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INTERNATIONAL

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Issue 2 • Volume 31 • 2023

interpack 2023 SPECIAL

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Critical Sensors Keep an Eye on the Line

Spotlight
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Hot Topics at interpack 2023

Tudor Vintiloiu - Editor in chief
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As the kickoff date approaches, the packaging and food processing industry is buzzing with excitement for the upcoming interpack 2023 trade show. This long-awaited event promises to bring together professionals from all corners of the industry to showcase the latest technologies, products, and solutions that are driving innovation and shaping the future of packaging and food processing. interpack 2023 aims to be an immersive experience that will provide an excellent opportunity for professionals to network, exchange ideas, and discover new business opportunities. Visitors can expect to see a wide range of products, including packaging materials, machinery, and equipment, as well as the latest software and AI solutions for the industry.

This special issue of Potato Processing International offers a wealth of relevant information related to this event, as well as an exclusive interview with Thomas Dohse, interpack Director, who shared with us a few insights on the challenges it had to overcome as well as the long-awaited opportunities the show brings for the industry. interpack will also feature a comprehensive program of seminars and presentations from industry experts, discussing the latest trends, challenges, and opportunities in the packaging and food processing industry. These sessions will offer a glimpse into emerging technologies and provide attendees with actionable takeaways that they can implement in their own businesses.

Sessions will offer a glimpse into emerging technologies and provide attendees with actionable takeaways that they can implement in their own businesses.

"We focus on highly relevant trend and future-oriented topics for our target groups. For example, our spotlight talks & trends lecture forum will feature presentations, case studies and interactive sessions with top experts and industry pioneers," said Dohse.

interpack 2023 is set to be the most exciting and informative event in the packaging and food processing industry this year. If you are ready to take your business to the next level, then attendance is highly recommended. We look forward to seeing you on the show floor! ●

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Kellogg Company Splits into Two Separate Businesses

Kellogg Company plans to split into two market-leading, publicly traded businesses with an emphasis on global snacking and North American cereal, respectively. The Company hopes to accomplish the separation by the end of 2023. The "Kellogg's" trademark will continue to appear on product labels for both businesses globally even though the company titles will change once the split is complete. Kellanova will be the brand name for the worldwide snacking, international cereal and noodles, plant-based foods, and North American cold meal industries. WK Kellogg Co will be the new brand identity for the North American cereal company.

"Upon spin completion, we believe both businesses will be better positioned to focus on their distinct strategic priorities, execute with increased agility and operational flexibility, realize improved outlooks for profitable growth, and shape distinctive corporate cultures, each rooted in Kellogg Company's strong values," said Steve Cahillane, Kellogg Company's Chairman and CEO, and future Chairman and CEO of Kellanova.

Utz Brands Net Sales Rose in the Q4 2022

Utz Brands, Inc. recently announced financial data for its fiscal fourth quarter and full year that ended January 1, 2023. Net sales rose 17.9% to USD354.7m in the quarter of 2022, compared to USD300.9m in the fourth quarter of 2021.

The company's ongoing transition to independent operators and the consequent rise in sales discounts, which harmed net sales growth of (1.0%), partly offset the increase in net sales, which was driven by organic net sales growth of 15.9% and acquisitions of 3.0%.

Compared to last year, gross profit increased by 27.5% to USD115.4m, or 32.5% of net sales, from USD90.5m, or 30.1% of net sales. In comparison to the same time last year, when Adjusted Gross Profit was USD103.5m or 34.4% of Net Sales, it increased by 25.3% to USD129.7m or 36.6% of Net Sales.

McCain Coaldale Processing Facility Receives Investment

McCain Foods is significantly increasing its investment in Coaldale, Alberta, doubling the size of its facility and production. The USD436.9m investment initiative will generate 260 new jobs, which will significantly boost the local economy.

"The development in Alberta marks our largest global investment in our 65-year history, totaling USD436.9m while underscoring our commitment to the future of agriculture and innovation in Canada. This will fuel continued growth for the business, allowing us to serve key markets further by bringing customers high-quality potatoes that begin with our dedicated local farming community," Max Koeune, President & Chief Executive Officer, of McCain Foods mentioned. Two brand-new manufacturing lines will be built as a result of the expansion in Coaldale. The expansion project will increase the number of hourly and salaried workers who work on these lines once it is completely operational, bringing the total number of employees at Coaldale to 485. Later this year, construction on the extension is anticipated to begin.

Acquisition Wrap-up of Meijer Frozen Foods B.V.

Recently, Lamb Weston Holdings, Inc. announced that it had finished buying the remaining stock stakes in its joint venture in Europe with Meijer Frozen Foods B.V. 1,952,421 shares of Lamb Weston common stock and EUR525m in cash, subject to certain adjustments, made up the total deal consideration. In October 2022, the Company declared its intention to buy the stake.

"Having completed the transaction, Lamb Weston owns 100% of Lamb-Weston/Meijer, v.o.f., which formerly operated as a 50/50 joint venture between a wholly-owned subsidiary of Lamb Weston and Meijer Frozen Foods. With the acquisition, the Company adds five manufacturing facilities to its footprint worldwide, including four facilities in the Netherlands and one in the United Kingdom, as well as a sixth manufacturing facility operated through a 75% interest in a joint venture in Austria. These facilities produce nearly two billion pounds (910,000 MT) of finished frozen products annually," according to a recent company press release.

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FPS Food Process Solutions Expands in Mexico

FPS Food Process Solutions recently inaugurated a brand-new plant in Monterrey, Mexico. The 1,000-square-meter building offers sales, engineers, parts, and services in its entirety. The new location will offer assistance to not only Latin America but also to Canada and the United States.

"Latin America is by and far, a major export market. Our goal is to help drive production capacity as well as hygienic standards to meet global demand. With exponential growth in the meat, poultry, produce, and bakery sectors, we are in the right place at the right time to meet this demand," Jeffrey Chang, President, of FPS Food Process Solutions Corp mentioned.

With connections around the world, FPS currently serves important customers. With these anchor clients, FPS Mexico is optimistic that over the coming years, it will be able to attract more dependable clients, helping Latin America become a multimillion-dollar market.

Calbee to Consolidate Domestically and Internationally

To strengthen its activities both domestically and internationally, Calbee Inc. has set aside approximately USD1bn for M&A, automation, machinery, and facility improvements. To seek development and boost productivity, the company that produces the popular Jagabee potato fries intends to spread the investment over the following three years. A total of USD588m will be spent on M&A transactions to grow activities internationally and on general machinery and plant renovations. An extra USD441m will be spent on environmental, social, and governance initiatives as well as automation-based efficiency improvements.

"We'll position North America and China as key markets and boost recognition as a Japanese brand," Makoto Ehara, COO, recently stated who will take over as president and CEO on April 1, 2023.

New Brand Identity for The Little Potato Company

The U.S. Little Potato Company has debuted a new brand identity that includes a new emblem and contemporary, lively, fresh hues. A new digital advertising campaign, a new website, updated social media platforms, new brand figures, and new family-friendly products.

"We did extensive research to deeply understand our consumers, and what they care about is feeding their families with healthy, easy meals and finding moments of connection and joy together. We refreshed the brand with a new brand promise, to bring little moments of happiness to busy families. We bring that to life in every element of our relaunch, from the colorful logo to our characters, and our heartwarming ad campaign," Angela Santiago, CEO and co-founder of The Little Potato Company, mentioned, cited by Blue Book Services. The new package features a transparent window to highlight the fresh, whole foods inside and is made to stick out on shelves. The brand's positioning is further brought to life by the new packaging, which emphasizes key differentiators like quick cooking times of only five minutes, straightforward prep that doesn't require washing or peeling, and culinary techniques like air frying that make preparation even simpler.

'Building' With Potato 'StarCrete' Bricks on Earth and Mars

Scientists from the University of Manchester have developed a novel substance called 'StarCrete'. The material, which is twice as powerful as regular concrete and is ideal for use in building projects in extraterrestrial settings, was developed by scientists using potato starch, salt, and replicated Martian dirt. The study team showed how common potato starch can function as a binder when combined with synthetic Martian dust to create a substance resembling concrete in a paper published in the journal Open Engineering. 'StarCrete' measured 72 Megapascals (MPa), more than twice as powerful as the 32 MPa found in typical concrete. Even more powerful 'StarCrete' created from lunar dust measured over 91 Mpa. According to the team's calculations, a 25 kg bag of dried potatoes (chips) contains enough starch to make nearly half a tonne of 'StarCrete' or more than 213 bricks' worth of material. In contrast, it takes about 7,500 blocks to construct a three-bedroom home. They also found that magnesium chloride, a ubiquitous salt that can be obtained from the Martian soil, greatly increased the product's strength.

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interpack 2023: Long-awaited and 'Simply Unique'

This year interpack will again offer the packaging and related process industry the biggest international overview of the market, thereby more than earning its motto "simply unique". To help visitors not get lost in 18 trade fair halls, the halls feature a custom concept based on the core target groups food, beverages, confectionery and baked goods, pharmaceutical products, cosmetics, non-food and industrial goods.

by Tudor Vintiloiu

Around 2,700 companies from around the world will meet in Düsseldorf from 4 -10 May, 2023, to present cutting edge technologies and packaging trends from along the entire value chain, demonstrate chances for growth and respond to the challenges of the industry. In an exclusive interview for Potato Processing International, **Thomas Dohse, interpack Director**, shared with us a few insights on the upcoming trade fair and the challenges it had to overcome as well as the long-awaited opportunities it brings for the industry.

Can you tell us what your expectations are for this edition of interpack?
We are obviously excited to welcome the world of processing and packaging back to Düsseldorf in May. The last few years have been challenging to say the least but here we are, in the final stages of preparation for interpack 2023. I'm extremely proud of the team here in Düsseldorf and everything they have been able to accomplish, a fully booked show and sizable waiting list. As each day goes by, the excitement grows and we are expecting a great interpack.

What are some of the novelties this edition brings for visitors?
With so many international exhibitors, you can bet there will be a lot to see. The processing and packaging industry will show us everything it has to offer, in addition to discussing current trends and setting the course for the future. The range of products and services is therefore as impressive as ever. A new aspect since the last interpack is the addition of several digital services and offers, which are taking on a much greater role. We see ourselves as an active platform 365 days a year. A key focus here is on networking and how to better bring exhibitors and visitors together. There are also new digital tools to aid in improving your overall trade fair experience. Maximizing your time through better and more efficient planning.

