenging factory footprint, getting in the way of much-needed upgrades. Or, maybe you have a grand plan for future expansion, or a complete sustainability overhaul - but you don't know where to start. With so much time in the business - we've seen just about every problem a customer can face, and helped them overcome it - while riding the wave of challenging market conditions alongside them. Choosing an optimization partner who understands your product/s, the application/s and has the ability to model the overall process, is the quickest and easiest way to unlock the true potential of an investment in optimization. At Heat and Control, our research and development has recently culminated - in a number of groundbreaking, new solutions for the French fry and potato chip industries. We have the answers you've been looking for - and when you're ready - we're ready! •





PROCESSES



PRODUCTS &
INGREDIENTS



MARKETS



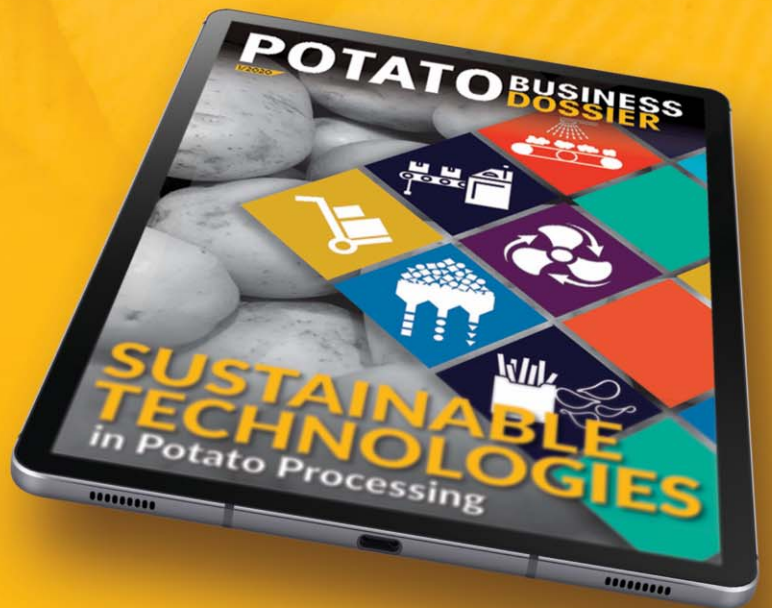
PACKAGING



AGRO &
STORAGE

*you always know
when you need to know more*

POTATO BUSINESS DOSSIER



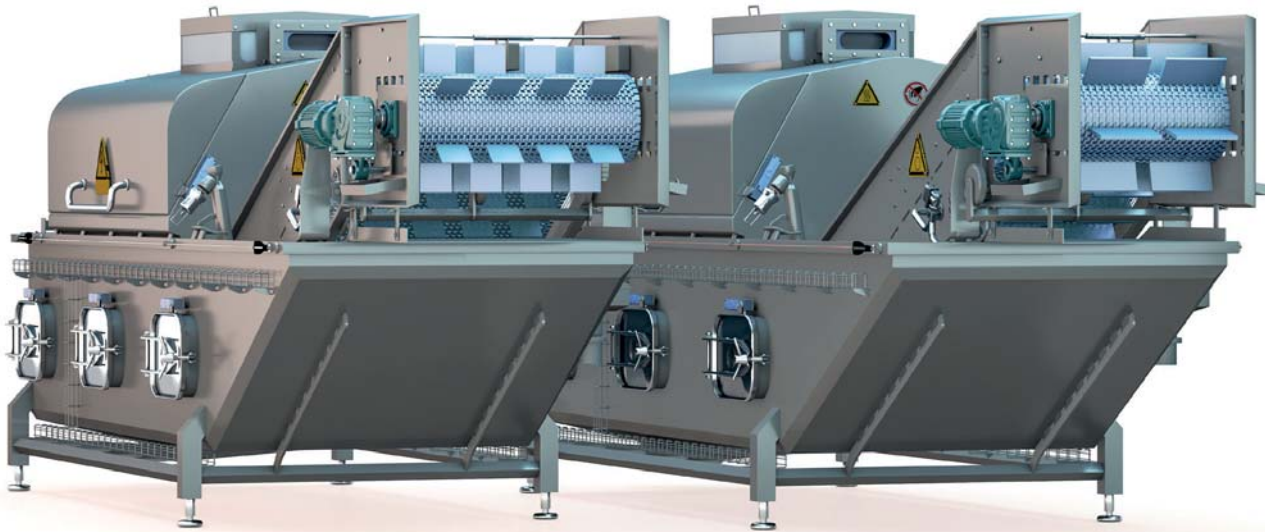
4 times a year

POTATO BUSINESS DOSSIERS

are added-value online products, filled with useful information and rich reports on potato industry topics. Access your complimentary copy on potatobusiness.com



The new Elea PEF Advantage B 1000-850



Elea Technology presents its new, high-capacity system range

Process up to 100 t/h, improve quality, save energy, oil & water, enhance capacity and gain greater control of your potato processing

Elea installed the world's first turn-key industrial-scale PEF system for French Fries processing at Wernsing (Germany) in 2012, after more than ten years, that system is still PEFing potatoes.

With more than 250 installations since then, Elea PEF Advantage systems have become a standard addition to the potato processing line, providing better texture management, cutting improvements, yield increases, improved quality, new product opportunities, and reduced water, oil and energy costs.

Since those early days of PEF, Elea has continuously improved its systems with new upgrades, designs and innovations.

The PEF effect

PEF is a non-thermal process that uses electric pulses to induce electroporation, opening nanometer-sized pores in the cell membranes of potatoes (or other tubers, fruits or vegetables). The intracellular liquid is then released, that causes tissue softening. The effect is instantaneous.

Elea PEF Advantage systems provide total control over the treatment parameters, with the extent of the tissue softening controlled by electric field strength and the specific amount of energy applied. PEF is volumetric and so works independently of tuber size.

Conserving energy, water and oil with PEF

Compared to thermal treatment PEF reduces energy and water consumption by up to 90 %. The typical energy input for PEF processing of potato tubers is 0.3 to 1.5 kJ/kg, corresponding to a temperature increase of 0.01 to 0.4°C.

up to

90%

reduced energy and water consumption

Process intensity is adapted during the season, being highest with fresh from the field crop or harder tuber varieties and lower at the end of the season. Average product length increases, and starch lost to cutting and blanching water streams is reduced, resulting in up to 1.5 % yield improvement for French fries processing lines.

up to

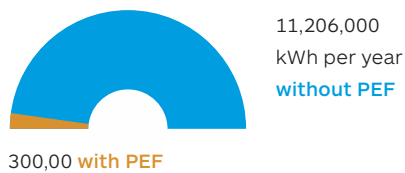
1.5%

yield improvement for French Fries

Due to less tissue breakage, the oil uptake during frying is reduced by approximately 10 %. There is no holding time requirement and no start-up or shut-down time needed.

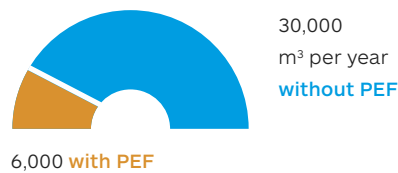
Examples shown here: 26 t/h raw material French fries line, 7.700 production hours per year

Reduce energy



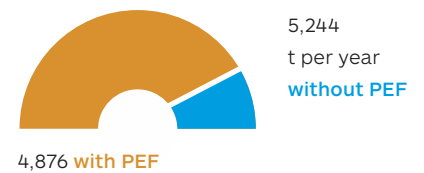
-10,906,000 kWh per year

Reduce water



-24,000 m³ per year

Reduce oil



-368 t per year

Improved product quality and greater yields

Potato and vegetable chip processing depend on high-quality raw materials and optimised processing. Slicing quality and consistency are key factors, as the performance of subsequent processing steps and product quality depends on them.



PEF reduces tissue breakage during slicing and reduces the number of fines and smaller particles. A smoother cut surface will decrease starch loss and the volume of free starch on the product surface, improving product yield and texture, reducing stickiness and doubles during frying. Increased starch in the slices improves texture and crunch. With reduced starch loss and improved cutting, yield can be increased by up to 2 % for chips.

Faster water release reduces frying temperature and/or time. On continuous frying lines – dependent on process line setup - up to 10 % frying time reduction is possible. A reduced final frying temperature results in less heat load and increased product quality. For batch frying, up to 15 % capacity increase can be achieved due to facilitated moisture removal.

Most potato chip lines do not include a blanching step, but where applied PEF can help to revert its undesired effects on product texture. Less slice surface damage will result in less oil uptake, up to 15 % for typical product and frying conditions. With today's frying oil costs, reducing oil uptake significantly contributes toward a fast investment return. Fewer fines and particle carry-over into the fryer will also help to reduce oil degradation and increase frying oil lifetime with comparable benefits for other raw materials such as carrots, parsnip, sweet potato or cassava.

Reduced frying time and temperature produce a lighter, more appetising product colour with a more natural appearance.

Savings potential and greater value from PEF

PEF implementation delivers savings at various stages of the production chain. Substituting preheating and reducing blanching time, less starch release, increased yield and reduced oil uptake will reduce energy usage, raw material and frying oil expenditure.

On a standard-sized French Fries line of 30 t/h final product output, the water and energy savings can amount to up to 20 million kWh of thermal energy and 60 million litres of processing water compared to preheating.

Reduced starch losses can generate up to 500 t of extra yield per year, whilst oil uptake is reduced by up to 700 t per year.

PEF processing potatoes also increases yields, reduces oil uptake and contributes towards a fast ROI. On a 1,300 kg/h final product line, an extra annual yield of up to 47 t is possible. Fewer fines or doubles and reduced fryer heat load will minimise defects and further increase product yield. Lowering the oil content from 33 to 28 % translates to up to 175 t less oil consumption per year.



Both French Fries and chips benefit from improved quality and new product opportunities using novel materials and cuts, providing further process and financial benefits.



