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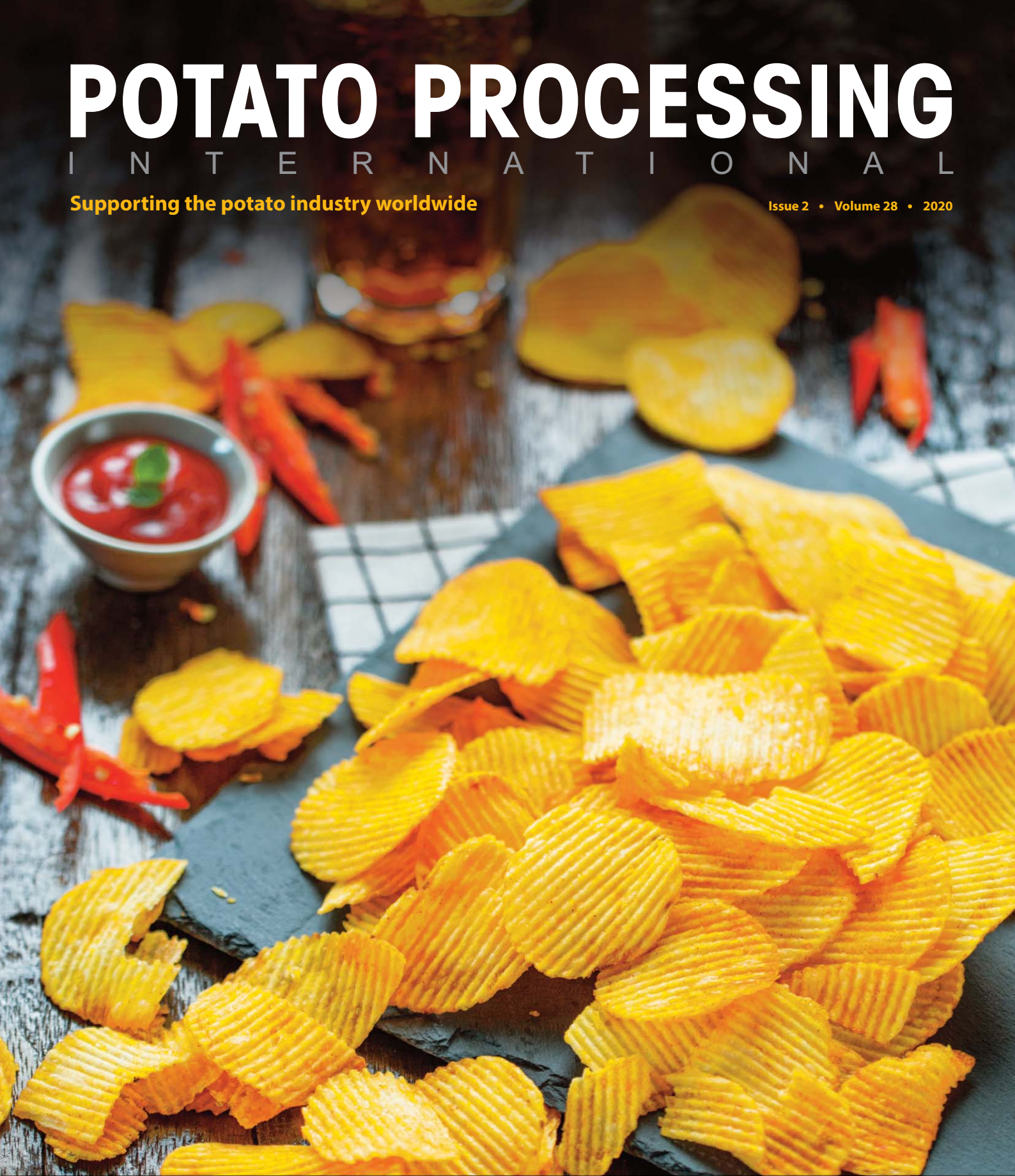

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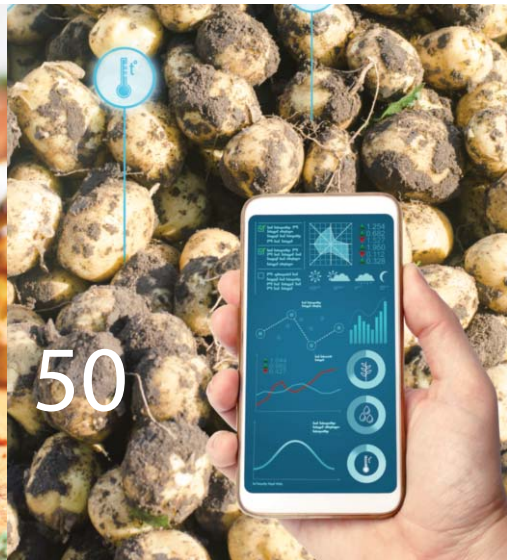

What Will Smart Packaging Be Like in the Future?