Tell us a bit about your registered exhibitors. What is the return rate, what sectors are best represented and what can newcomers expect?
After the cancellation of interpack 2020, we were obviously disappointed but we still had a great deal of support from the industry. The overwhelming majority of exhibitors from 2020 retained their spaces for 2023. Also, this year we can finally implement our new hall concept, which sets clear focal points and helps visitors to more efficiently plan their time. The confectionery and bakery sectors are concentrated in Halls 1,

"interpack is the flagship of the global processing and packaging industry. It is unique in terms of its dimension, diversity, innovative strength and internationality. Nowhere else do you meet the entire industry in one place, and nowhere else do you have this density of innovations and premieres."

Thomas Dohse, interpack Director

3 and 4. Packaging materials and packaging means are also an important contact point and can be found as a cross-sectional area for all target groups in Halls 7 and 7a, 8a, 9 and 10.

The COVID restrictions have disrupted interpack's calendar, having the 2021 edition cancelled. How did that affect this edition, and what are the ramifications of that decision both for you as organizers, and for exhibitors?
Six years without an interpack is a long time. After the initial postponement in 2020, we tried to fit the event into the 2021 calendar but as we now know, the uncertainties were simply too great at the time to meet the demands of a leading trade fair. Everyone agreed on that. The industry though has continued to show its support for interpack and the 2,700 exhibitors plus the waiting list are proof of that. The processing and packaging industries are ready to come together and this year's edition might just be the most anticipated interpack yet.

Can you give us some details regarding the program?
We focus on highly relevant trend and future-oriented topics for our target groups. For example, our spotlight talks & trends lecture forum will feature presentations, case studies and interactive sessions with top experts and industry pioneers. We have the theme of co-packing and packaging innovations with several award ceremonies at the show. And we are looking forward to our first TV studio with live reports and talk shows from interpack. And we can't forget SAVE FOOD - this initiative also continues because it is really close to our hearts. The processing and packaging industries are important players in the fight against global food losses.

The trade show's motto is "simply unique". What are the features that set this event apart from other industry trade shows?
interpack is the flagship of the global processing and packaging industry. It is unique in terms of its dimension, diversity, innovative strength and internationality. Nowhere else do you meet the entire industry in one place, and nowhere else do you have this density of innovations and premieres. "Simply unique" is our self-image, claim and promise to our exhibitors, visitors and partners. We are delighted that we are once again "fully booked". This year's interpack has an extremely high status – There has been perhaps never more a need to meet. Since the last interpack in 2017, the market, political and social conditions, and above all technological progress have changed drastically.

Anything else for everyone to look forward to?
We will see a lot of new things, for example production with more efficient machines and higher levels of automation, resource-saving processes, optimized supply chains, new digital services, material innovations and countless more. We are excited about all the announced premieres and helping the industry move into the future. •

Ashworth

Hall 1 - B 82

www.ashworth.com

Ashworth, a global company, is the only conveyor belt company that manufactures and services both metal and plastic belting for straight running, turn-curve, lo-tension, and self-stacking spirals - offering customers the best solution for their specific requirements. Celebrating over 75 years of revolutionizing the future of conveyor belts, Ashworth continues to lead the market with the most conveyor belt patents in the food processing, can making, and material handling industries. Companies around the world depend on Ashworth's quality products, reliable customer service, and innovative solutions to resolve problems and increase productivity. Ashworth Factory Service offers a full range of engineering services, including system refurbishment, troubleshooting, and belt installation.

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Hall 14 - A 56

www.heatandcontrol.com

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Heinen Freezing GmbH & Co. KG

Hall 3 - E 91

www.heinen.biz

Mastering any degree means having the right person for each of your questions. We are mastering any degree on a world-wide basis. Since 2010, the company has operated under the name Heinen Freezing GmbH & Co. KG and meanwhile has left its humble beginnings behind to become the market leader for spiral systems. Our company is a member of the Amandus Kahl Group in Reinbek, Germany. Amandus Kahl is an owner-run, medium-sized, family business which was established in 1876 as a factory for mills and presses. Product Categories: Cooking Equipment, Freezing Systems/Freezers, Cooling Equipment, Dosing&mixing equipment, Drying Equipment, Industrial proofing systems.

Intralox LLC Europe

Hall 13 - D 03

www.intralox.com

Intralox is the global conveyance solutions leader, offering direct service for a broad range of industries in more than 100 countries. Machines for depalletizing, de-stacking, sorting, aligning, and feeding of empty packagings and packaging components.

Optimum Sorting

Hall 5 - E 01

www.optimum-sorting.com

Optimum Sorting develops, builds, installs, and services innovative optical sorting solutions for the food and non-food industry. All machines use cutting-edge camera and laser technology. Its high-end solutions, supported by a team with +1000 years of combined experience in optical sorting, ensure it can provide products of consistently high quality. The company's HQ is located in Belgium, with subsidiaries in The Netherlands, Thailand, and United States. A network of agents provides sales support and personalized service to customers in + 80 countries worldwide.

TOMRA Food

Hall 5 - A 41

www.tomra.com

TOMRA Food designs and manufactures sensor-based sorting machines and integrated post-harvest solutions transforming global food production to maximize food safety and minimize food loss, by making sure Every Resource Counts. The company has more than 12,800 units installed at food growers, packers and processors around the world for Confectionery, Fruit, Dried fruit, Grains and Seeds, Potatoes, Proteins, Nuts, and Vegetables. These solutions include advanced grading, sorting, peeling and analytical technology to help businesses improve returns, gain operational efficiencies, and ensure a safe food supply.
TOMRA Food operates centers of excellence, regional offices and manufacturing locations within the United States, Europe, South America, Asia, Africa and Australasia.

Urschel Cutting Technology

Hall 1 - C 34

www.urschel.com

Visit Urschel to see the latest in food cutting technology. Explore the new laser cut Model CC Slicer frame. This bold, improved design offers increased sanitation and flexibility. See the E TranSlicer® Cutter and the Sprint 2® Dicer both with built-in conveyors - ideal for complete discharge of product into totes. Learn more about the Affinity® Integra CD-L Dicer and the processing of sticky fruits. Also on display, the Comitrol® Processor Model 1700 for optimal milling of pastes and purees. Successful processors partner with Urschel to deliver intelligent cutting solutions.

Walterwerk Kiel

Hall 3 - E 73

www.walterwerk.com

WALTERWERK KIEL is specialised in the production of wafer baking machines for sweets wafers, Monaka wafers and snacks. Customers in more than 80 countries produce wafer products on JUPITER, MARS and METEOR machines made by WALTER. Sustainability has become a central aspect in the design and construction of wafer baking machines. Therefore, WALTER will take the opportunity to present its latest development at the interpack exhibition: the electrically heated oven JUPITER ELEKTRA. The e-oven will be exhibited at the WALTER booth E73 in hall3. Take a closer look and get detailed information from the WALTER staff.

interpack 2023 Gets Under Way

The unique flair of the Düsseldorf exhibition halls will once again turn into a platform for the world's packaging industry during interpack 2023: 18 halls, targeted exhibition areas, new specialty shows and forums demonstrate the industry's innovative prowess.

Visitors interested in the food industry will find everything in one area at interpack 2023. The same is true for visitors from the beverages, confectionery, bakery, pharma, cosmetics, non-food and industrial goods industries. This refined layout was made possible by a new concept for the exhibition halls, which will be implemented for the first time in 2023. Exhibitors at the accompanying suppliers' fair "components" will also be hosted in their own hall. Orientation for visitors is thus optimized, which allows visits to be planned more effectively.

CONFECTIONERY AND BAKED GOODS

Visitors will find processes and machines for packaging confectionery and baked goods especially in halls 1, 3 and 4 of interpack. As in many other sectors, concerning the packaging of confectionery, baked goods, snacks and cereals, much has changed over the recent years. Mechanical engineering companies, for example, are adapting their portfolio to include packaging made from mono material or novel materials. Digital technology is another focus for the entire industry.

FOOD, BEVERAGES, NON-FOOD AND INDUSTRIAL GOODS

The food sector is among the most favored target groups of visitors to interpack, and this shows in the breadth of their presentation. The global demand for packaged foods is increasing. Beverages and non-food products are presented together with the food sector in halls 5 and 6, as well as in 11 and 14. Around 20 percent of visitors to interpack are especially interested in solutions for industrial goods. These, too, are to be found in the same halls.

PHARMACEUTICALS AND COSMETICS

In light of global demographic changes, the industry's development opportunities are excellent. Increasing requirements within drug development result in a parallel increase in those within systems and machine technology concerning packaging and bottling of medicines. The pharmaceutical companies need universal solutions, and these are found in halls 15 to 17 at interpack, where the focus is on presenting processes and machines for packaging pharmaceuticals and cosmetics.