Process more for less with our latest belt systems

In 2023 Elea announced their newest, most innovative and highest-capacity belt systems to date, the **Elea PEF Advantage B 1000-850** (up to 100 t/h), **B 100-535** (up to 32 t/h) and the **B 10-535** (up to 20 t/h)

Each new system features the largest free cross-section available on the market, providing hassle-free product transport and achieving the highest product load ratio with maximum energy efficiency, resulting in significant energy savings, lower running costs and a faster ROI.

Enhanced safety features enable a fenceless and compact design. They are powered by a single generator, allowing multiple configurations and easy integration into your production line.

Other new features include enhanced water management, easier cleaning and servicing and new pulsed power cabling for increased maximum length. Available with a split belt for multiple products on the system, anti-foam dosing and automated conductivity control and equipable with different belt types suitable for sinking or floating products.

All three models share the same form factor enabling options for future upgrades from mid-range to high capacities.

Advanced process monitoring and optimisation ensure you achieve the best PEF treatment of any roots, tubers or fruits for your product, regardless of season or variety.



30 m



The Elea PEF Advantage B 1000-850, B 100-535 and B 10-535 are all powered by a single generator with a maximum cable length of 30m. In combination with its compact, fenceless design placement into a production line is simple.

Harnessing Green Energy: Transforming Large Potato Processing Plants

Potato processing plants play a vital role in meeting the global demand for processed potato products. However, their energy-intensive operations contribute to significant carbon emissions and environmental degradation. To mitigate these concerns, many potato processing plants are increasingly turning to alternative energy sources, such as solar, wind, and geothermal power, to reduce their carbon footprint.

By Tudor Vintiloiu

Embracing green energy not only helps in environmental preservation but also brings economic advantages by cutting production costs and fostering positive contributions to local communities. Solar, wind, and geothermal power are revolutionizing the industry by providing clean, renewable energy options. By harnessing these green energy technologies, potato processing plants not only reduce their environmental impact but also reap economic benefits through lower energy costs.

INVESTING IN SOLAR ENERGY PAYS OFF

One of the most popular alternative energy sources for large potato processing plants is solar power. These plants often have ample rooftop space and open areas, making them ideal for installing solar panels. By harnessing the abundant sunlight, potato processing plants can

generate clean electricity to power their operations. The adoption of solar power helps reduce reliance on fossil fuels, resulting in a significant decrease in greenhouse gas emissions. Moreover, investing in solar energy provides long-term cost benefits as it lowers energy bills, providing a stable and predictable source of electricity while shielding the plant from fluctuations in energy prices. One such example is the Agrana's Gmünd potato starch factory in the Austrian Waldviertel region, where an innovative system has been installed, in line with the company's green power initiative. With RWA Solar Solutions as the installer and operator of Agrana's first large-scale photovoltaic installation, a total of 890 photovoltaic modules covering an area of around 1,650 square meters have been installed on the roof of the potato starch factory and, with a capacity of 334 kWp, will produce around 338,000 kWh of power





commercial

owner of the photovoltaic system. It will also undertake the ongoing operation and maintenance of the photovoltaic systems.

"If we want to achieve the energy revolution, we need to rely more extensively on solar power in Austria in the coming years and expand the scale of solar installations. We regard it as our responsibility to deploy our expertise in the interests of climate protection and hope that many other companies will follow the good example set by Agrana and also make their production processes more sustainable," explains the member of the Executive Board of Raiffeisen Ware Austria, Christoph Metzker.

SOLAR BY DAY, BIOMASS BY NIGHT

A recent collaboration between McCain and Smart Commercial Solar involved the installation of a total of 17,000 solar panels at its Ballarat production plant as part of McCain's commitment to sustainability and reducing its carbon footprint.

"During daytime hours we basically will be off-grid once the solar power is running, that's on a sunny day when it's at full efficiency," a company representative told The Australian Financial Review. "To get to be totally clean energy, we will have to buy a residue of clean energy from the grid, from a clean energy supplier, because we won't be able to generate 100%, but this gets us a hell of a long way towards that goal which for us is very exciting." The project, which will cut the site's carbon-dioxide emissions by more than 27,000 tonnes a year, involves 8.2 megawatts of capacity

annually.

The total annual solar power output generated at the Gmünd site is equivalent to the requirements of approximately 75 households.

"Our green power initiative will continue [...] with the construction and commissioning of photovoltaic systems at a further four Agrana sites in Austria. As an energy-intensive processor of agricultural raw materials, Agrana is firmly committed to action aimed at achieving its goal of climate-natural production activities by 2040. The photovoltaic systems at our production sites are a further component of our decarbonization strategy to achieve our emissions targets," according to Agrana's CTO Norbert Harringer.

The power generated by the photovoltaic system will be entirely consumed by the company. RWA Solar Solutions GmbH, a subsidiary of RWA Raiffeisen Ware Austria AG, is the planner, constructor, and

in total, including 1.2MW of biomass and the rest solar. Most of the solar panels would be mounted on the ground, covering 10 hectares of land behind the manufacturing plants, and would have a single-axis system that allows them to track the sun during the day. About 500kW of panels would be mounted on a carpark structure and on a truck flyover at the site entrance.

Smart Commercial Solar managing director Huon Hoogesteger said the ability of the biomass plant to run around the clock meant it could smooth the output of the solar plant, which only generates in the daytime. The biomass plant could be ramped down during the day, effectively saving power for the evening.

"It's almost like having a grid-scale battery, working together with solar," he said, adding that McCain's predictable operations and regular output of potato waste ensured the steady supply of waste that was critical to the success of biomass projects.

HEATING BELGIAN HOMES

Another example of using energy resources responsibly and sustainably comes from Suikerpark, which is a neighborhood in Veurne, Belgium that is part of an innovative project that repurposes heat from a local PepsiCo's snacks plant and transforms it into sustainable energy. The Veurne site cooks up to 20 tons of potatoes an hour, releasing heat vapors as a byproduct. When real estate developer Ion wanted to find inventive environmental solutions for Suikerpark, PepsiCo proposed an idea: What if some of the heat released during the process of making chips could be put to use? With the help of partners Noven, who designed the technology, and Fluvius, the area's utility grid operator, PepsiCo is making it happen.

"Using a condenser, we capture the vapors from cooking and heat a water circuit from 50°C up to 80°C," explains Frank De Clercq, Maintenance and Sustainability Manager at the Veurne snacks plant. From there, the heated water

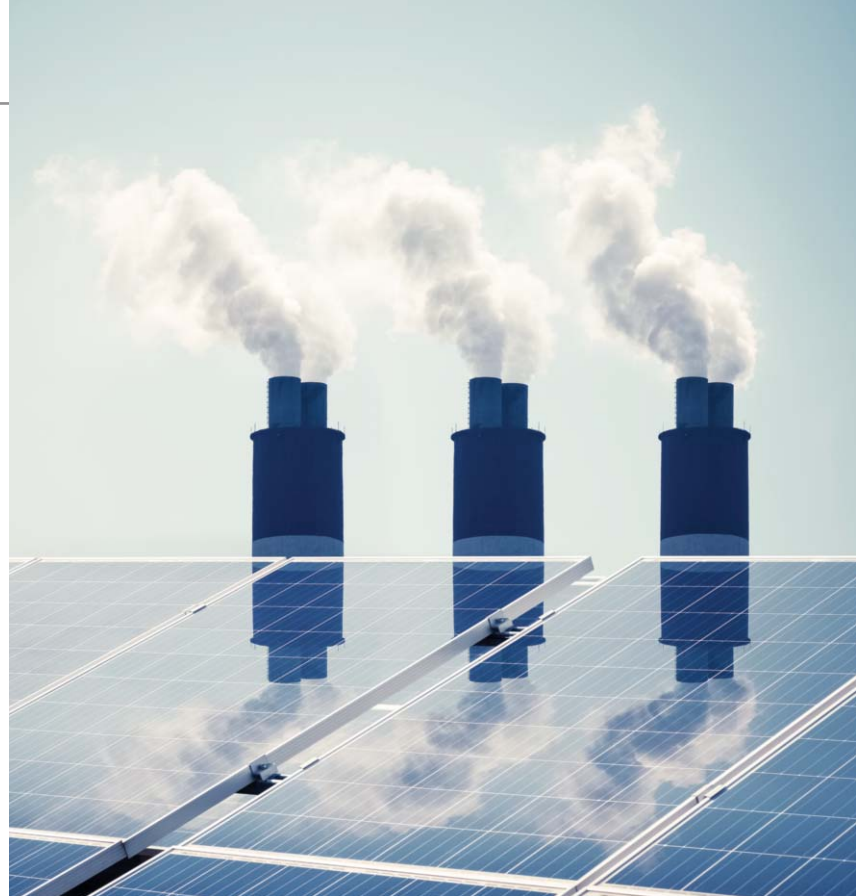
will be transported to the houses at Suikerpark, where it will flow through the central heating system into radiators and hot water taps. The first homes will be warmed with the technology starting in 2022. The project will heat a total of 500 houses using clean, sustainable energy once it's complete. "The heat generated at the Veurne plant helps reach net zero emissions and replaces heat that would normally be sourced by burning natural gas," De Clercq explains. And the mayor of Veurne says Suikerpark is just the beginning. "Suikerpark is the opportunity of a lifetime," says Peter Roose. "This is a great project to introduce new concepts that can be brought to the rest of Veurne." As the technology develops, there is potential to expand the system to the local hospital and other public buildings in the future. The Veurne plant could potentially heat more than 2,000 homes.

A POSITIVE CONTRIBUTION

The adoption of these alternative energy sources by large potato processing plants brings about a range of positive impacts on local communities. Firstly, the reduction in carbon emissions helps combat

climate change and promotes environmental sustainability. By embracing renewable energy, these plants become beacons of responsible industrial practices, setting an example for others in the industry. Also, the shift towards green energy fosters a sense of community engagement. Local residents benefit from job opportunities created during the installation, maintenance, and operation of solar panels, wind turbines, and geothermal systems. The growth of the renewable

energy sector also attracts investments and contributes to the economic vitality of the region. Additionally, these alternative energy projects often involve collaboration with local stakeholders, ensuring that the benefits of green energy extend beyond the plant itself. Educational initiatives, community outreach programs, and partnerships with local schools and colleges can further promote sustainability awareness and renewable energy education. •



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is a project which contains reports on the most important frozen food categories, as well as technical equipment innovation related to product manufacturing, published both in print and on-line.