Dan Orehov - Managing Editor
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From my talks with various industry experts and equipment manufacturers, one thing same thing with reiterates: the future of packaging is undoubtedly digital, and that's where anyone can see some of the most interesting developments recently.
Food manufacturers are facing numerous challenges; from ensuring their operations are as energy efficient as possible and striving for the lowest possible carbon footprint, to delivering transparent solutions – all while meeting consumer demand for relevant experiences, real-time interaction and personalized content.
This means that packaging systems with higher levels of automation and improved diagnostics are in growing demand.
To achieve higher levels of automation in their packaging lines and for increasing machine up-time and therefore the economic efficiency of operations, customers are using technologies such as the Internet of Things (IoT), self-learning software and artificial intelligence (AI). The latest in packaging equipment can streamline all components of the packaging line, including multi-head weighers, metal detectors and date coders. This allows operators to control a complete system from a single, intuitive User Interface (UI) to promote greater productivity, reliability and serviceability.

To achieve higher levels of automation in their packaging lines customers are using technologies such as the Internet of Things (IoT), self-learning software and artificial intelligence (AI).

As for plastic, while right now it is still essential, it is important not to view it as a standalone solution to the world's sustainability challenges. Sourcing material from sustainable suppliers, applying eco-friendly practices in manufacturing and finding innovative ways of reducing carbon footprint are additional ways in which manufacturers can improve their sustainability credentials.
The industry is constantly evolving to find new energy-saving solutions, such as power-saving software for food processing and packaging lines. Such developments help brand owners reduce carbon footprint and energy usage by offering features that include 'stand-by time'.
What measures does your company undertake to be more sustainable and environment-friendly in terms of the packaging equipment and materials you use?

Stay safe!

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Tolsma-Grisnich Reveals New Storage Projects

Tolsma-Grisnich recently announced the delivery of a brand-new storage and grading line, designed for one of the biggest potatoes and grains wholesale production companies in the Bryansk region, in Russia. The storage and grading line have the capacity to handle over 6.000 tons of seed potatoes. The building of this new seed potato business in Russia began in early 2019, and the completed operation includes storage locations for boxed potatoes, as well as a fully-equipped grading hall. Four storage facilities have been equipped with the latest QCC 60 and QML 60 compact coolers. Each cell has a capacity of 1,500 tons of boxed potatoes. The QCCs are fitted with a hatch, so that ventilation with outside air is also possible. All QCCs and QMLs are controlled by a Vision Control climate computer. The grading installation features a roller inspection table, the MV13 grading machine and buffer-bins with integrated box-fillers. The grader contains four sieving decks, which sort out three different sizes of potatoes. The box filler starts automatically after sensing the box in its place. The total hourly infeed capacity is 30 tons of potatoes per hour, and the fully automated process ensures a significant reduction in the amount of labor required.

At the same time, the company revealed the completion of another storage facility in the heart of Rakaia, Timaru, New Zealand. The beneficiary is the Rakaia Hub Ltd, a company that has grown over the last few years to become a successful place for storage and grading. The storage facility has a 2,100 tons capacity for the cooling of seed and processing potatoes and is climate-controlled. The potatoes are stored in boxes. The Vision Control storage computer saves data such as temperature, relative air humidity and CO_2 and ensures the storage is permanently monitored. The units are designed to run in an energy efficient manner, to keep the power bill low. Both the Quadro Air Mix Unit 60 (QML 60) and the Quadro Compact Cooler are characterized by their high efficiency and easy installation. The QML can be connected to a cooling unit and the QCC achieves different cooling capacities, using the variable control on the compressor.

Japan's Calbee Buys Sweet Potato Processor

Calbee, Inc. announced in a press release that it has reached a definitive agreement for the purchase of stocks with J-GIA I Limited Partnership, which was founded by Japan Growth Investments Alliance, Inc. and are individual shareholders of Potato Kaitsuka Co. Ltd.

Under the long-term vision announced in May 2019, Calbee aims to establish overseas markets and new food domains as growth pillars. The entry into the sweet potato business by making Potato Kaitsuka a subsidiary will strengthen their efforts to enter new food markets. Potato Kaitsuka started operation in 1967 as a wholesale company specializing in sweet potatoes. Today, based mainly on their original brand of sweet potato, "Beni-Tenshi", they engage in the sale of raw materials for baked sweet potato to retail stores, as well as the direct sales of baked sweet potatoes. With the demand for sweet potatoes expanding due to the introduction and utilization of baking potato machines in retail stores, the amount of exports is also increasing in recent years, thanks to the rising recognition of baked sweet potato products in Greater China and South Asia. The Ibaraki Prefecture, where Potato Kaitsuka is located, ranks second in terms of domestic sweet potato yields in 2018, and Potato Kaitsuka has a considerable share of this production.