PACKAGING MATERIALS AND PACKAGING

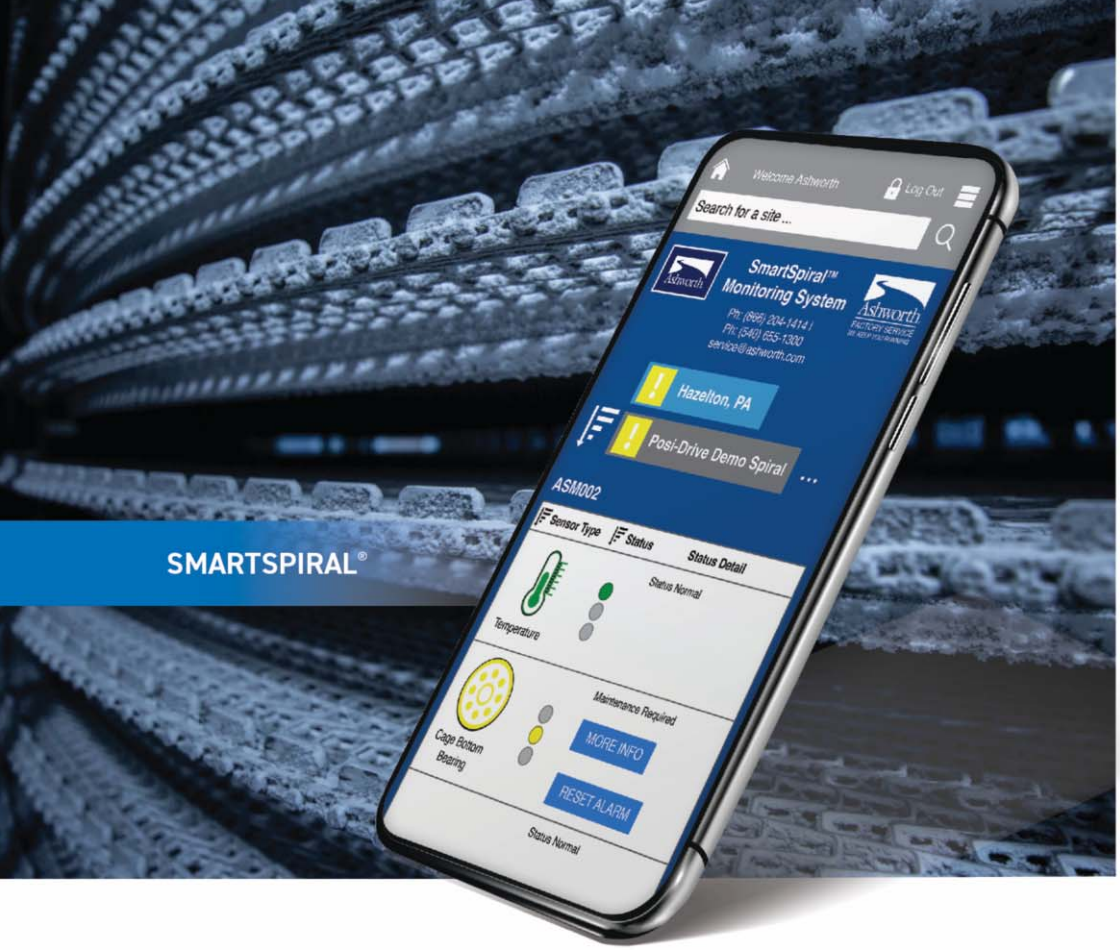
Halls 7 and 7a, 8a, 9 and 10 of interpack are of the highest importance for the sector. This is where visitors can view at least a third of all exhibitors with all their materials and their finished packaging products. Here is where all packaging materials are represented and there is an especially high number of innovations in the field of sustainability and conservation of resources.

LABELLING, MARKING, FINISHING

Inform, decorate, customize – packaging carries information. How to implement this for different products and requirements, is presented by the exhibitors in halls 8a and 8b. Here, there are machines for labeling and marking technology.

COMPONENTS

"Every part counts" is the motto of the components trade fair, which takes place parallel to interpack as its own event. This is where you find companies offering technology for drives, control units and sensors, products for industrial imaging, handling technology, industrial software and communication as well as comprehensive automation systems for the packaging industry. •



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Looking at Modern Conveying Systems with Sanitation in Mind

Conveying systems are essential in potato processing plants as they play a crucial role in transporting potatoes from one area of the plant to another. By utilizing conveyors, the entire process of sorting, cleaning, peeling, cutting, and packaging potatoes can be streamlined, making it more efficient and cost-effective. Additionally, conveyors can be customized to handle potatoes of varying sizes and shapes, and they can be designed to minimize damage to the potatoes during transport.

By Tudor Vintiloiu

One equipment manufacturer that has a broad portfolio of conveying solutions is **Key Technology**. The company has recently introduced its Zephyr™ conveyor. Achieving higher capacities than other horizontal-motion conveyors, Zephyr gently moves product with minimal bounce to protect product quality and reduce noise. Now equipped to flow in either direction, the reversible Zephyr maximizes production line versatility while improving sanitation and minimizing maintenance. "We've made design changes to our field-proven Zephyr to expand its capabilities and meet the needs of even more food processors. Previously, if customers needed to redirect a product stream, they had two options – diverter gates and reversible belt conveyors – both of which have more moving parts that require additional cleaning and service," said Rudy Sanchez, Process Systems Product Development Manager at Key. "The new modified Zephyr offers the same simple design, great sanitation and low maintenance as our standard model but now with a reversible function." The reversible Zephyr is ideal for frozen bulk foods including potato products, fruits, vegetables, meat and poultry, as well as dry products like potato chips/crisps, nuts and cereals. Zephyr's unique motion profile gently slides and conveys product with no segregation or stratification, and it reduces product damage and the loss of coatings such as seasoning, batter and certain types of oil. The Zephyr offers up to twice the throughput of other horizontal-motion conveyors, while limiting noise to 75 decibels or less. When integrated with pneumatic controls on the production floor, the reversible Zephyr allows processors to change direction of product flow with either the push of a button or automatically if fully integrated with the line. Reversible Zephyr can be configured to separate a single product stream to two side-by-side machines or even divert a single stream to two different downstream production lines to produce different products.

Zephyr's robust construction helps maximize sanitation, ease cleaning and reduce maintenance. Its easy to maintain drive system requires no timing set up and can be located in any position below the bed to support seamless integration with other equipment in the line.
With a bed width and length can be tailored for individual customer applications, Zephyr can be equipped with a variety of options including slide gates for scale feed distribution, a discharge to enhance multi-head weighing or a bias to spread product when feeding downstream systems. It can also be configured with a stop-start mode for scale feeding or product distribution. Zephyr easily accommodates varying product flow rates, maximizing the flexibility of the system to meet a broad range of customer requirements.
The reversible capability is available on new Zephyr conveyors and as a field upgrade for installed systems.

A VARIETY OF CONVEYANCE TECHNOLOGIES

Belt and vibratory conveyance are two of the most popular technologies that **PFI** designs and produces for the processing of potatoes. The company can supply solutions for a variety of processes, including dewatering, spreading, and distribution, using their proprietary technologies.
"For example, vibratory de-watering shakers that are used after potatoes are cut or vibratory distribution systems that feed multiple lines. We can also supply conveyance systems to support processes, like the inclined infeed conveyor, outfeed conveyor, and platform surrounding a scale or bagger. All these solutions are 'made to order' based on the customers' needs. (…) For more fragile products like potato chips, PFI's PURmotion builds on horizontal motion technology with patent-pending feed rate and instant reversibility control. The reversible operation can feed two lines or accumulate and store product in-line," PFI's Regional Sales Manager mentioned.
One of PFI's specialties is product distribution, and vibratory technology naturally fits in nicely with these uses. These applications heavily rely on features like variable gates, laning, bias discharges, customized frames (to reduce product drop), variable speed, and rapid stop/start controls. The conveyors that feed these systems must work flawlessly with the equipment to improve the efficiency of all processing equipment, including digital sorters, peelers, cutters, blanchers, dryers, fryers, freezers, and weighing and packaging machines. These infeed conveyors, in addition to those that collect, grade, and distribute potatoes, are crucial components in a potato processor's efforts to raise yields, improve the quality of the finished product, and increase overall equipment efficiency (OEE). Deep processing understanding, application expertise, and great conveyor selection and

equipment design engineering must come together for these integrated systems to perform at their best.

A CLOSER LOOK AT FOOD SAFETY

While technical innovations are crucial to the success of any potato processing plant, food safety is also a major concern. One of the most critical components of any conveying system is the conveyor belt itself, which can come into contact with the product and potentially transfer contaminants. To mitigate this risk, it is essential to choose a conveyor belt that is specifically designed for food processing, with materials that are easy to clean and sanitize.

The complexities of dealing with food safety and hygiene make choosing the right conveyor belt for food processing applications a crucial task. Anna Marcol, marketing communications manager at conveyor and power transmission belt specialist **Habasit**, explores the findings of a recent webinar that discussed how hygiene-rated equipment and the right choice of belt type and material are crucial in achieving food safety.

While food plant managers do a good job of keeping their facilities clean, food debris and microbes can still find their way into the smallest of dead spots. Bacteria can harbour on and in conveyor frames, under equipment, under the belt, or even in the small gaps of a modular belts. What's more, they can survive even the most rigorous cleaning cycles, leading to excessive use of detergent, water, time, and energy.

When thinking about food safety and hygiene, food processing operators should consider two key areas. They must think about hygiene-rated equipment and selecting the right food-contact elements, including belt type and material.

HYGIENIC APPROACH

In open conveyor systems, food debris can contaminate surfaces and get into crevices and internal support structures over time. While effective cleaning and sanitation plans reduce contamination, equipment and components designed specifically for hygiene can take less time, water and cleaning agents to clean and sanitise. Therefore, equipment and components should be appropriately hygiene certified for food. This includes meeting minimum hygiene standards in accordance with industry guidelines such as 3-A, NSF or EHEDG, as well as being compliant with the food contact regulations by the FDA or EU 1935/2004, and other national regulations.

Hygiene certified components consider, among other factors, the cleanability of surfaces, preventing ingress and the growth of microbes in dead spaces, self-draining surfaces or on levelling-feet or castors and much more.

BELTING

According to experts, food plant managers should consider three areas when using open conveyor systems: choosing the right conveyor design,

choosing the right food contact material to match the process conditions and selecting belts that support ease of cleaning.

A conveyor design supporting sanitary needs is one that provides easy access to belting from all sides, allowing operators to inspect, clean, sanitise and validate effectively. When selecting the right food contact material, it's important food processors choose a belt that doesn't change its mechanical properties or wear quickly when regularly exposed to harsh, chemical-based cleaning cycles, at elevated temperatures and with extended contact times.