How Potato Processors Can Meet High-quality Expectations, Reduce Food Waste, and Enhance Profitability



Marco Colombo

Today's processors must meet so many requirements that their tasks might sometimes seem impossible. But the latest sorting and grading technologies have all the answers.

Marco Colombo, Global Category Director for Potatoes at TOMRA Food.

Potato processors must always ensure a high level of food safety while meeting required quality standards.

Processors work closely with their farm suppliers to ensure the best land is utilized, and farming practices applied to deliver a high-quality product. There are multiple steps, from digging the potatoes to shipping them to the processor. Each step is implemented to reduce or eliminate the diverse types of foreign material that are typical of growing potatoes. The heavy ground conditions, emerging rocks, roots, and man-made foreign material may be found at harvest time. Even birds may contribute to this foreign material problem when they carry aloft golf balls over farmland, thinking they are eggs. These are sometimes found at harvest time.

While several mechanical steps are taken to reduce the presence of foreign material, TOMRA, with decades of experience in both field, pack plant, and processing, readily recognized the need for the further reduction and elimination of foreign material through optical sorting. Even more surprising is that sorters can do so much more than sort. These advanced solutions can also accurately grade to specification, handle high throughputs, manage peaks in demand, reduce the need for manual line interventions, solve labor scarcity problems, reduce

downtime, and overall reduce the line's total cost of ownership. Sorting solutions are now available for a wide variety of potato products – everything from potatoes just coming out of the field or storage to fresh pack, chips (crisps), French fries, other frozen products (such as wedges, slices, and hash browns), and dehydrated flakes and granules.

SORTING THE HARVESTED CROP

Before the potatoes get to the processing plant, they must be harvested and sorted. Harvest time is a remarkably busy time full of long days in the field for farmers. The TOMRA 3A was designed with ease of use, powerful detection capabilities, robustness, and mobility in mind. It is perfect for the busy farmer at harvest time seeking to remove all foreign material before shipment or into

storage. Indeed, the TOMRA 3A can also be utilized coming out of storage and prior to shipment to ensure the highest quality of product delivery. The TOMRA 3A can operate at high capacities, often working at storage sheds at a rate of up to 120 tons/2400 cwt/100 tonnes per hour. For growers operating at remote storage facilities, it is designed to be moved easily from shed to shed and mounts well onto an Even Flow tub and fine dirt eliminator. Long before these foreign materials can threaten food safety at a processing plant, they add bulk to the crop and storage. When undetected, foreign material increases the risk of potato rot causing product loss. The TOMRA 3A is so effective that it removes 95% of rocks, floating stones, dirt clods, corn cob, wood, metal, rubber, plus 85% of other typical foreign materials. Sometimes small amounts of foreign materials may



remain mixed up with the potatoes when they go into storage, but the task of removing these – which may be smaller and harder to detect – is handled by a more sophisticated sorter later in the production process. The TOMRA 3A significantly reduces the sorting work required at these later stages, reducing stoppages due to machine damage and optimizing downstream equipment.

A SORTER DESIGNED FOR POTATO PROCESSORS

After the potatoes have been harvested, pre-sorted, stored, typically pre-sorted again, and then washed, sorters on the processing line have to detect and eject the harder-to-see foreign materials and product defects. This is important not only to ensure food safety and product quality but also to prevent disruptions on the line. If foreign materials get too far down the line, they may cause damage to the processing line, break knives, and potentially stop the entire operation. To counteract these threats, the TOMRA 5A optical sorter was specifically designed for potato packers and processors. Intended to handle washed and peeled potatoes – typically used for French fries, chips, and specialty potato products – this sorting machine is equipped with top and bottom banks of optical

inspection to view both sides of each object in air using a combination of pulsed LED, camera, and near-infrared (NIR), it performs targeted spectroscopy with 1mm precision. Machine parameters can be set to precisely alter the accept/reject levels for subtle defects, discolorations, and blemishes in the potatoes by product size and shape.

The TOMRA 5A is renowned for its superior removal of foreign materials, with a 98% removal rate and highly efficient detection of rotten potatoes, potato defects, and remaining peel. It accomplishes this by running the highest capacities in the industry (sorting whole potatoes at up to 54 tons per hour).

SUSTAINABILITY REALLY MATTERS

In addition to food safety, the TOMRA 5A maximizes the use of all consumable potatoes and reduces waste, demonstrating a commitment to sustainability. With the increase in consumer expectations for sustainable food products, food brands also expect this from their suppliers.

Attitudes vary across nations, generations, and industries, but as a brief overview, sustainability is rated as an important purchase criterion by 60% of consumers. This was one of the findings of the Global

Sustainability Study 2021 (conducted by global strategy and pricing consultancy Simon-Kucher & Partners), which also found that more than a third of consumers globally are willing to pay more for sustainability. In recent years, 85% have become “greener” in purchasing.

This study, like others before it, identified that consumers below the age of 40 are more mindful of such issues than older generations. It’s worth remembering that, year by year, the younger generations will represent an ever-greater share of the consumer demographic.

Reducing food loss also matters because the food supply is in a race to keep up with the world’s growing population. The United Nations Food and Agriculture Organization (FAO) warns that by 2050 global food demand will increase by about 50%, yet only 20% more land can be brought for farming. This means existing resources must be used at maximum efficiency. Sustainability and survival will become inextricably linked.

AN EVEN MORE SOPHISTICATED OPTION

An excellent solution for potato processors is the TOMRA 5B. As products move along for quality inspection, this machine’s 360-degree surround cameras, a laser, and off-belt cameras detect foreign material and produce imperfections. Combining these technologies takes optical sorting to an even higher level. It is suitable for specialty potato products, French fries (which must also be accurately sorted to size), and chips/crisps. Because this machine’s NIR can detect density differences, it is able to see and remove chips/crisps which have stuck together in clusters or that are spoiled by wet centers after frying. The off-belt laser detects up to 99% of foreign material and can see if chips contain excessive oil or water content.

The TOMRA 5B was further enhanced a couple of years ago by a software update that added new features. One of these, Health Check, reduces the risk of line disruptions caused by dirt sticking on the machine’s window between the camera/laser and the product stream. Health Check



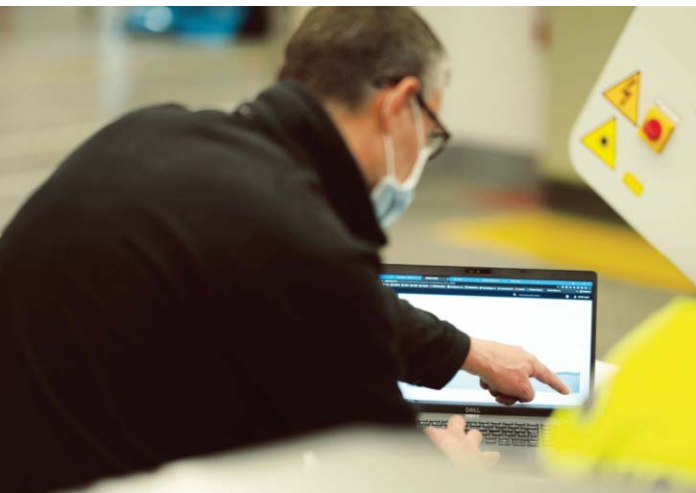
automatically checks the machine's cleanliness before sorting and informs the operator which surfaces need cleaning. And because it works remotely, the operator or line manager does not have to go to the line to make the Health Check. Another essential feature of the TOMRA 5B is Smart Ejection. This uses new de-clustering algorithms that improve efficiency in the production of French Fries. Smart Ejection optimizes its performance by 25% to 100%, and it improves the acceptance-stream quality by making even more accurate decisions on defect types and clusters. It helps reduce the false detection, especially of shorts in clusters, in order to minimize product waste and increase yield, creating a greater ROI.

SOPHISTICATED SORTING AND MULTI-LANE SOLUTIONS

TOMRA Insight's Health Check and Smart Ejection features are great examples of how sorting machines are so effective not only because of their technology advancement - their cameras, lasers, and NIR spectroscopy - but also because of developments in software and controls. These technological advancements play a big role in the sustainability movement, making it possible for farmers and processors to stay on top of demands. Many control features are now available to enhance sorting efficiencies in potato processing. Sort-to-Spec ensures that automated quality specifications are consistently met while optimizing the highest yields. This makes it easy to sort

batches into different qualities, for example, AAA-grade and B-grade fries, in order to maximize product utilization. Sort-to-Length, for example, ensures that French Fries meet a pre-determined grade. Reverse Sorting recuperates good products from recovery streams. SmartSort helps operators easily define color specifications and detection settings. Dynamic Cloud gives a real-time view of all the materials the machine assesses as defects so that detection settings can be fine-tuned. Digital Transformation Recent developments in sorting technologies are now available for gathering performance data from sorting machines in near real-time and storing this securely in the cloud. The TOMRA Insight subscription-based service turns sorting machines into connected devices with information that can unlock machine performance. This data can be accessed from anywhere and across plants via web-based desktop and mobile devices, ultimately paying off in many ways. Downtime is reduced by monitoring

machine health near real-time, supporting the management of predictive and condition-based maintenance, and preventing unscheduled machine shutdowns. Performance is maximized by evaluating throughput variations to optimize sorting equipment. Operating costs are reduced by identifying gaps in production and analyzing potential root causes. Additionally, sorting to target quality is enhanced by having accurate material-composition data that enables decisions based on more detailed information. TOMRA Insight is transforming sorting from an operational process into a strategic management tool. This tool is constantly becoming more powerful because the platform's functionality and features are reviewed and updated every three weeks in response to customers' needs and priorities. This is just one of the ways in which TOMRA Food works closely with growers and processors and collaborates with their other line suppliers - making it easier to meet daily operational challenges while enhancing profitability. •