While the acquisition of shares has no impact on consolidated results for the year ending March 31, 2020, the acquisition will contribute to improving the performance of Calbee Group over the medium- to long-term.

Haith Appoints Financial Controller

The designer and manufacturer of vegetable handling equipment has appointed a new financial controller to head up its accounts department. Emma Johnson joined Haith Group last month, reporting to Nigel Haith, managing director. With nine years of financial experience gained at an industrial hose manufacturer, Emma has been given responsibility for managing all aspects of Haith finances, dealing with day-to-day financial administration as well as producing monthly accounts, forecasting and budget management.

Emma Johnson is pleased to be joining the company at an exciting period. "Haith is well known and is synonymous with excellence in the farming sector. I've only been here a few weeks, but it is clear that the company is growing. As the team here focuses on meeting the increasing demand, we need to ensure the financial side of the business runs as smoothly and effectively as possible. I'm looking forward to working with the accounts team to ensure this continues."

Incorporated as a limited company in 1964, Tickhill Engineering, which trades as Haith, has a long tradition of innovating vegetable handling. The company invented the modern barrel washer in 1961, developed the brush roller bed in the 1970s, which was superseded in the '80s by the Hydro Flow washer. The company introduced the Self Clean washer at the beginning of this century.

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Key Technology Promotes Quentin Kemph

Key Technology, a member of the Duravant family of operating companies, announced the promotion of Quentin Kemph as Area Sales Manager for the South-Central United States. Kemph is responsible for bringing Key's high-performance digital sorting, conveying and other automation systems to customers that process fruits, vegetables, potatoes, nuts, snack foods, poultry and more.

Quentin Kemph has been with Key for more than 30 years, holding a variety of positions of increasing responsibility. Most recently, he was Sales and Applications Technical Support Specialist where he worked closely with customers and Key teams to customize equipment that improves product quality, increases yield and reduces operating costs. Previously, he was Senior Applications Specialist and prior to that, Service Technician and Precision Welder/Supervisor. Innovative problem solving has led Kemph to develop five patents at Key.

"As I pivot my career to become more directly involved with customers, I'll continue to be available to our applications and technical support teams, as needed," said Kemph.

Prior to Kemph's appointment, Jeff Nielsen was responsible for Key sales in both the Southeast and South-Central United States. To better serve this large 12-state area, Nielsen will now focus on the Southeast territory as Kemph takes on the South-Central region.

tna Launches Latest robag 3 Packaging Series

tna will showcase its range of integrated, start-to-finish food processing and packaging solutions for the snack industry at this year's SNAXPO - including the newest addition to the tna robag® 3 packaging portfolio, the tna robag® 3e. Visitors are also invited to experience live demonstrations of the tna intelli-flav® OMS 5.1 on-machine seasoning system, the tna roflo® HM 3 horizontal motion and tna roflo® VM 3 vibratory motion conveyors - suitable for a range of snack applications, from potato chips and pellets, to french fries. The new tna robag® 3e will take centre stage at their booth at the 2020 SNAXPO trade show. With fully integrated real-time communication software and smart diagnostics, the system focuses and delivers on control sophistication.

"The food packaging industry is evolving at a rapid pace, with manufacturers finding themselves under ever-increasing pressure to improve the operational efficiency of their packaging processes. In an industry where the real and virtual worlds are increasingly converging, digital control systems must become more sophisticated to deliver the levels of automation and performance expected - from a single piece of equipment to entire production lines," comments Steven Wolfe, general manager at tna North America."

Tong Engineering Upgrades Coil Cleaner

Vegetable handling equipment manufacturer, Tong Engineering, is building upon the success of its popular potato and vegetable coil cleaning unit, with new advancements for optimum performance and ease of maintenance. Tong's range of coil cleaning and pre-grading systems are designed to offer gentle handling of crop while combining soil removal and crop sizing within one unit.

"Our PU coil cleaner is a very popular choice among growers and processors, offering very flexible application across a wide variety of root crops including potatoes, carrots, parsnips, onions and more," says Richard Knighton, sales manager at Tong Engineering. He adds that "with reduced downtime and maximum efficiency remaining at the forefront of equipment upgrade decisions, the new super-speed self-cleaning function on the latest models is already proving to bring invaluable time-saving and operational benefits."