To support engineers in identifying the chemical resistance of various belt types and materials, Habasit created a free online tool to help users decide the best belt for them. Whatever the food processing application, choosing the right conveyor belt, and ensuring equipment is designed with hygiene in mind is pivotal. This will help food processors comply with industry standards and ensure the industry can continue to reduce the dangers of contamination while making it easier for plant managers to run their facility. •

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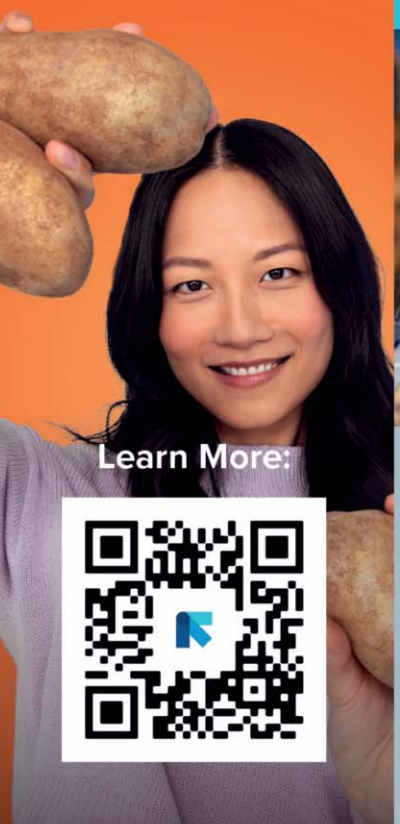

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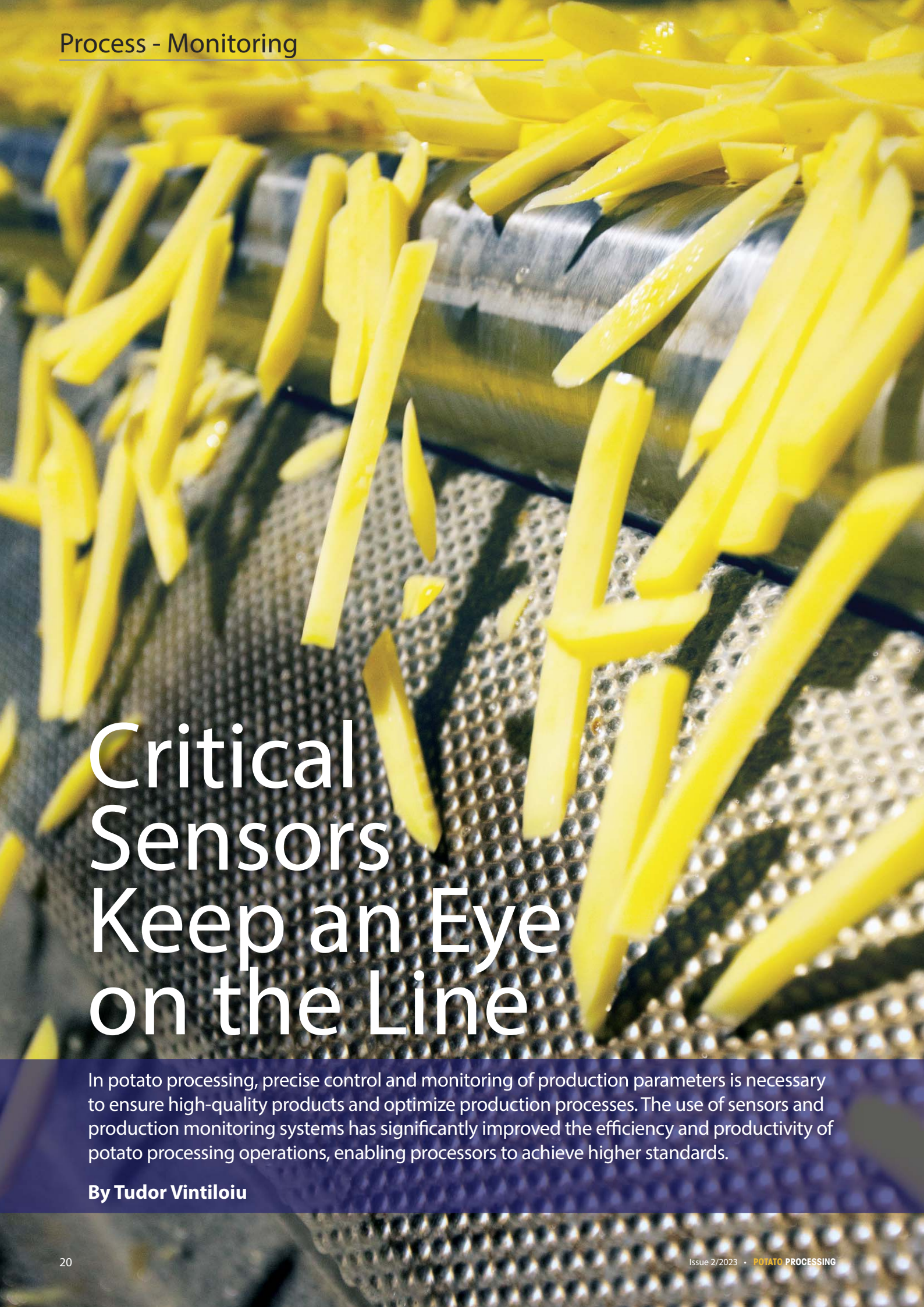

Critical Sensors Keep an Eye on the Line

In potato processing, precise control and monitoring of production parameters is necessary to ensure high-quality products and optimize production processes. The use of sensors and production monitoring systems has significantly improved the efficiency and productivity of potato processing operations, enabling processors to achieve higher standards.

By Tudor Vintiloiu

There are various types of monitoring equipment used in potato processing, including sensors, cameras, and software systems. These devices are designed to capture and analyze production data to identify areas for improvement and optimize the production process.
One of the most critical sensors in potato processing is the load cell, which is used to measure the weight of potatoes in each processing stage. This data is critical in determining the yield and quality of the final product.
Another important sensor is a device used to detect the color of potatoes and sort them based on their quality. High-quality potatoes are sorted out for further processing, while those that do not meet the required standards are removed from the production line. The use of color sensors has significantly improved the quality and consistency of potato products, resulting in better customer satisfaction and increased sales.
In addition to sensors, cameras are also widely used in potato processing to monitor production lines and detect defects. These cameras are often equipped with advanced image recognition software that can detect and classify defects such as bruising, rotting, or discoloration. This information is critical in identifying the root cause of production defects and implementing corrective actions to prevent future defects.
Production monitoring systems provide real-time information on various production parameters, including temperature, humidity, and moisture content. This information ensures the production process remains within the required specifications and that the final product meets the required standards. Furthermore, production monitoring systems provide valuable insights into production performance, revealing where there's room for optimization.
There are several production monitoring systems available in the market, each with its unique features and benefits. One popular solution is the SCADA system, which is designed to monitor and control industrial processes. This system provides real-time data on various production parameters and enables processors to make informed decisions.
Another example is the Manufacturing Execution System (MES), which is designed to manage and optimize the production process. This system provides visibility into production performance and enables processors to monitor the progress of each production stage.

OPTICAL SENSORS

In many manufacturing applications object detection commonly deploys optical sensors because when compared to other types of sensors, they provide the important benefits of precise, non-contact detection at very short response times across both long and short distances.
Also, compared to other types of sensors they are extremely compact, so require minimal space.
The two most common types of optical sensors used in potato processing are visible light and

infrared sensors. While these sensors offer several advantages, they also come with limitations and challenges that potato processors need to consider when implementing such systems.

Visible light sensors are the most commonly used sensors in potato processing. These sensors emit visible light and measure the intensity of the reflected light to determine the size, color, and shape of potatoes. The sensors can detect the presence of foreign materials, such as rocks or sticks, which are often found in harvested potatoes. Visible light sensors are also used to sort potatoes based on their quality and size.

The main challenge with visible light sensors is that they require a consistent level of light intensity and color temperature to produce accurate results. Any variation in lighting conditions can affect the accuracy of the sensor's measurements. Therefore, potato processors must ensure that the lighting conditions are consistent throughout the production process. Additionally, visible light sensors are susceptible to interference from reflective surfaces, such as shiny or wet potatoes, which can distort the readings.

Infrared sensors are another type of optical sensor used in potato processing. These devices detect the infrared radiation emitted by potatoes and are used to measure the temperature and moisture content of potatoes. Infrared sensors are also used to detect defects such as bruises and rotting in potatoes.

The main challenge with infrared sensors is that they require a clear line of sight to the potato being measured. Any obstruction between the sensor and the potato, such as dust or steam, can interfere with the readings. Additionally, the accuracy of infrared sensors can be affected by the color of the potato skin, which can vary depending on the potato variety and growing conditions.

Hyperspectral and multispectral sensors measure the reflectance or transmittance of light at different wavelengths, providing detailed information on the chemical composition of potatoes. For example, hyperspectral sensors can be used to determine the sugar content of potatoes, which is critical in the production of French fries and potato chips.

The main challenge with hyperspectral and multispectral sensors is that they are expensive and require specialized expertise to operate and interpret the data. These sensors can also be affected by variations in environmental conditions, such as humidity and temperature, which can affect the accuracy of the measurements.

REAL-WORLD APPLICATIONS

Marco Colombo, Global Potato Category Director, TOMRA Food says that food safety, product quality, elimination of food waste, and yield optimization are among the benefits of their optical sorting systems. "These machines sort according to each individual customer's specification on length and defects (TOMRA offers a 'Sort to Spec' feature). They detect and analyze each and every potato or strip or chip that gets processed on the line. They do this with accuracy and consistency. And they're reliable."

Full 360-degree inspection is not made, or necessary, at every sorting position on the processing line. According to the specialist, double-sided sensors are sufficient when looking for foreign material at the beginning of the processing line (where they achieve removal efficiency greater than 98%) and when conducting another, final check for foreign material prior to packing.

A 360-degree inspection is appropriate, however, in the wet strip sorting area. Here their RGBI (red, green, blue and infrared) surround inspection achieves full product coverage to look for quality defects that might also be on the side or bottom of the product. Optimal product visibility is achieved with dome positioning for high-intensity LEDs - this

ensures uniform light reflection from all visible surfaces and gives an optimal surround view to minimize shadows and see defects from all angles. Additionally, the machine can be equipped with a bottom inspection sensor to see the 6 surfaces, covering a full 360° inspection.
"TOMRA's Smart View technology also helps. With this, the camera uses infrared transmission under the belt to distinguish between product and belt, and employs software to eliminate shadow and belt stains. This results in low rates of false detection and high yields," says Colombo.
Looking at the processing plants of today and the future, the expert sees a shift from interventions needed to fix problems to interventions that prevent them. "The goal is to anticipate all that can go wrong on the line and take precautions to prevent this from happening. Sorters will increasingly communicate with the central control room and trigger alerts to report or anticipate problems, reducing unexpected line downtime," he explains.
Lukas Lackner, Vice President, INSORT says his company focuses on free fall sorting equipment for whole potatoes and finished frozen product. "We inspect the product from top and bottom to detect any FM and product surface defects. Our Chemical Imaging Technology (CIT®) provides the most reliable FM detection and allows us to detect invisible defects like sugar ends and glassy potatoes. CIT® combined with high resolution RGB color camera technology on our sorting equipment is setting benchmarks in the potato processing industry."
Referring to the need for ever-faster lines, while maintaining sorting precision, Insort's specialist says this continues to be a constant battle. "Building bigger machines has been an easy solution in the past but is also reaching feasibility limits. New software features, improved inspection technologies and mechanics are some of the developments that help with increased capacities and improving good-to-bad ratio."
By removing defective potatoes early in the processing stage, optical sorters help to reduce waste throughout the entire production process. This means that fewer resources are used to process and transport unusable potatoes, which in turn reduces energy consumption and greenhouse gas emissions. Additionally, optical sorters can help to improve the quality and consistency of the final product, which can lead to increased customer satisfaction and loyalty.
"Our Peel Scanner and Peeler Control is a prime example of what significant impact optical sorting equipment can have on food waste reduction, energy savings and overall increase of yield for our processing customers. Additional processing and product quality data generated by optical sorters in the line will further contribute to improving the efficiency of each processing step. Separating FM from defective product and splitting defective product into different categories further reduces food waste while creating new revenue streams for processing companies," Lackner concludes. •

A.I. and Digitalization Is the Way Forward

The use of AI and smart technology in industrial environments has revolutionized the way businesses operate. AI and smart technology have made it possible to automate several stages in potato processing, including sorting, grading, and packing. These technologies optimized production processes and increased output, leading to more efficient operations and increased profitability.