It's all about **POTATO**



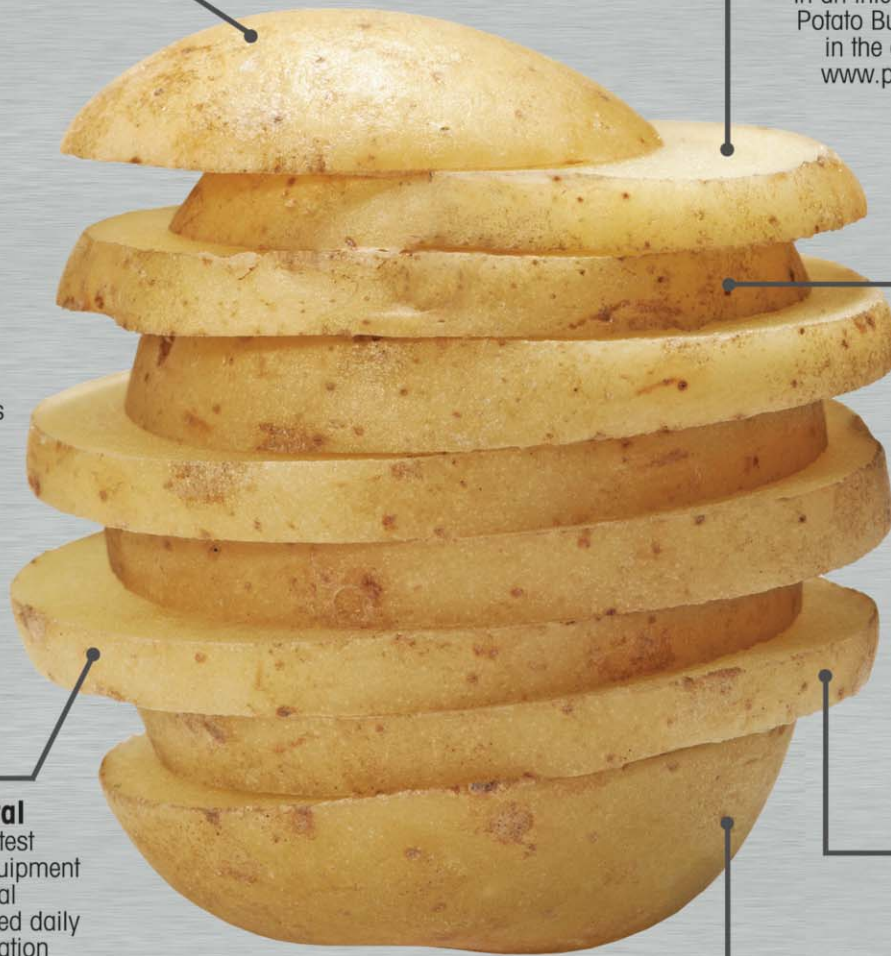
POTATO PROCESSING INTERNATIONAL

Potato Processing International has been serving the global potato processing industry for 25 years and is regarded as a must-have information source for potato processors, equipments and ingredients manufacturers, as well as players in storage, retail and foodservice. This business-to-business magazine is published six times per year and continuously strives to be the most comprehensive publication, containing in-depth articles, expert views from some of the most respected companies in the industry, exclusive interviews, as well as news and trends.



POTATO BUSINESS Portal

From breaking news to the latest innovations in processing equipment and potato products, the portal potatobusiness.com is updated daily with the most relevant information for all players in the potato processing and storage industries. Regarded as a trusted source of information, the website also contains exclusive blog articles and white papers on various current topics that concern the potato universe.



POTATO BUSINESS DIGITAL

Tailored specifically to meet the needs of the busy professionals in the potato industry, Potato Business Digital is the first industry standardized digital magazine for tablets and mobile phones. This quarterly online publication presents exclusive articles on various processing topics, as well as information on ingredients, food safety and storage innovation, in an interactive and dynamic form. Potato Business Digital is available in the click-to-read format on the www.potatobusiness.com portal.



POTATO BUSINESS Weekly Newsletter

The latest news, exclusive articles and interviews are delivered directly to your inbox with our weekly newsletter service, containing pertinent information from trusted sources, as well as industry insights and updates.



E-BLAST

- Custom e-blasts using specific segments of our e-database, depending on the client's needs, with measured results.
- Special e-blast covering major worldwide trade fairs.



SPECIAL PROJECTS

- May - Potato Business Dossier 1
- November - Potato Business Dossier 2



A COMPLETE COMMUNICATION PLATFORM



The Value of Quality Frying Oils

Oil seed crops are planted throughout the world to produce cooking oil. The seeds are washed and crushed before oil is removed using an extraction process. The oil is then refined to remove any unwanted taste, smell, color, or impurities. Frying oils are a critical component of the food processing industry, especially in the production of French fries, potato chips, and other deep-fried snacks.

By Tudor Vintiloiu

Different types of frying oils exist, with each offering varying levels of quality, stability, and health benefits. The choice of oil used in large fryers within the potato processing industry is a critical factor that affects the quality and taste of the final product, as well as production costs. Some oils, such as virgin olive oil, walnut oil, and grapeseed oil, are pressed straight from the seed or fruit without further refining. Some other sources of frying oil include sunflower, canola, palm, and soybean.

Most vegetable oils are liquid at room temperature. When oils are heated, unsaturated fatty acids, which are the building blocks of triglycerides, are degraded. Monounsaturated-rich oils, such as olive oil or peanut oil, are more stable and can be re-used much more than polyunsaturated-rich oils like corn oil or soybean oil. For this reason, when deep-frying foods, it

is important not to overheat the oil and to change it frequently.

BEST OPTIONS FOR THE POTATO PROCESSING INDUSTRY

The potato processing industry requires frying oils that can withstand high frying temperatures and offer excellent stability, flavor, and shelf life. Based on these requirements, vegetable oils, such as canola, soybean, and sunflower oils, are the best options for use in large fryers. These oils are readily available, cost-effective, and have high smoke points, making them ideal for use in the potato processing industry. In addition, the use of high oleic versions of these oils can further enhance their stability and prolong their life. Proper filtration and temperature control, as well as the judicious use of antioxidants, can also help extend the life of frying oils, reducing production costs and improving the quality of the final product.

DEGRADATION OF FRYING OILS

Frying oils undergo various forms of degradation during use. The most common types of oil degradation include oxidation, hydrolysis, and polymerization. Oxidation occurs when the oil reacts with oxygen, leading to the formation of free radicals that cause the oil to become rancid. Hydrolysis occurs when the oil reacts with water, leading to the breakdown of the oil into fatty acids and glycerol. Polymerization occurs when the oil's fatty acids react with each other, leading to the formation of polymerized compounds that can cause the oil to darken and form deposits.

SOLUTIONS TO PROLONG THE LIFE OF FRYING OILS

Filtering

Filtering the frying oil is an effective way to remove food debris and contaminants that can accelerate oil degradation. Filter systems can

be installed in large fryers to remove impurities, thereby extending the life of the frying oil.

Reducing Frying Temperature

Frying oils degrade faster at high temperatures. Reducing the frying temperature to the recommended range (320-375°F) can help prolong the life of the frying oil.

Using Antioxidants

Antioxidants, such as butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT), can be added to frying oils to reduce oxidation and extend the oil's shelf life. However, the use of these additives must be limited to approved levels as they may have adverse health effects.

Using High Oleic Oils

High oleic oils, such as high oleic canola oil, are more stable than regular vegetable oils due to their high levels of monounsaturated fatty acids. They have a longer shelf life and are less prone to oxidation.

CHEMICAL REACTIONS

Many chemical reactions take place during frying and affect the quality and storage time of the oil. Several of these reactions lead to spoilage of the oil.

Hydrolysis is the major chemical reaction that occurs during frying. As the food product is heated, water in the food evaporates and the water vapor diffuses into the oil. The water molecules cause hydrolysis in the oil, resulting in the formation of free fatty acids, reduction of the smoke point of the oil, and unpleasant flavors in both the oil and the food.

The smoke point, or the burning point, of an oil or fat is the temperature at which it begins to produce a continuous bluish smoke that becomes clearly. For high temperature cooking (160–190°C), an oil with a low smoke point, such as unrefined sunflower oil and unrefined corn oil, may not be suitable.

PROCESS

Repeated frying (using the same oil several times) increases the viscosity and darkens the color of the cooking oil. If the physio-chemical properties of cooking oil deteriorate, the oil must be discarded because it can

prove to be harmful for human consumption. Antioxidants, such as Vitamin E, added during frying are extremely effective in decreasing the rate of lipid oxidation, while enzymes such as superoxide dismutase, catalase, and peroxidase are also beneficial. Nonetheless, Vitamin E effectiveness decreases with increasing temperature.

During frying, the water loss process passes three different steps. The first step corresponds to potato heating, involving mainly the loss of water at the cutting surfaces. During the second step, an intense formation of water bubbles and an exponential decrease of water content with time are occurring. The third step occurs after the formation of the crust, hindering the movement of the vapor bubbles, created by the internal gas pressure. Physical changes induced by frying process such as crust formation have been closely correlated to oil penetration, and this imparts the characteristic appetizing nature of the food. Also fried foods develop desirable organoleptic properties such as color, crispiness, texture, and fried flavor resulting in popularity among consumers.

OIL ABSORPTION REDUCTION

Absorption of oil is influenced by a variety of factors: oil quality, product and frying temperature, oil degradation, frying time, frying duration, initial moisture content of food ingredients, product shape and content, porosity of coating, and the method of frying.

Oil fried potato chips contain up to 39% oil, which accounts for 60% of their calories. Fat and calorie contents of these chips are of concern to health conscious consumers. In many countries, medical authorities have implicated a high fat diet as being one of the major factors causing increased incidence of cardiovascular disease. Fats (lipids) are implicated in cardiovascular disease due to the fact that the fats are a major source of energy supplying about 9 kcal/g, whereas proteins and carbohydrates each supply about 4 kcal/g; eating a high-fat diet is conducive to obesity. High oil content is therefore a major

factor affecting consumer acceptance of oil-fried products today and the low fat food products are becoming more popular. In particular, during the past years, the American Heart Association and other health organizations have encouraged reduction of fats in foods to less than 30% of calories for most people. Saturated fat and trans-fat are the undesirable fats. Reducing oil content in potato chips is motivated by other reasons also; oil is a costly raw material and is an important determinant of the cost of a product. A high oil content often makes the chips greasy or oily. On the other hand, it is possible to make chips so low in fat content that they lack flavor and seem harsh in texture. •

TYPES OF FRYING OILS

- 1. Vegetable oils**, derived from plant sources, are the most commonly used frying oils in the food processing industry. They include canola, soybean, sunflower, and cottonseed oils, among others. These oils are high in unsaturated fatty acids, which makes them healthier than animal-based oils. Vegetable oils have a high smoke point, meaning they can withstand high frying temperatures without breaking down.
- 2. Animal-Based Oils**, such as lard and tallow, are less commonly used in the food processing industry due to their high levels of saturated fats. However, they offer excellent flavor and stability, especially when used in combination with vegetable oils.
- 3. Specialty oils**, such as olive oil, avocado oil, and coconut oil, have gained popularity in recent years due to their perceived health benefits. However, they have a lower smoke point and are more expensive than vegetable oils, making them less suitable for the potato processing industry.

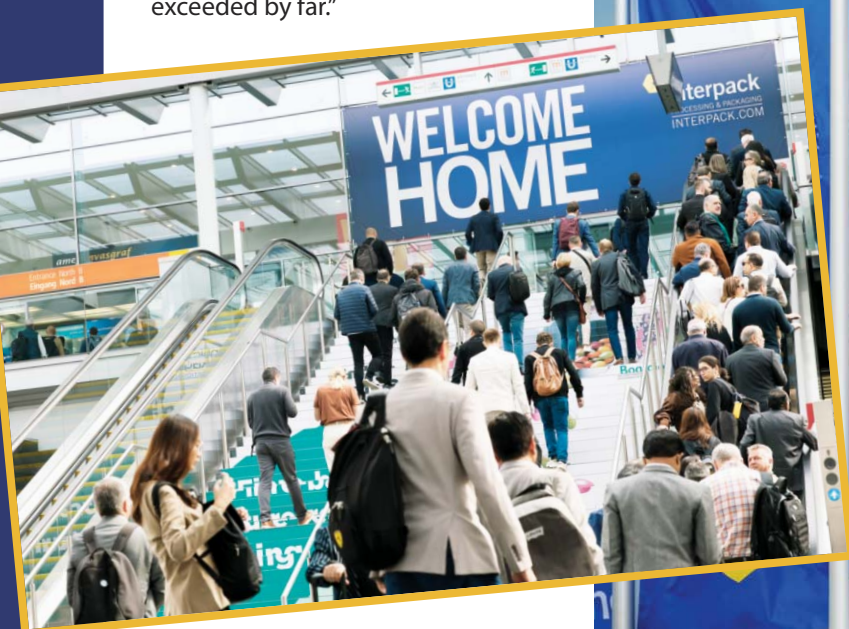
It's a Wrap! A Look at interpack Innovation Offering

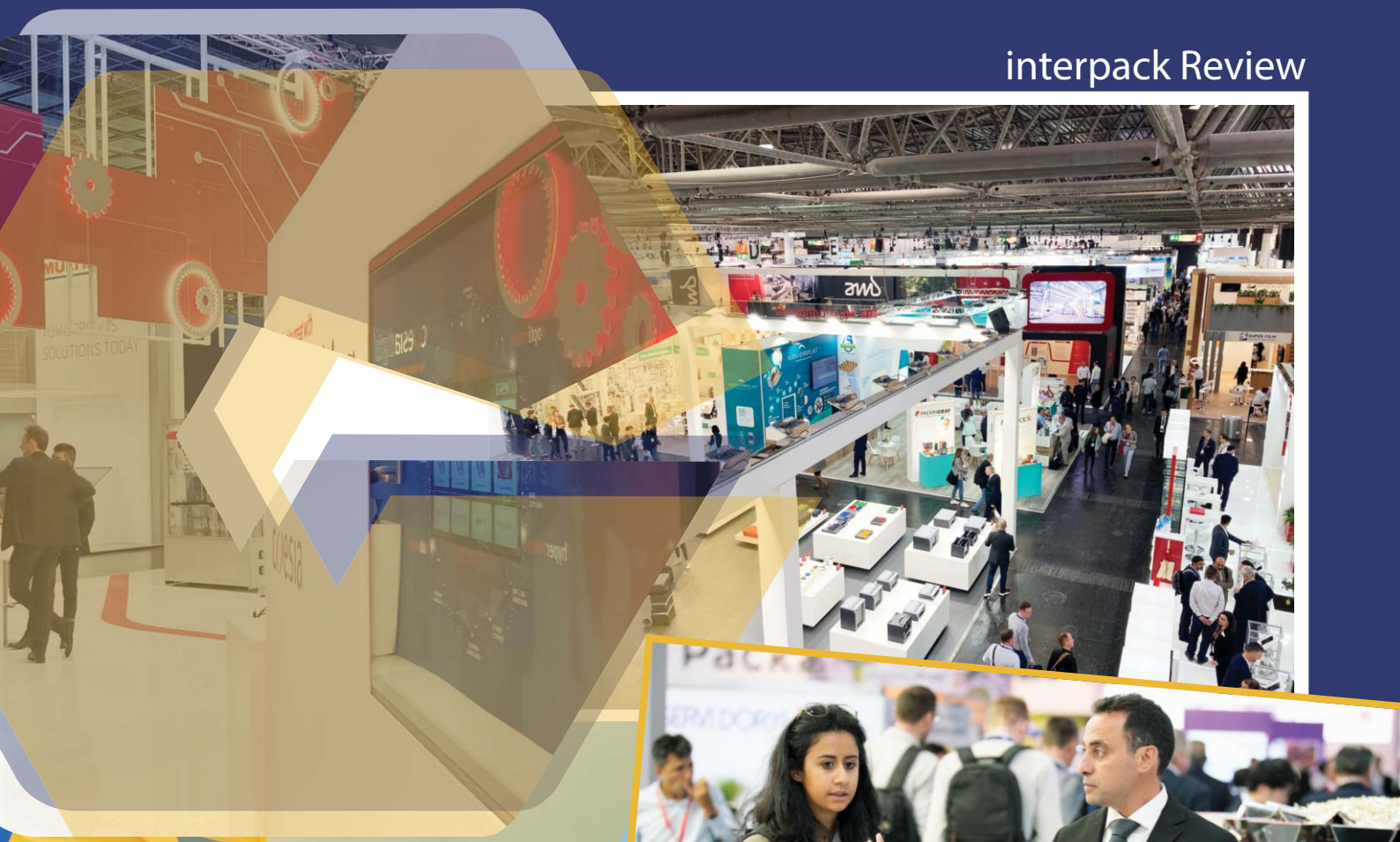
Under the heading “Welcome Home”, interpack 2023 delivered what it promised and exceeded exhibitors’ expectations: the world’s largest packaging trade fair set standards yet again from 4 to 10 May, connected the industry on a global level and acted as both a marketplace and content hub.

By Tudor Vintiloiu

Visitors from 155 countries, many with firm intentions to buy, came to interpack 2023. In all, 2,807 exhibitors showcased the power and creativity of the packaging industry with their technologies and solutions. What was easy to see were the numerous impulses, ideas and concrete business deals which will be implemented over the coming years.

At the end of the trade fair Bernd Jablonowski, Executive Director at Messe Düsseldorf, said: “With interpack we were able to finally hold one of the Messe Düsseldorf’s most important events again. It has reported back impressively and reinforced its position as the global platform for the exchange amongst all players in the packaging sector, related process industries and all user industries. Our targets were exceeded by far.”





Altogether approximately 143,000 visitors travelled to interpack in Düsseldorf, two thirds of them coming from abroad. Alongside many European countries, the largest visitor nations were India, Japan and the USA. Around 75% of visitors came from middle or top management. “interpack 2023 will reverberate with us for a long time – both in business and personal terms,” says Director Thomas Dohse after seven trade fair days adding: “The mood in the halls was great and the inter-cultural exchange enriching for all sides. It was ‘simply unique’ again.” Considering current market developments, the enormous challenges but also the even bigger opportunities, this interpack definitely proved one of the most important ones in its history. interpack’s strategic orientation towards the four Hot Topics: Circular Economy, Resource Management,

photos: Messe Düsseldorf/ctillmann

Digital Technologies and Product Safety found concrete expression in numerous innovations.

EXHIBITOR HIGHLIGHTS

In Hall 5, **Tomra** exhibited its '5B', which is the ideal option for wet and IQF goods, such as French fries or chips. Tomra 5B examines color and shape flaws with unrivaled accuracy, thanks to cutting-edge camera and laser technology, an on-belt inspection zone, and a 360° view. The machine can automatically sort by size and length-to-width ratio, meeting specifications whilst maximizing the good-in-bad ratio and the recovery of saleable raw materials. Smart Ejection was another of Tomra 5B's novel features.

In addition to showing their other top-notch machinery, **Key Technology** demonstrated their VERYX optical sorter and Zephyr horizontal-motion conveyor in Hall 6. The VERYX digital sorter locates and eliminates foreign material (FM) and user-specified flaws to assure product quality, safeguard food safety, and practically eliminate false rejects while lowering labor needs. Zephyr softly transports product with little bounce to safeguard product quality and minimize noise while achieving

larger capacities than comparable horizontal-motion conveyors.

In Hall 1 visitors were able to see the latest in food-cutting technology from leading supplier **Urschel**, like the new laser-cut CC Slicer frame with a bold, improved design for increased sanitation and flexibility. The sleek TranSlicer 2520 Cutter, designed for expedited sanitation (IP69K), ideal for leafy greens, celery, or leek was also on display, along with the Affinity Integra Dicer designed to take on traditionally hard-to-process applications.