By Tudor Vintiloiu

The industry is in a transitional phase, which is being accelerated by rising energy and raw material costs. Processes honed over many years based on full employment and robust supply chains will inevitably have to change, but where manufacturers are driven to achieve efficiencies there are benefits to be reaped if changes are addressed in the right way.

According to Natasha Avelange, Group XR Manager–Projects, at **tna solutions**, transition – or change – presents opportunity, and the way to take advantage in a digital age is to leverage technological advances. In short, digitalization is the way forward!

WHERE DO WE BEGIN?

This is inevitably the first question that occurs, and tna's expert believes the answer lies with a partner with the portfolio and expertise to advise from the outset and to deliver in the short, medium, and long term. OEMs have increasingly moved from the role of commodity suppliers to consultative partners, supporting customers as they adapt to evolving trends, and by working with an expert partner that is not only well-versed in digitalization but that also has the capital equipment and software to support it in-house, the journey starts to become easier very quickly. "Help is the operative word, and alongside it support, as making the decision to forge ahead with digital solutions can be daunting. However, once made the benefits offered by digital technologies are – in effect – endless and can be seen to deliver value very quickly. In the following sections we will highlight three of the most prominent examples of how digitalization can make a positive impact, addressing not only the need for efficient energy consumption and increased automation, but also how integrating technology can help to protect margins and therefore profitability," says Avelange.

END-TO-END CONTROL

Having a complete operational overview and the ability to control it

is key. IoT-based technologies such as advanced self-learning software, artificial intelligence (AI) and wireless connectivity protocols provide the digital functionalities necessary to deliver seamless integration between various line components – driving efficiencies in a range of areas. "If we take a vertical form fill and seal system (VFFS) as an example, real-time protocols now come as standard which, along with smart diagnostics and remote connectivity, enable food producers to optimize their lines in real-time via detailed packaging performance reports. Should any challenges arise, the smart operating system and remote communication features within the system give operators access to targeted global servicing support to get production back up and running quickly and easily – minimizing downtime," Avelange added.

Seamless, wireless integration between line components also enables operators to calibrate an entire line to produce almost any product type – which cuts changeover times dramatically. This has a tangible, positive impact in terms of line efficiency, as all factors that have the potential to slow down production can be minimized. In the production of potato chips, for example, blockages or errors in the conveying system can be communicated automatically to the seasoning, frying, and weighing equipment, which prevents product waste and alerts operators to the issue before it causes costly downtime or compromised batches.

Modern food production facilities use several different layers of control and monitoring protocol, structured as follows:

- Enterprise resource planning (ERP) software – sets out goals at a company-wide level
- Manufacturing execution systems (MES) – manage big-picture production planning
- Supervisory Control and Data Acquisition (SCADA) systems – supervise production lines while in use
- Programmable logic controllers (PLC) – programme individual equipment operation
- Actuators, sensors and Human Machine Interface (HMI) – collect the real-time data that feeds the entire process.

The performance data captured from the above can be used to set accurate, bespoke production targets and, with this information at their fingertips, site managers can establish an effective predictive or preventative maintenance strategy – a valuable, proactive approach to avoiding unplanned stoppages.

THE POWER OF IMAGE PROCESSING

Another example of AI and smart technology in potato processing is the use of machine vision systems. These systems use cameras and image processing algorithms to detect and sort potatoes according to their size, shape, and quality. The system can quickly and accurately grade potatoes, reducing the need for manual labor and increasing efficiency.

Qtechnology (qtec), a global end-to-end developer of customized industrial cameras and turn-key machine vision systems, recently announced that its leading modular AMD Ryzen embedded V1605B APU-based camera platform running GNU/Linux will now be powered by Hailo-8™. The enhanced qtec camera series is already being utilized by customers, most notably Newtec Engineering, which reported a 400% increase in the number of pixels processed, a decrease in power consumption, and faster AI model development and deployment using well-established libraries such as Tensorflow and Pytorch.

Production processes powered by AI are key to the smart factory of the future; without it, manufacturers face bottlenecks and high operational costs when producing, managing, and sorting goods.

To meet these challenges, qtec is now integrating the Hailo-8 into their embedded cameras for industrial use, significantly improving their performance. With easy integration via the PCIe connection, an intuitive software development kit (SDK), and available Yocto recipes, the Hailo-8 ensures fast and efficient AI processing in

real-time, while keeping energy consumption low. The Hailo-8 handles inference of high-resolution images, unburdening the qtec cameras' available CPUs and GPUs so they can prioritize other tasks.
"Hailo's AI chip is designed to perform a large number of parallel operations. This enables our embedded cameras to efficiently incorporate neural networks into demanding industrial processing pipelines," said Aleksandar Topic qtec Software Engineer. "Dedicated components such as the Hailo-8 help us optimize how valuable resources are allocated, which ultimately allows us to perform more sophisticated analysis for our customers."
Newtec Engineering relies on qtec's embedded cameras in the production of their optical sorting machines for agricultural products. With the addition of Hailo's AI chip, Newtec can now run larger AI models in real-time, leading to improved performance for their customers. In addition, the low power consumption of the Hailo-8 helps manufacturers better manage challenging thermal conditions machines often face in rugged climates.
"qtec is empowering industries by providing them with powerful machine vision systems used in industrial applications to solve real-world problems in a large variety of industries worldwide," said Orr Danon, CEO and Co-Founder of Hailo. "With the Hailo-8, these systems will be even more powerful, ushering in a new era of smart factories powered by AI at the edge."

OTHER BENEFITS

AI and smart technology can also be used to optimize the production process itself. For example, predictive maintenance algorithms can be used to anticipate when equipment will require maintenance, reducing downtime and increasing productivity. Similarly, machine learning algorithms can be used to optimize the use of raw materials, reducing waste and improving the overall efficiency of the process.
Finally, cutting-edge technologies can also improve worker safety. For example, robots can be used to perform dangerous tasks, reducing the risk of injury to human workers. Similarly, sensors can be used to detect unsafe working conditions and alert workers to potential hazards.
Overall, the increasingly popular use of modern technologies in the processing of potatoes has started a revolution in the industry, making it more efficient, profitable, and safe. These technologies have made it possible to automate several stages in the production process, optimize the use of raw materials, and improve product quality. As the industry continues to evolve, we can expect to see even more innovative uses of AI and smart technologies, further enhancing the efficiency and profitability of potato processing. •

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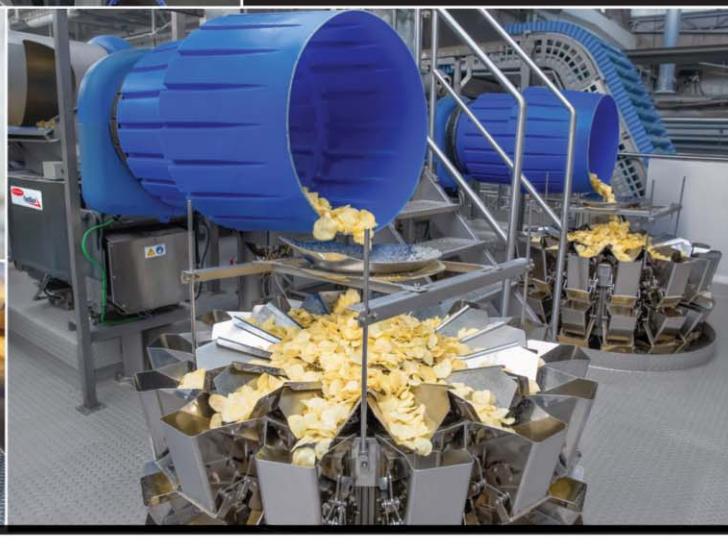

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Quality Belgian potato snacks

In a Changing Snack Market, Quality Belgian Potato Products Remain Consistent

Across both retail and hospitality in the UK, crisps and other potato products have long been the leaders in the savoury snack market, typically accounting for around a third of the entire category[1]. With the introduction of high in fat, sugar and salt (HFSS) regulations in the UK, and a general consumer trend towards healthier eating, the expectation was that crisps' supremacy in the snack market would weaken, however, is there cause for a more positive outlook? The lifting of restrictions and a move toward a hybrid working model has revitalised the on-the-go market, while the long-lasting impact of the pandemic has meant at home snacking occasions have remained high, and although a trend toward healthy eating is evident, 73% of consumers reference taste as a more important influencer on purchase opposed to a products healthiness[2].

Quality Still Key

With taste still the top priority for UK consumers, to maximise the opportunity the current snack market affords, producers and wholesalers should prioritise the quality of the raw materials and innovation in flavour. The rich, fertile soil, mild climate and long-held potato growing traditions ensure Belgian potatoes are the perfect, raw ingredient for crisps and other innovative, potato snack concepts – and producers and wholesalers have an almost unlimited choice of standard and bespoke products, formats, coatings and packaging.

The need to focus on quality raw ingredients is doubly important for producers who are looking to develop healthier, alternative products. There is great opportunity to capture more health-conscious consumers by retailing potato-based snacks with lower fat and salt content by looking at alternate cooking methods such as baking or air-frying, however these products are even more dependent upon premium ingredients, such as Belgian potatoes, as they reflect the true taste of the potato even more than traditionally prepared crisps.

FRESH FROM BELGIUM

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Look to Sustainability for Long-Term Growth

As with so many products, sustainability is forecast to be a more and more important factor on consumer purchase in the snack market. In fact, The IBM Institute for Business Value (IBV) recently conducted a survey of 16,000 global consumers and found that more than half (51%) of respondents say environmental sustainability is more important to them today than it was 12 months ago[3].

Belgium leads the way in sustainable potato growing and processing, having developed approaches to tackle packaging and plastic usage, reduce the industry carbon footprint and manage water consumption to help create confidence of a sustainable product with full traceability.

This includes initiatives like the Farm to Fork Strategy, which addresses the challenges of sustainable food systems and recognises the link between people, planet and profit. A combination of efforts is allowing the market to contribute towards positive targets, such as those laid out by the European Commission like the goal to be the first climate-neutral continent by 2050. A range of efforts have been taken to increase sustainability in potato production and processing in Belgium and the sector actively participates to reach the sustainability goals.

[1] Market value of the savoury snack market in the UK, Statista, January 2023
[2] Mintel, UK Crisps, Savoury Snacks and Nuts Market Report 2022
[3] IBM, Institute for Business Value (IBV), Balancing sustainability and profitability, April 2022

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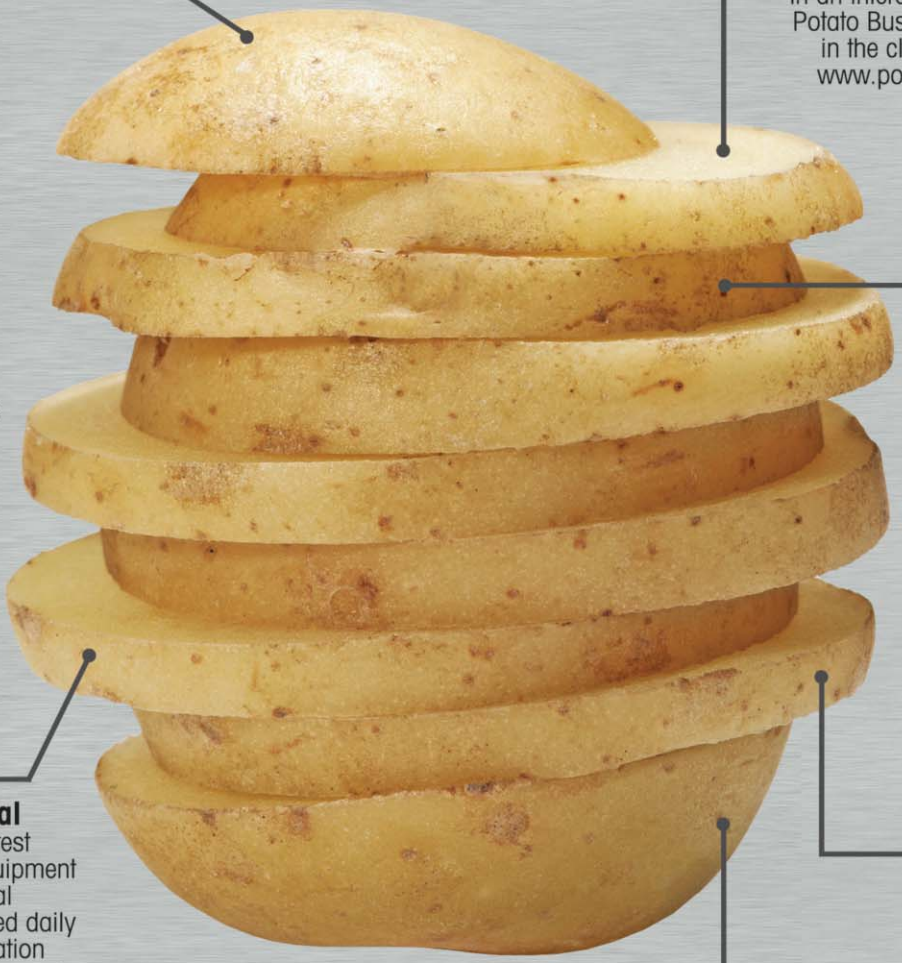

POTATO PROCESSING INTERNATIONAL

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 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.

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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.

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A COMPLETE COMMUNICATION PLATFORM

New vs. Established Flavors in Chips

Potato chips have been a favorite snack of people around the world for decades. These crispy and crunchy delights come in a variety of flavors that tantalize the taste buds and keep us coming back for more. Over the years, the taste trends in potato chips have evolved, with new flavors and taste profiles emerging to cater to the changing preferences of consumers.

By Tudor Vintiloiu

The most popular flavor in potato chips is undoubtedly the classic salted variety. This simple flavor has been a favorite of snack lovers for many years, and continues to be the go-to choice for many people. The reason for its popularity is the perfect balance of saltiness and crunchiness that makes it a satisfying snack for any time of the day. Salted potato chips are also versatile, and can be paired with a variety of dips and sauces to create delicious flavor combinations. However, the taste trends in potato chips have evolved over time, with new and innovative flavors emerging to cater to the changing preferences of consumers. Some of the most popular flavors today include barbecue, sour cream and onion, cheese, and chili. These flavors are loved by people around the world, and are a testament to the creativity and ingenuity of potato chip manufacturers. Geographical and cultural influences play a significant role in the development of potato chip flavors. For example, in the United States, barbecue is a popular flavor due to the country's love for grilled meat and smoky flavors. In Asia, flavors like soy sauce and seaweed are popular, reflecting the region's culinary traditions and preferences. In the UK, salt and vinegar is a favorite flavor, while in Australia, chicken salt is a popular seasoning for potato chips. These regional flavors are a reflection of the unique

tastes and preferences of people in different parts of the world. Availability of ingredients is another factor that influences potato chip flavors. For example, in regions where certain spices and herbs are readily available, they are often used to create unique and flavorful seasoning blends. Similarly, in areas where fresh produce is abundant, potato chips are often flavored with locally sourced herbs and vegetables to create a unique and authentic taste.

Health concerns are also a criteria that influences potato chip flavors. In recent years, there has been a growing demand for healthier snack options, and potato chip manufacturers have responded by introducing low-fat, low-sodium, and organic varieties. Flavors like sea salt, olive oil, and sweet potato reflect this trend towards healthier snacking options.

Processing requirements for various seasonings also play a role in the development of potato chip flavors. Some flavors require specialized processing techniques, such as smoking or drying, to achieve the desired taste profile. Other flavors may require the use of specific oils or coatings to ensure even distribution of seasoning on the chips.

CHANGING TASTES

There have been several shifts in the taste preferences for potato chip seasonings in recent years. Some of the most significant changes include:

- Demand for healthier options: As consumers have become more health-conscious, they are looking for healthier alternatives to traditional potato chips. This has led to an increased demand for chips seasoned with natural herbs and spices, rather than artificial flavors and preservatives.
- Adventurous flavors: Consumers are increasingly seeking out unique and adventurous flavors. This has led to a rise in popularity of chips seasoned with unusual flavors such as kimchi, truffle, and sriracha.
- Ethnic flavors: With the rise of multiculturalism and global travel, consumers are becoming more interested in trying foods from different cultures. This has led to a growing interest in potato chips seasoned with ethnic flavors such as curry, jerk seasoning, and wasabi.
- Customization: Consumers are interested in customizing their food choices to a greater extent, and potato chips are no exception. Many brands are now offering customizable options, allowing consumers to choose their preferred seasoning blends.

The drivers of these changes include a combination of cultural, social, and economic factors. As consumers become more health-conscious and adventurous in their food choices, manufacturers are responding by developing new and innovative seasoning options. Additionally, the rise of social media and influencer culture has made it easier for consumers to

discover and share new food trends, which has further fueled demand for unique and unconventional flavor options.

TECHNOLOGICAL ADVANCEMENTS

The evolution of seasonings for potato chips is strongly influenced by technological advancements in processing equipment. These advancements have allowed manufacturers to apply seasonings more efficiently and effectively, resulting in more consistent and flavorful chips. Some of the techniques for the application of seasonings include:

- **Drum Tumbler:** A traditional method of seasoning potato chips involves placing them in a rotating drum tumbler and adding seasoning powder. The chips are then tumbled for several minutes to ensure even coverage. This technique is relatively inexpensive and works well for small to medium-sized manufacturing facilities.
- **Dusting:** Dusting involves using a machine to apply seasoning powder to the chips as they move along a conveyor belt. This technique is more precise and efficient than the drum tumbler method, and can be used for both small and large-scale manufacturing facilities.
- **Spraying:** Spraying involves using a machine to apply a liquid seasoning mixture onto the chips as they move along a conveyor belt. This technique is highly efficient and provides even coverage, but can be more expensive than dusting or drum tumbling due to the cost of the liquid seasonings.
- **Flavor-infused oils:** Flavor-infused oils can be used to season potato chips during the frying process. This technique can produce highly flavorful chips, but can be more expensive and time-consuming than other seasoning methods.

In terms of cost and yield, the most efficient method for seasoning potato chips will depend on the size of the manufacturing facility and the specific seasoning requirements. Drum tumbling is generally the most cost-effective method, but may not provide the precision or consistency required for larger-scale operations. Dusting and spraying are more efficient, but can be more expensive due to the cost of the equipment and seasonings. Flavor-infused oils can provide a high level of flavor, but may be more expensive and time-consuming to produce. Ultimately manufacturers need to balance the costs of equipment and labor against the desired quality and consistency of the finished product.

INNOVATION AND DRIVERS OF CHANGE

The evolution of flavors and seasonings for potato chips has been driven by a range of factors, including changing consumer preferences, advancements in processing equipment, and the rise of social media and influencer culture. As consumer tastes continue to evolve, it is essential for manufacturers to stay ahead of the curve by identifying emerging trends and leading the way in flavor innovation.

At the same time, manufacturers must be careful not to completely abandon established taste profiles, as these flavors still have a loyal following and play an important role in the market. Instead, producers ought to try to create a balance between innovation and tradition, adding fresh, intriguing flavors while preserving the tried-and-true qualities that customers adore.

In the end, recognizing consumer tastes and preferences and reacting quickly and effectively to developing trends are the keys to success in the potato chip sector.

Manufacturers can continue to enthrall consumers and fuel growth in this vibrant and dynamic sector by exploiting technological advancements in processing equipment and being ready to take risks with innovative flavor combinations. •

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The Contribution of the Potato Industry to the US Economy

According to a recent report from the National Potato Council, the 2021 total economic contribution of the potato sector is estimated to be USD100.9bn. The contribution stemming from farm production makes up about USD10.8bn. These economic contribution estimates entail USD37.2bn direct economic activity arising from growing, processing, wholesaling, and retailing potatoes and potato products.