Ashworth Belts B.V., the conveyor belt manufacturer, showcased the SmartSpiral® Monitoring System – an innovative application that provides real-time remote monitoring of multiple machines at multiple locations. SmartSpiral allows access to multiple machines at multiple plant locations to continuously monitor temperature, belt tension, cage power and features the industry's first, patented bottom bearing wear sensor. Also on display at their booth in Hall 1 was the PosiDrive Spiral® System. The PosiDrive Spiral features a unique cage design that maintains product orientation,



disorientation, lowers belt tension, and increases production capacity.

Also in Hall 1, **Spice Application Systems** exhibited two new additions to the SAS product range. According to the company, the SAS electrostatic oil spray head and the SAS central control system, both deliver significant additional benefits and have been recently developed in their UK manufacturing facility.



2,807
exhibitors

143k
visitors from...

...155
countries



system Dylight. From checkweighers, metal detectors, and X-ray inspection systems, to platform scales and the applicable software solutions, through to the new automated image processing technology, visitors to Minebea Intec's stand at the trade fair received expert advice to help make their production processes even more efficient.

control solutions and "end to end" packing line solutions to meet the specific needs of the fresh food and snack food sectors. Each of the four areas of the stand also featured a brand-new Ishida development – the new CCW-AS multihead weigher, IX-PD X-ray inspection system, QX500 tray sealer, and a first look at the company's new complete snacks packing line solution.

Visitors that stopped by **tna's** booth in Hall 14 were able to enter a fully functional virtual factory that allowed for remote planning, scoping, and testing

Among many other innovations, **Syntegon** unveiled its brand-new SVX series, launching four machines for the most common vertical form, fill and seal applications in different

With systems for visual product inspection, like the VisioPointer, through to a new checkweigher, **Minebea Intec's** solutions generated a lot of interest. The checkweigher Flexus, which is also available as a high-speed version, was on display along with the X-ray inspection



of production lines, reducing carbon impact and downtime. Additionally, tna displayed its most recent vertical form fill and seal (VFFS) packing system, the tna robag 3e, along with the tna auto-splice 3, for the first time in Europe. This "Perfect Pair" can boost production uptime by up to 5% while only adding 200mm to the total amount of floor area.

food industries. The new VFFS machine series combines high pack style flexibility with intuitive functionalities, giving frozen food, bakery, confectionery, and snacks producers a wealth of easy upgrade options and access to Syntegon's digital services. State-of-the-art monitoring via the cloud-based solution Synexio allows to optimize production, while Syntegon's value-packed Service Agreements ensure maximum uptime and performance, including maintenance, parts management, and tailored training packages. •

Ishida Europe's stand at interpack 2023 presented 40 models from its extensive product portfolio, focusing on four areas of expertise: weighing technology, quality



Eastern Europe: Shrinking Acreage Leads to Large Volume Imports

Potatoes are a staple crop in Eastern Europe, with the region being one of the largest producers and consumers of potatoes and processed potato products. The market for potatoes and potato products has been evolving in recent years, driven by changing consumer preferences, the war in Ukraine and other economic factors.

By Tudor Vintiloiu

The demand for potatoes and processed potato products in Eastern Europe has been steadily increasing over the past few years. One of the primary drivers of this trend is the growing demand for convenience foods, which has led to an increase in the consumption of frozen French fries, potato chips, and other processed potato products. Another factor contributing to the growth of the market is the increasing popularity of plant-based diets, which has led to a rise in the consumption of potato-based alternatives to meat products. However, the situation in the European potato markets is not positive across the board. Growers in Europe saw the cultivation costs increase enormously and many abandoned potato cultivation, or opted to grow potatoes for other segments.

The deficit of potatoes has resulted in huge volumes of imports since September 2022 – the highest volumes in at least ten years, according to experts. The strong need for imports is also a consequence of a poor local harvest in Autumn 2022, which in turn was caused by adverse weather.

GEORGIA IMPORTS SEED POTATOES

Seed import volumes in Georgia during this pre-season (December-April) are 45% higher than the previous 9-year average for the same months, and the highest since 2015, official reports show. According to EastFruit, seed potato imports to Georgia usually kick in in December. Most active months for imports are February, March, and April. Imports peak in April, then fall significantly in May, and there are practically no imports

until the next December. As per the official trade data, in this pre-season, monthly import prices (CIF – Cost, Insurance, Freight) range from USD0.80-USD1.00. In year-on-year terms, this is a growth of about 5-10%, however, prices in Georgian Lari have reduced due to the strengthening of Georgia's currency. Similarly to the previous years, currently the seed potatoes are imported from Germany and Netherlands. Seeds from the EU are deemed to provide the best quality potatoes on the Georgian market. Generally, the farmers who have imported over the years have found that demand for quality potatoes can be good, and focusing on quality pays well. Hence we get strong imports of seed potatoes even in times when there are talks about a significant amount of farmers switching to onions.

As before, quality potatoes from the EU seeds will not take up a large share of the Georgian market. About 1800 tons of seed potatoes have been imported since December 2022. A kilogram of seeds is expected to give 10 kilograms of potatoes. Given there will also be some imports in May 2023, output from the imported seeds will exceed 18 000 tons. For comparison, total potato output in Georgia usually fluctuates around 200 000 tons.

MOLDOVA IMPORTS FOR RETAIL

The first batches of imported potatoes from North Africa arrived in Moldova in the first days of April, according to local reports. On the domestic market, the wholesale price for such potatoes was about USD1-1.2/kg, being bought and sold in retail mainly by supermarket chains. The packaging format is usually in the form of 1kg plastic trays and flow packs at a price of MDL30-35/kg (USD1.67-1.95/kg). In addition, early potatoes from the southern regions of Romania also

became available in some retail outlets of Chisinau and some other cities at the beginning of the week, EastFruit reports. The price for small wholesale lots is slightly higher – up to USD1.4/kg. Specialists of the Association of Potato Growers of the Republic of Moldova claim that they are distinguished by a lighter color and are slightly smaller than North African potatoes. Consumers can usually find these varieties being sold in plastic bags for about MDL40/kg (USD2.24/kg).

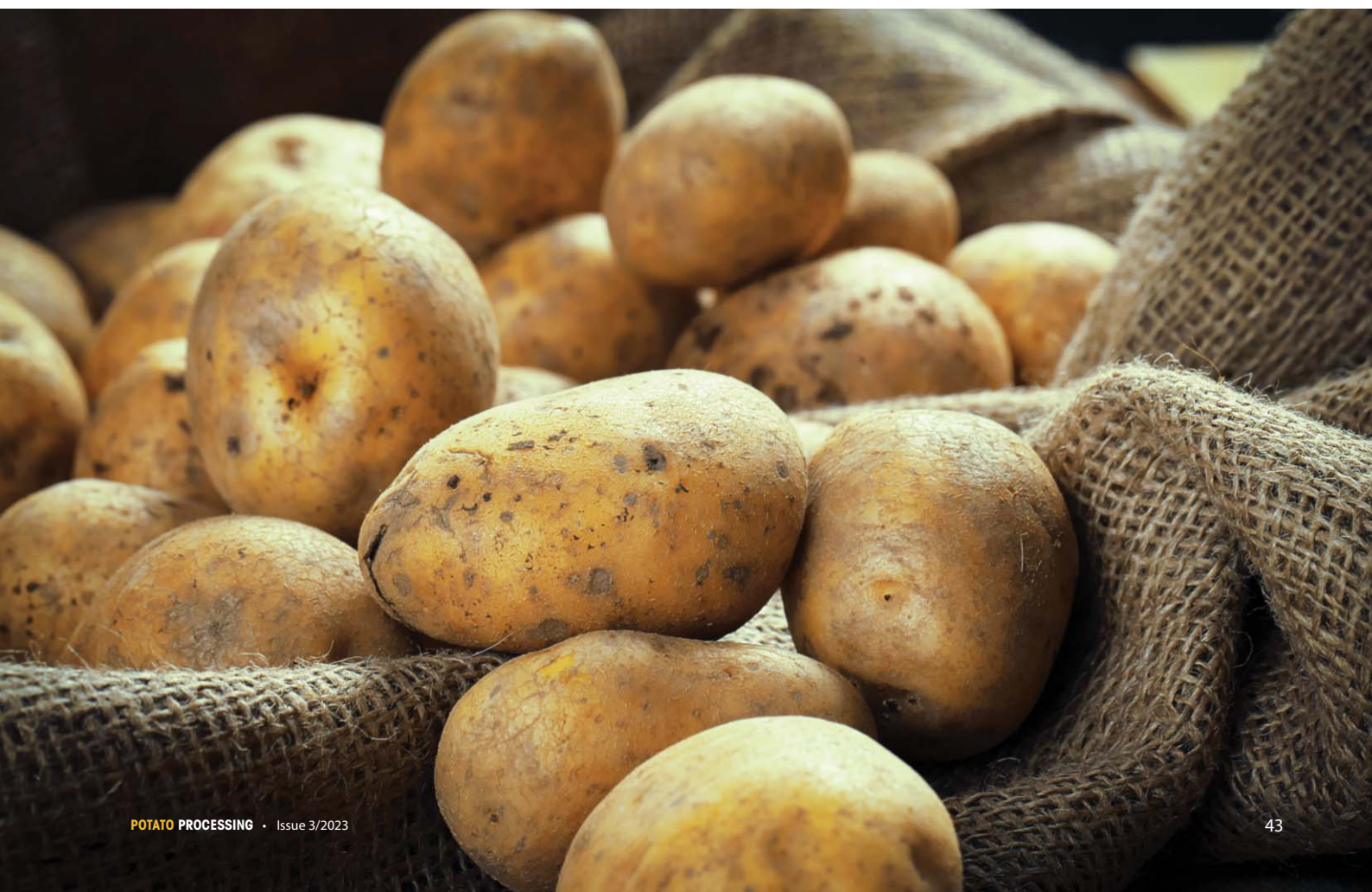
According to market operators, early imported potatoes became available about a week later last year and cost a little less than USD1/kg in small wholesale, i.e. about 10-15% cheaper than in April this year.