By Tudor Vintiloiu

The remaining USD63.7bn is made up of indirect activity from affected industries and expenditures from household consumption that can be traced back to activity generated by the potato sector.

Total employment generated by the potato sector is estimated to be in excess of 714,000 domestic jobs, of which approximately 405,000 are directly employed along the potato supply chain and more than 309,000 are employed in related industries or other businesses. These jobs command about USD34.1bn in wages and salaries per year and contribute USD53.5bn to the annual gross domestic product (GDP) of the United States.

The potato industry entails a wide spectrum of activity, from agricultural production, through wholesaling and processing and distribution ending with consumer purchases of final products through retail channels or through food service providers. Farms and businesses producing, processing, and distributing potato and potato products can be found in all parts of the U.S. and accordingly, the potato industry is present throughout the nation.

The U.S. is the world's fifth largest producer, and potatoes are the number one consumed vegetable by U.S. consumers. The largest producing state of potatoes is Idaho, followed by Washington. Other major producing states include Wisconsin, Oregon, North Dakota, Colorado, Minnesota, Maine, Michigan, Nebraska and California. States tend to specialize in the variety categories grown, though all varieties are viable in every state. Many, if not most, of the potatoes grown in the U.S. are produced under contract (Source Trace Systems 2020). Contracts are most pervasive for processing potatoes, especially for potatoes grown for fries and chips.

More than two thirds of the potatoes sold in the U.S. were used for processing in 2018. One quarter of those were used for sales to households; the rest were allocated to other uses. Food service is an especially important outlet for potatoes primarily in the form of fries.

THE INTERNATIONAL MARKET

While most potatoes grown in the U.S. are consumed domestically, foreign trade is an important outlet for potatoes. Approximately 20

percent of the potatoes grown or processed in the U.S. are exported either as fresh or processed potatoes, though the U.S. both imports and exports fresh, processed and products derived from potatoes.
Total U.S. exports of potatoes generated USD1.875bn in sales in 2021 up from USD1.667bn in 2020. The total volume of fresh potatoes making up 2021 exports was just under 3.4 million metric tons.
Processed potato shipments in the form of frozen was the most common form, followed by fresh, dehydrated, chips and seed, respectively. While fresh was the most second most common form of exports by sale value, dehydrated was the second most common form exported by volume.
Mexico and Canada were the largest export markets for all potato products in volume. However, Japan was the second largest market in terms of sales. Authors note that trade with Mexico and Canada is often two-way. All three countries participate in intermediate trade exports to one market may be for processing for export to others, including the country of origin.
Similarly, the top 10 exports for frozen potatoes in 2021, indicate Japan as the top importer of U.S. frozen potatoes. Mexico follows closely, while Canada is the fifth largest importer of frozen potatoes.
Consistent with the intermediate trade of potatoes discussed above, Canada and Mexico are the top export markets for fresh U.S. potatoes. By weight, Canada imported more than twice that of Mexico, but in dollar terms Mexico exports command a relatively higher sale price.

EXPORT VALUE ON THE RISE

The value of the U.S. potato exports increased for all potato varieties from July to December 2022 when compared to the same six months in 2021, given that global markets are showing strong signs of recovery.
The amount of U.S. shipments of frozen and dehydrated potatoes increased during this period, whereas fresh potato shipments decreased slightly.
In comparison to the same six

months in 2021, the number of frozen potato exports from the US increased by 0.6%, while the value of frozen exports increased by another 25%. All potato categories have a substantial increase in value over volume, which is indicative of global inflation and price rises.
"A few major export markets saw decreases in U.S. frozen potato shipment volume over the six months, including China (-50%), Vietnam (-38%), and Myanmar (-42%). However, many markets saw significant volume increases during this time. U.S. frozen exports increased in the Gulf Cooperation Council (GCC) region (+28%), Malaysia (+28%), and Thailand (+26%)," a recent Potatoes USA report reveals.
In comparison to the same period last year, the volume of U.S. fresh potato exports, including table-stock potatoes and chipping potatoes for processing, dropped during these six months. U.S. fresh shipment volume decreased by -8%, but their worth increased by 13% as a result of higher prices.
"Now that the U.S. can ship potatoes beyond the 26-kilometer border region in Mexico, there was a significant increase in volume (+20%) and value (+56%) for fresh exports to the market. Fresh shipments also increased by volume to Central America (+37%), South Korea (+40%), and the Philippines (+64%). However, volume was down to several markets, such as Canada (-28%), Japan (-48%), and Taiwan (-10%)," the expert behind the report added.
The number and value of American dehydrated potato exports increased by 16% and 29%, respectively, from July to December 2022. However, some countries, such as China (-13%) and South Korea (-17%), saw declines in U.S. dehydrated shipment volume throughout the six months.
"Reports from South Korea indicate that this decrease represents the significantly high U.S. dehydrated exports to the market in 2021, though buyers are maintaining confidence in U.S. supply. The large increase in U.S. dehydrated potato shipments globally was led by increased shipments to several markets. Dehydrated potato exports to Canada and Mexico increased by 19%, Japan by 16%, and Malaysia by 79%," according to the same document.
Although some foreign markets continue to report a limited supply of American potatoes, conditions appear to be getting better in many nations. For instance, food service operators in South Korea are looking to introduce new products and run promotions for American potatoes while still keeping a steady supply. Retailers and food service providers are back in operation in the majority of areas, and tourism is increasing. Price increases, however, have an impact on these marketplaces and frequently result in higher costs for the final consumer. •

Comfort Foods With a Comforting Future

Jonathan Thomas

Potato chips (or crisps, as they are more frequently called in markets such as the UK) remain arguably the most popular form of snack food worldwide. They are widely eaten across the globe, usually between meals – although, as will be discussed later, eating patterns (especially amongst younger consumers) are becoming ever more flexible, with the result that new opportunities are opening up for manufacturers of snack foods.

By Jonathan Thomas

Although potato chips and crisps continue to dominate the snack foods category in many regions, competition remains strong, not just from traditional rivals such as nuts, chocolate, biscuits and cakes, but also many of the newer and more innovative snacks coming to market based around foodstuffs like vegetables, legumes and cereals/grains.

Although estimates vary, global sales of potato chips and crisps are valued at more than USD30bn. Volume sales are also high – in the UK, for example, it is estimated that around 6 billion packets of crisps are eaten every year. Data suggests that the category benefited to a large extent from the lifestyle changes introduced during the pandemic, with people staying within the home for longer periods and therefore snacking with greater frequency. The increased stress and boredom experienced during lockdown periods also boosted sales, with potato chips and crisps seen as an affordable treat to improve moods.

Annual growth for the remainder of the current decade is forecast to average around 3-4%, driven by factors such as the launch of more products tailored towards health concerns, greater experimentation with flavors and textures and the increased tendency of many consumers to replace formal meals with snack foods. Over the coming years, growth is expected to be highest in less developed markets in regions such as Asia, Africa and Latin America. In these places, the popularity of snack foods such as potato chips and crisps amongst the expanding urban population is expected to continue growing.

According to the latest edition of Mondelez's State of Snacking report (which surveyed the opinions of consumers in 12 countries and was published early in 2023), 71% of consumers snack at least once a day, with the snacking habit most deeply ingrained amongst the younger age groups. Despite the rising cost of living, 75% of people always find room in their budgets for snack foods, a figure that increases to 80% for millennials. This is largely because snacking is often seen as comforting – the research found that 60% of consumers believed that snacking helped them to take their minds off the many issues facing the world at present.

One of the main insights from the Mondelez research was how often snacks are now replacing main meals during the course of a typical day. With the percentage of consumers skipping at least one main meal a day having grown from 30% in 2013 to 40% in 2021, snacking in the morning has increased significantly during this time. In 2022, over 60% of consumers claimed to eat snacks for breakfast (up from 50% two years earlier), while a similar percentage turned to snack foods as an option for both lunch and the evening meal. With 64% of consumers preferring to eat many small meals during a typical day (rather than three large ones), the snacking habit appears unlikely to diminish as far as eating patterns are concerned.

According to the research, 53% of consumers claimed to eat crisps, popcorn or pretzels at least once a day in 2022, up from 48% three years earlier. As can be seen from the table below, however, a higher percentage of consumers claim to eat snacks such as cakes and sweet and savory biscuits on a daily basis. Evidence exists that many consumers like to experiment with different ways of eating potato crisps and chips, even though the most conventional method – i.e. eating them one by one – remains the most widespread. According to research carried out in the UK by Doritos in 2022 (which canvassed the opinions of 2,000 adults), almost 70% admitted to adopting unconventional habits when eating crisps. Examples include crushing crisps into a powder, mixing multiple flavors and even dipping them into drinks such as tea or milkshakes.

From a supply perspective, the market faces a potential shortfall of potatoes over the coming year. Much of this can be attributed to factors such as seasonal conditions affecting the potato harvest and the rising cost of production for growers, coupled with increased global demand. In the UK, for example, data from the National Farmers Union (NFU) suggests that the cost of producing a potato increased by 20% between 2021 and 2022 – this is largely due to rising energy prices, as well as the higher cost of fertilizer. Elsewhere in the world, extreme weather conditions are having a negative impact upon potato output.

Most Popular Snacks Eaten (%), 2019-2022

	2019	2022
Cookies/sweet biscuits	60	65
Savory biscuits/crackers	51	55
Cakes/sweet bakery prod.	49	51
Crisps/popcorn/pretzels	48	53
Bread/rolls/wraps	73	79

Mondelez State of Snacking report

INDUSTRY SUPPLY & NPD

The global market for potato crisps and chips is dominated by a handful of multinational operators present in most of the world's regions. One of the most significant is PepsiCo, owner of leading brands such as Lay's and Walkers. The company continues to invest into its operations – in February 2023, its UK-based Walkers business announced plans for a new potato preparation site near its main facility in Leicester, the latter of which was upgraded two years earlier as part of an investment programme worth GBP14m. The new site will wash and grade potatoes for the company's crisps, therefore reducing transportation costs and the company's environmental footprint. Other leading suppliers of potato crisps and chips include Kellogg (owner of the Pringles brand), Campbell Soup Company (which owns Kettle Chips in the US) and the German-based Intersnack Group, which includes the KP Snacks business in the UK.