Forecasts of representatives of the organization of potato growers reveal local potatoes grown in greenhouses and in fields under agrill will begin to enter the Moldovan market at the end of the first decade of May. A wholesale price of MDL14-15/kg (USD0.78-0.84/kg) can be considered suitable for farmers-sellers at that moment.

However, taking into account the rather favorable weather in April and good harvest prospects, the price for new potatoes will probably be decreasing by MDL1-3/kg per week from the second half of May. However, according to the industry association, selling new potatoes in the spring is a less risky business than selling late potatoes between autumn and next spring.

OUTLOOK

The outlook for the market for potatoes and processed potato products in Eastern Europe remains positive, with experts predicting that the market will continue to grow over the next few years. Despite the positive outlook for the market, there are also challenges that need to be addressed, including the impact of climate change on potato yields and the need for more sustainable farming practices. However, with the right investments and policies in place, the potato industry in Eastern Europe has the potential to continue to grow and thrive in the coming years. ●



Not Just for Breakfast



Jonathan Thomas

Although the global market for frozen processed potato products is dominated by French fries (or chips as they are called in certain parts of the world), the category also encompasses hash browns and potato croquettes.

by Jonathan Thomas

Both are enjoyed widely throughout the world and are served and eaten during a widening range of eating occasions. In terms of their description and history:

- **Hash browns** – these have a rather obscure origin, although they are generally recognized as being invented in the US during the nineteenth century. They are made from diced potatoes, mixed with shortening and chopped onions, before being fried to form a browned potato cake. Hash browns come in a range of shapes and styles and can be purchased in frozen format, for in-home or out-of-home consumption. They are frequently viewed as a breakfast option.
- **Potato croquettes** – these also date back to the nineteenth century and have traditionally been linked with chefs in France. The word croquette comes from the French 'croquer', which translates as to crunch or bite. They are made from mashed potato, which is coated in breadcrumbs and fried. They have traditionally been regarded as more versatile than hash browns – eating occasions range from meal accompaniments to appetizers, suitable for all times of the day. Over the coming years, global demand for hash browns and potato croquettes is expected to benefit from the further expansion

of the market for frozen potato products. According to Future Market Insights (FMI), this market was valued at USD58.5bn in 2022, with annual growth expected to average almost 6% for the period leading up to 2032. Much of this is projected expansion is likely to result from greater urbanization of the population in countries such as China and India, together with the accompanying increase in demand for processed and convenience foods as income levels rise. The ongoing expansion of the quick service restaurants (QSRs) sector in these parts of the world – driven by the activity of suppliers such as McDonalds, KFC and Burger King – should also assist the global market. At present, the market's largest sector by some distance is French fries, which accounts for over 40% of global sales. However, the fact that more adventurous consumers in many parts of the world are now inclined to seek out alternatives to traditional French fries and chips augurs well for products such as potato croquettes and hash browns. Much of the consumer appeal of these products stems from their convenient cooking and preparation nature, as well as their texture and taste, i.e. the combination of a crisp outer coating and a soft interior made

from potatoes. Additionally, efforts to improve the health profile of these products remain ongoing – for example, levels of saturated fat have been lowered by switching from beef tallow to vegetable oils during the frying process. Furthermore, the range of occasions on which these products are eaten also appears to be changing.



Although breakfast remains a key market for hash browns (which will be discussed in more detail shortly), there is evidence that more experimentation is taking place in terms of consumer eating habits. Some foodservice outlets, for example, have started using hash browns as a topping for burgers, alongside other foods such as bacon, cheese and barbecue sauce.



In a similar vein, there has been greater interest in using hash browns as pizza toppings. Both applications are ideally suited for images shared on social media websites. Elsewhere, use of potato croquettes and hash browns as hot-eating snacks or appetizers also appears to be increasing, driven in part by the trend towards less structured and more informal eating patterns. It should also be noted that demand for potato croquettes and hash browns may also derive some benefit from the growing trend towards plant-based diets observed

in many parts of the world. At present, there are believed to be around 88 million people worldwide following a vegan diet, equivalent to just over 1% of the global population. This percentage is higher in certain countries – for example, it increases to around 19% in India, largely for religious reasons. With the accompanying expansion of the country's urban population and advances in refrigeration technology, India would therefore appear to represent a key future opportunity for suppliers of frozen hash browns and potato croquettes.

THE BREAKFAST MARKET

Breakfast remains one of the key eating occasions for hash browns in many western markets and, to a far lesser degree, potato croquettes. Much of the growth within this sector over the last few decades can be attributed to consumers seeking out more diverse breakfasts incorporating novel or unusual ingredients, as well as a wider spectrum of choice. It should be noted, however, that this trend also poses its own challenges, with hash browns and traditional cooked breakfasts now facing greater competition from emerging

breakfast options such as Eggs Benedict and Smashed Avocado. The UK remains one of the most important out-of-home (OOH) breakfast markets for hash browns. The popularity of eating breakfast out of the home appears to be increasing again amongst UK consumers after the market was severely impacted by the pandemic. According to the Delifrance Breakfast Report 2022 (which surveyed the opinions of 1,000 people), 24% of UK consumers breakfasted out-of-home during a typical week, compared with 19% during the weekend. This habit appears to be most deeply ingrained with younger consumers, specifically those aged 18-24. In 2022, 40% of this demographic were likely to have an OOH breakfast during the working week, compared with 34% during a typical weekend. Variety of options remains a key consideration within this market – only 30% of OOH breakfast consumers are likely to eat the same breakfast every day or more days. This compares with an average of 43% for the general population. Although the consumer base is large and growing, cooked breakfasts (and by extension, hash browns) continue to face challenges from portable alternatives such as pastries, snack bars and rolls, as well as yoghurts, cereals and fruit smoothies. The data from Delifrance found that cooked breakfasts were a leading choice for 35% of respondents during the weekend. This figure decreases to 22% for the Monday to Friday period, mostly owing to the

lack of preparation time available for workers and parents in the week. Although cooked breakfasts are not always recognized as the healthiest option available, they are linked with advantages or benefits – for example, some consumers felt they provided energy first thing in the day, as well as reducing the likelihood of snacking before lunch. Separate data from Lumina Intelligence found that breakfasts accounted for just over 4% of all OOH eating occasions in the UK during 2022, up from 3.5% the previous year. The market leader is McDonalds, accounting for over 12% of all OOH breakfast eating

occasions, ahead of Greggs, coffee shop chains (e.g. Costa Coffee and Starbucks) and pub group JD Wetherspoon. Meal deals – i.e. the combination of a hot drink with a morning roll or pastry – remain one of the staple offerings from outlets such as Greggs, as these are perceived as convenient and offering value for money. Elsewhere, breakfast menus are becoming more diverse at dine-in outlets, encompassing options such as pancakes, waffles, Mexican-style wraps and even burgers. Hash browns appear to be holding their appeal within UK breakfasts – according to a YouGov survey, 60% of respondents would include them as part of their ideal cooked breakfast, alongside items such as bacon, fried eggs, sausages and baked beans. However, the campaign group English Breakfast Society spoke out against hash browns during the first quarter of 2023, claiming they should not form part of what might be termed a traditional cooked breakfast. According to the Society, hash browns have only been popularized as a cooked breakfast component in the UK due to their presence in the McDonalds menu and should



be replaced by an alternative such as bubble and squeak (a traditional British dish made from cooked potatoes, vegetables and other leftovers and then fried).

Within the last year, hash browns have been one of the contributors towards the increased cost of cooked breakfasts in the UK. During the early months of 2023, it was revealed that the average price of a full English breakfast had increased by almost 20% compared with 12 months earlier. During this time, the average price for hash browns rose by 37%, while the cost of eggs and baked beans increased by 41% and 32% respectively.

MANUFACTURERS & NPД

From a supply perspective, the market for frozen hash browns and potato croquettes is dominated by the world's leading processed potato manufacturers. The market leader is McCain, which supplies hash browns via retail channels in major markets such as the UK, the US and Australia. In the US, its foodservice range includes products such as Skin-On Hash Brown Cubes, Hash Brown Rounds and Babycakes Seasoned Hash Brown Bites. It also supplies Shredded Hash Brown Bites and Hash Brown Ovals and Triangles under the Ore-Ida brand. In Australia, the McCain range has recently been extended with Quick Cook Hash Browns, which appear under the Speedy Solutions brand. As its name suggests, the products within this range emphasize quick cooking. One of its leading rivals is Lamb Weston, which operates in most parts of the world. It represents one of the world's leading suppliers of dehydrated potato flakes (a key component in the manufacture of hash browns and potato croquettes), with an annual output of more than 30,000 tonnes. In the US, its foodservice range includes Waffled Hash Browns (which resemble Belgian-style waffles), Side O'Browns and Home Browns. The company also occupies a major presence within the EMEA region, where it operates from its

headquarters in the Netherlands. In this part of the world, the company's foodservice range includes Pommes Croquettes, Hash Browns and Mini Hash Browns. Also marketed as a suitable appetizer or side dish are Rosti Rounds, which are similar to croquettes in that they are manufactured using potatoes, chopped onions and herbs. These are available in normal and king-sized formats.

Also present in the large US market is JR Simplot, which supplies a range of products to the foodservice industry. These include Hash Brown Patties, Cubed Hash Browns, Sliced Hash Browns and Shredded Hash Browns. Also included in its range are formed products of a similar consistency, such as Tater Triangles, Tater Bucks and Tater Sticks. Many of these are now being promoted as a suitable finger food in foodservice applications, as well as an unusual component of other dishes such as burritos.

Aviko, which competes in 110 of the world's countries, also occupies a leading position within the global market for frozen and chilled potato products. It forms part of the Dutch-based Royal Cosun Group, which has annual revenues worth around €2bn. Its range includes Hash Browns and Hash Rounds, both of which are targeted at breakfast applications, as well as Rosti Mix – this can

be used as an ingredient to various dishes, such as potato-based toppings for pies. Also part of the Aviko range are Potato Croquettes and Oven Croquettes, which are coated in a light golden crumb to produce a crisp outer layer. Despite the relative maturity of the category, other efforts at innovation have been apparent for hash browns. In the UK, the Heinz range was recently extended with frozen Bean Filled Hash Browns – as their name suggests, they are hash browns filled with baked beans. However, these garnered mixed reviews from consumers, with some complaining about a perceived lack of beans within the hash browns. Another launch from the UK was own-label Quarter Pounder Hash Browns, which were introduced by frozen food retailer Iceland. Made with shredded potato and onion, they are targeted at breakfast occasions. These were somewhat more successful than the Heinz offering, selling out online shortly after being launched. •



Sensing Trouble in Storage

The use of sensors and data gathering technologies in the management of potato storage facilities has revolutionized the way that farmers and producers approach the storage and preservation of their crops. With the help of these technologies, it is now possible to monitor key variables such as temperature, humidity, and carbon dioxide levels, ensuring that potatoes are stored under optimal conditions and minimizing the risk of spoilage and loss.

By Tudor Vintiloiu

Sensors and data gathering technologies are used to collect data from various points within a storage facility, providing real-time information about the conditions in the facility. This information can then be used to automatically adjust the environmental conditions within the storage facility to ensure that the potatoes are stored under optimal conditions. Data gathered from sensors can be analyzed using specialized software, which can provide valuable insights into the performance of the storage facility. For example, data can be used to identify patterns and trends in temperature and humidity levels, allowing farmers and producers to make informed decisions about the optimal storage conditions for their potatoes. The use of sensors and data gathering technologies in the management of potato storage facilities has several advantages. First, it helps to minimize the risk of spoilage and loss, ensuring that stored potatoes remain in good condition and can be sold at a higher price. Second, it can help to reduce energy consumption and costs by optimizing the environmental conditions within the storage facility. Finally, it can help to improve the overall efficiency of the storage process, reducing the time and labor required to manage the facility.

REDUCING FOOD WASTE

Cellar Insights is a Canadian AgTech firm that uses sophisticated sensors and cloud-based algorithms to remotely monitor the health of potatoes in long-term storage. The system incorporates predictive algorithms and provides management with insights to maximize returns.

Millions of potatoes are stored in enormous climate-controlled buildings for up to 11 months. Farmers face an increased risk of loss due to shrinkage, quality reductions, disease, sprouting, or rotting during such long storage durations.

“We’re extremely pleased to be launching Cellar Insights. Reducing food loss and optimizing the quality of crops post-harvest is an issue of worldwide importance. Potatoes are the world’s third most important food crop, produced in over 100 countries. It is an essential and nutritious food staple, which has led to soaring cultivation rates in India and China. In North America, production value exceeds USD4bn annually, with retail sales approaching USD14bn. Unfortunately, potatoes and other root crops – such as carrots and onions – experience significant losses during storage. Effective storage management practices are vital, and we believe Cellar Insights offers a compelling solution,” said Martin Vetter, a venture partner with Carrot Ventures, a company formation platform.

Potato preservation procedures vary greatly in sophistication around the world, with losses ranging from 10% to 25%. Cellar Insights' mission is to provide farmers with a dependable solution for remotely monitoring and controlling the health and value of their stored root crops. Cellar Insights will begin its commercialization journey right away, including recruiting farmers and potato processors to participate in field-testing this year.

DISEASE MANAGEMENT

Despite increased advances in food production, microorganism-caused rot destroys half of the world's harvested food. Plants emit a variety of volatile organic compounds into their surroundings, which can be monitored to detect plant disease early and prevent food loss. A study led by the Hebrew University of Jerusalem (HU) and Israel's Agricultural Research Organization (Volcani Institute) details the success of a biological sensor for the early detection of hidden disease in potato tubers, one of Israel's leading export industries with 700,000 tons produced annually. Israeli farmers purchase European potatoes to plant in Israel. However, a small percentage of them carry disease within them, either visibly or invisibly, which causes rot and significantly reduces the quality of the potato. The collaboration

between Hebrew University and Volcani is about to change that. They've created a sensor that detects disease and can be used to prevent it from spreading. Dr. Dorin Harpaz and her Ph.D. student Boris Veltman conducted the research at HU's Faculty of Agriculture, Food, and Environment, under the supervision of Dr. Evgeni Eltzov of the Volcani Institute. Dr. Sarit Melamed and Dr. Zipora Tietel of the Volcani Institute, as well as Dr. Leah Tsrur of the Gilat Research Center, were part of the team. The sensor is based on clever bioengineering and optics. When the sensor is placed near an infected potato, a bacterial compound within glows, with the intensity of the glow indicating the concentration and composition of the rot. "The intensity of the light given off by the bacteria panel makes it possible to quickly and quantifiably



analyze the characteristics of the disease, which the sensor can ‘smell,’ before the appearance of visible symptoms,” Eltzov declared. In his turn, Harpaz added that the biosensor they’ve developed will help identify diseased potatoes that do not yet have any external indications and keep them away from healthy tubers, thus preventing the rot from developing or spreading to other healthy plants. The bacteria panel was created by combining four genetically engineered bacteria that measure biological toxicity. The biological sensor detected disease before there was any visible trace in this study, causing the optical sensor to shine twice as brightly as the sensors in non-infected potatoes. Their capabilities were previously demonstrated in a study that used the sensors to detect toxicity in artificial sweeteners in sports supplements. According to the researchers, early disease detection, before the potatoes are exported or replanted, provides a significant advantage to food growers.

“The biological sensor can be used to quickly and economically identify hidden rot in potatoes, facilitate better post-harvest management, and reduce food wastage - particularly important given the current global food crisis,” Harpaz concluded.

OTHER CHALLENGES

Despite all these advantages, there are some challenges associated with the use of such smart technologies. For example, the sensors and equipment required to gather data can be expensive, which may limit their use to larger farms and producers. In addition, the data gathered from sensors can be complex and difficult to interpret, requiring specialized knowledge and expertise to analyze and understand. This means that there is a need for training and education to ensure that farmers and producers are able to effectively use these technologies to improve their storage facilities. Furthermore, there are also concerns around data privacy and

security. As more data is gathered and analyzed, it is important to ensure that this data is stored securely and that appropriate measures are taken to protect the privacy of farmers and producers. Despite these challenges, the benefits of using sensors and data gathering technologies in the management of potato storage facilities are clear. By providing real-time information about environmental conditions and potato movement within the facility, these technologies can help to optimize storage conditions, improve efficiency, and reduce the risk of spoilage and loss. As such, the use of sensors and data gathering technologies in the management of potato storage facilities has revolutionized the way that farmers and producers approach the storage and preservation of their crops. While there are some challenges associated with the use of these technologies, the benefits are clear, and they offer a valuable tool for improving the efficiency of potato storage facilities. ●

2023 FEATURE PLANNING

1

JANUARY/FEBRUARY

Ad closing 16.01/Publishing 27.01



Key Exhibitors Road Map and Event Agenda

Processes

Sorting, Pre-cleaning, Washing, De-stoning
Energy and Water Saving

Expert View

Cutting/Slicing/Dicing
Sustainability in Production

Spotlight

Cleaning and Sanitation

Markets

Western Europe

Products

French Fries in Retail and Foodservice

Ingredients

Batters, Coatings

Storage Special

Refrigeration and Long-term Storage
Sprout Suppressants in Storage

Trade shows: Potato Expo 2023, Fruit Logistica 2023

2

MARCH/APRIL

Ad closing 13.03/Publishing 22.03



Key Exhibitors Road Map and Event Agenda

Processes

Conveying Systems and Belts
Process Monitoring

Expert View

Automation - Ensuring a Reliable and Flexible Production Flow
Drying - Innovation in Belt and Drum Dryers

Spotlight

Smart Production/IIoT/Industry 4.0

Markets

North America

Products

Chips and Potato-based Snacks

Ingredients

Established vs. New Flavors

Storage Special

Storage Challenges and Cost-saving Solutions
Storage Design and Construction

Trade shows: World Potato Congress, Interpack 2023

3

MAY/JUNE

Ad closing 08.05/Publishing 19.05



Key Exhibitors Road Map and Event Agenda

Processes

Cutting, Peeling, Slicing
Seasoning & Coating

Expert View

PEF Applications and Advantages
Frying Technologies and Advancements
Optical Sorting - Increasing Yields, Reducing Waste

Spotlight

Alternative Energy & Increasing Efficiency

Markets

Eastern Europe

Products

Hash Browns and Croquettes

Ingredients

Frying Oils

Storage Special

Power Saving and Sustainability
Sensors and Data Gathering

Trade shows: Europatat 2023

4

JULY/AUGUST

Ad closing 17.07/Publishing 28.07

Processes

Blanching, Frying
PEF Systems

Expert View

Cutting Accuracy and Equipment Reliability
IQF Freezing for French Fries

Spotlight

Supply Chain Management & Logistics

Markets

South America

Products

Flakes & Mashed Potatoes

Ingredients

Seasonings for Chips and Fries

Storage Special

Automated Climate Control
Potato Monitoring & Quality Assurance

Trade shows: Potato Association of America Annual Meeting

5

SEPTEMBER/OCTOBER

Ad closing 04.09/Publishing 15.09

Processes

Oil Filtration Systems & De-fattening
Cooling and Freezing
Starch and By-products Processing

Expert View

Remote Maintenance and Customer Service
Complete Lines for Processing
Conveying And Product Transport

Spotlight

The Road to Sustainability

Markets

APAC/ANZAC

Products

Extruded Potato Products

Ingredients

Salt

Storage Special

Disease Management
Handling Potatoes to & from Storage

Trade shows: Potato Europe 2023

6

NOVEMBER/DECEMBER

Ad closing 07.11/Publishing 18.11

Processes

"Forming and Extruding"
Turnkey Projects
Waste Management/Upscaling

Expert View

Batch vs. Continuous Frying
Cutting vs. Hydrocutting
Pulsed Electric Field (PEF) Processing

Spotlight

Increasing Production Capacity

Markets

Global Market Predictions for 2024

Products

Seasoning Trends

Ingredients

Better for you/Clean Label

Storage Special

Store Preparation and Hygiene
Bulk vs. Boxed Storage

Trade shows: British Potato 2023



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