Faced with strong competition from other snack foods, manufacturers of potato crisps and chips continue to innovate, to keep consumer interest high and address their changing requirements. In

recent years, NPD has tended to focus upon one or more of the following three product attributes, each of which will now be analyzed separately:

- Health
- Flavor
- Texture.

HEALTH

The ongoing pressure from the health lobby means that manufacturers of potato crisps and chips continue to develop products offering improved nutritional profiles. Governments are also starting to address these issues via new regulations – one example is the legislation affecting so-called HFSS foods (i.e. those with high levels of fats, sugar and salt) which came into force in the UK in the autumn of 2022 and introduced restrictions governing their marketing and advertising.

Furthermore, more consumers are now inclined to seek out healthier crisps and chips. According to the Mondelez research cited earlier, 68% of respondents check nutrition labels on snack foods prior to purchase, while 84% felt that snacks should meet different nutritional requirements for different consumers.

These trends have resulted in the emergence of products offering a myriad of health claims and benefits – examples include low or reduced sodium, saturated fats and/or calories, as well as crisps and chips free from artificial additives and products manufactured using a baking (rather than frying) process.

Manufacturers of crisps and chips are also seeking out new ingredients to improve the perceived healthiness of their products, examples of which have included lentils, kale, quinoa and various vegetables. The quality of the oils used in the production process has also come under greater scrutiny, since using a high stability frying oil can help to minimize the presence of trans fatty acids.

One of the more significant new product launches within this market sector took place in the US early in 2023, when Campbell Soup Company extended the Kettle brand with new air-fried potato chips. Not only do these contain 30% less fat than the original version, but they deliver a light and crisp texture. The new chips were launched in Sea Salt & Vinegar and Jalapeno flavors. Moving to the UK market, the Pringles range was extended the previous autumn with new Multigrain varieties, which were described as containing less salt than standard chips. These were launched in BBQ Sauce, Roast Chicken & Rosemary and Sour Cream & Chilli flavors.

Many new 'disruptor' style companies are also developing products to address consumer health concerns. A recent entrant to the UK market is Mindful Snacker, which utilizes novel technology to develop crisps, which are roasted, rather than fried. These contain 50% less fat than standard equivalents, as well as under 100 calories per impulse bag, and are available via the Booth's supermarket chain in northern England. In the US, meanwhile, Christie's Chips offers vegan-friendly, clean-label potato chips positioned as healthier than rival brands. Flavors in the range include Nacho Inferno, Backyard BBQ and Sour Cream & Wild Onion.

FLAVOR TRENDS

Development of new flavors continues to represent one of the most widely used forms of NPD amongst manufacturers of potato-based snacks, in response to the ongoing growth in consumer demand for more adventurous and novel taste profiles. In the US, the summer 2022 edition of Frito-Lay's Snack Index found that 35% of consumers were influenced in their purchasing by the presence of innovative flavors. Separate research in the US from the Hartman Group found that 70% of consumers rank new and/or interesting flavors as an important influence when purchasing snacks.

Despite these findings, it should be noted that plain and/or salted varieties still account for the bulk of the global market for potato crisps and chips, while the old favorites

(e.g. Salt & Vinegar and Cheese & Onion) continue to account for a significant percentage of sales, especially in markets such as the US. Nevertheless, innovation efforts are now broadening to incorporate concepts such as salty and sweet combinations (including ingredients based on lime, lemon, maple syrup and honey), as well as flavors based on regional-specific cuisine.

Hotter, bolder flavors providing more novel and interesting taste sensations continue to appear, making use of ingredients such as wasabi and jalapeno and habanero peppers. In the US, the Pringles range now includes Scorchin' varieties with a stronger flavor, examples of which include BBQ, Buffalo and Cheddar. A more recent launch in this sector was the appearance of Epic Eats, which formed part of the McCoys range of ridged crisps in the UK. These were introduced in Nacho Cheese and Spicy Salsa flavors.

Nostalgia has also been a profitable source of inspiration for flavor development, given the troubled times of the present. In the UK market, the iconic Chip Shop Curry and Beef & Onion flavors of the Golden Wonder brand recently made a return, partly to celebrate its 75th anniversary. During 2022, a Coronation Chicken flavor of the Tyrrells brand (which is valued at GBP58m and accounts for 13% of UK sales of premium crisps) appeared to mark the Platinum Jubilee, shortly before Queen Elizabeth passed away. The same year saw the launch of a Pink Himalayan Salt & Red Wine Vinegar flavor of the Cape Cod brand in the US. The chips featured a unique pink tint in honor of Breast Cancer Awareness.

TEXTURES

Manufacturers have also sought to develop more novel textures for their products, mostly in response to consumer attitudes and behaviors. According to Frito-Lay research carried out in late 2022, 71% of US consumers favored products offering a crunch when seeking out snacks. This has resulted in a continued growth in popularity of thicker and crunchier products, as well as batch-fried products, or kettle crisps/chips. These are prepared using the batch cooking process, which results in harder and crunchier products. At the other end of the scale, the Lay's range in the Indian market was extended in 2022 with new wafer-style thinner crisps, providing a more delicate texture. These were launched in flavors such as Salt & Pepper and Sundried Chilli. •

Potato Cold Storages: Key Challenges and Cost-saving Solutions

The successful storage of potatoes is often a challenging task. Since these crops are prone to a number of problems like sprouting, shrinking, and rotting, successfully storing potatoes is often a difficult task. Many potato farmers use cold storages, which are intended to keep potatoes fresh and avoid spoiling, to overcome these difficulties.

By Tudor Vintiloiu

Because they are so effective at maintaining the quality and prolonging the shelf life of potatoes, potato cold storages are essential parts of the potato supply chain. In order to keep potatoes fresh and retain their nutritional value, cold storage facilities offer a regulated environment that manages temperature, humidity, and other factors. Running a potato cold storage facility, however, may be difficult and expensive. In order to increase productivity and cut expenses, store managers can use some of the cost-saving solutions we've outlined in this article to overcome some of the major difficulties linked with potato cold storages.

KEY CHALLENGES

- **Energy Consumption**

Potato cold storages require a significant amount of energy to maintain the desired temperature and humidity levels. According to studies, energy costs can account for up to 50% of the total operating costs of a cold storage facility. High energy consumption not only leads to higher costs but also has a significant environmental impact, contributing to greenhouse gas emissions.

• **Maintenance and Repair**
Maintaining and repairing a cold storage facility can be expensive. As the equipment ages, it becomes more prone to breakdowns, which can lead to costly repairs and downtime. To ensure the smooth operation of a cold storage facility, it is essential to have a regular maintenance schedule and a contingency plan in place in case of unexpected breakdowns.
• **Product Loss**
Potatoes are perishable commodities, and any mishandling or storage errors can lead to product loss. Improper temperature and humidity control can cause potatoes to spoil, shrink or develop sprouts, reducing their quality and shelf life. To minimize product loss, it is crucial to have proper storage protocols in place and to monitor the condition of the potatoes regularly.

COST-SAVING SOLUTIONS

• **Energy Efficiency**
One of the most effective ways to reduce the energy consumption of a cold storage facility is to invest in energy-efficient equipment. Modern cold storage equipment, such as compressors, evaporators, and condensers, are designed to consume less energy while providing the same level of performance. Additionally, implementing energy-saving practices such as turning off equipment when not in use, optimizing temperature and humidity settings, and using natural light can also help reduce energy costs.
• **Preventative Maintenance**
To avoid costly repairs and equipment downtime, it is essential to have a regular maintenance schedule in place. Preventative maintenance helps identify and address potential issues before they become major problems, ensuring that the cold storage facility operates at peak efficiency. Implementing a computerized maintenance management system (CMMS) can help automate maintenance scheduling and reduce the time and effort required for maintenance.
• **Temperature and Humidity Monitoring**
To minimize product loss and ensure the quality of the potatoes, it is essential to monitor temperature and humidity levels regularly. Implementing a temperature monitoring system that alerts store managers to any changes in temperature or humidity can help prevent spoilage and reduce product loss. Additionally, using data analytics and predictive modeling can help store managers identify patterns and trends in temperature and humidity levels, enabling them to

make informed decisions about storage protocols.

• **Efficient Use of Space**

Maximizing the efficient use of space can help reduce the overall operating costs of a cold storage facility. Implementing a racking system that utilizes the available vertical space can help increase storage capacity and

SMART FUTURE

Presenting store operators with a 'smart' system was the whole reason Crop Systems developed the SmartStorTM, says Ray Andrews, managing director.

"Information is key, and SmartStorTM means operators have all the information they need on their mobile device and can monitor and manage all aspects of the store wherever they are. They can monitor all sensors and other equipment, check run times and make changes to optimize energy usage on the fly, and monitor graphs detailing store performance," he adds.

Tolsma envisions an automated, connected system with intelligent climate control computers that are integrated with weather forecast modules, which can fine-tune the environment depending on conditions. Such an energy management module could align energy consumption (fans, refrigeration) and energy production (solar, wind) on the whole farm.

Experts warn that growers will be faced with crippling energy bills, and they will eventually have to implement some of these measures, otherwise maintenance costs will cut into their already thin profit margins.

OPTIMIZING STORAGE EFFICIENCY

In a recent report, Adrian Cunnington, potato storage specialist and retired head of AHDB's Sutton Bridge Crop Storage Research Centre, wrote that optimizing potato storage efficiency is "a hot topic right now". "With serious changes in energy costs (...), it is imperative to do everything possible to make sure that stores are running as efficiently as possible to keep running costs down (...). And, with just two years' experience in the bank since CIPC was banned, the industry remains on a steep learning curve to tackle the new challenges in sprout suppression with its toolbox of more expensive sprout control products," Adrian Cunnington said.

He added that the choice of sprout suppression may extend beyond temperature alone for some growers. This could mean giving tighter control to fulfill supermarket criteria (many markets have a 0% tolerance for sprout growth on red types) as well as residual control to avoid growth after unloading.

"Any chemical sprout control treatment used needs to be effective; there is simply no latitude for failed or unsuccessful treatments. This means paying attention to the timing of treatments and implementing condensation control measures in particular as the new generation of products can burn or scorch potatoes (and ruin the skin finish) if the product is applied too quickly or put on when there is any moisture around – even the thinnest film of condensation," Cunnington concluded. •

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/IoT/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 Tehnologies and Advancements
- Optical Sorting - Increasing Yelds, 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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