Incorporating a heavy duty, scissor-action shaft design, the deformable PU coil shafts feature an easy-maintenance coupling and are fully adjustable to suit a wide range of sizing requirements. With a direct-drive motor on every shaft, the coil cleaning and sizing unit is not only easy to maintain, but also ensures maximum energy efficiency during operation. The next generation coil cleaner from Tong can be built to suit all throughput and sizing requirements, available in 4, 6 and 8 row configurations as standard, and is popularly combined with Tong's EasyClean separator for efficient cleaning and sizing results.

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J.R. Simplot and McCain Foods in Patent Legal Battle

J.R. Simplot and McCain Foods have spent the last few years battling in the U.S. District Court for the District of Idaho, over issues concerning a design patent related to a spiraled potato. The challenge refers to McCain's utility patent that is directed to the process of using high-energy electric field technology to pretreat potatoes (and other vegetables) before cutting and cooking them. Simplot filed a motion for judgment on the pleadings, arguing that McCain's patent is ineligible because it contains an overbroad claim directed to both a natural law and an abstract idea: that vegetables soften when exposed to an electric field. Claim 1 of the asserted patent reads: "A process for treating vegetables and fruit before cooking in order to reduce their resistance to cutting, characterized by the application of a high electric field directly to the vegetables and/or fruit under conditions such that the resulting increase in the temperature of the vegetables and/or fruit is almost zero or at least sufficiently low as to not amount to a preheating step." Simplot argued that vegetables softening (i.e., becoming easier to cut) when exposed to an electric field is a natural law and, therefore, a patent directed to an electric field making vegetables easier to cut is not patent eligible. In Simplot's view, claim 1 is impermissibly directed at the natural law itself. The court, however, noted that while it is true that Section 101 prohibits patents based on laws of nature, a claim drawn to a law of nature or natural phenomena does not become nonstatutory simply because it contains a law of nature. Looking at Rapid Litigation v. CellzDirect, the court stated that while the claimed process employs a well-known natural phenomenon, it does not preempt the use of the phenomena. Instead, the claim only seeks to foreclose the use of the phenomenon "in conjunction with all of the other steps of the claimed process." Simplot also argued that the claim is directed to an abstract idea. It reasoned that softening vegetables before cutting and cooking is a vague idea, so there must be some inventive concept for the patent to survive. The court, again, disagreed. It said the inventors recognized that applying an electric field to vegetables would soften them, but that's not what they patented. Their patent claims an application of that knowledge to create a new process. The court found the asserted claim patent eligible and denied the motion for judgment on the pleadings.

Burts Potato Chips Secures Growth Through Costa Coffee

One of UK's leading independent snacking companies has marked the next stage in its growth towards GBP100m worth of sales by 2022, announcing nationwide distribution of Burts Potato Chips through the Costa Coffee chain. According to retailtimes.co.uk, Burts Snacks has revealed the new listing following its GBP7m investment into the business last year. This aided the introduction of a range of new frying and popping techniques across its two manufacturing facilities, helping Burts to satisfy increasing demand for its unique products. The Plymouth and Leicester based business forecasts sales of GBP54.3m by the end of this financial year, as it continues to outperform in the chips, snacks and nuts category. Burts Snacks' top-selling hand cooked chips, Burts Potato Chips, will be available in four flavors – Sea Salt, Sea Salt & Malted Vinegar, Mature Cheddar & Spring Onion and Sweet Chilli – at Costa Coffee stores across the UK from March 2020. Simon Knight, sales & marketing director at Burts Snacks, commented: Eric Tavoukdijan, commercial marketing director at Costa Coffee, added: "At Costa Coffee, we're passionate about providing our customers with the highest quality produce and are constantly on the lookout for innovative products from provenance-based, authentic brands, that will appeal to everyone who walks through our doors."

Patatas Meléndez Acquires Integral Potato

Patatas Meléndez recently announced the purchase of the Integral Potato facilities, located in the Valladolid town of Medina del Campo, Spain, which was declared bankrupt by the Commercial Court of Valladolid in November 2017 and which began liquidation procedures in November 2019. The purchase agreement, authorized by the bankruptcy judge, states that in addition to the acquisition of the tangible assets of the bankrupt company and the payment of a significant amount towards reducing its liabilities, the company must retain the workforce of Integral Potato. The aforementioned operation authorized by the Commercial Court has also allowed Patatas Meléndez to acquire the ownership of the land in which Integral Potato was carrying out its activity. The purchase of the Integral Potato factory is part of the growth and innovation strategy of Patatas Meléndez, who will make a significant investment in the new facilities acquired, in a clear commitment to social cohesion in the Medina del Campo region. Patatas Meléndez is the leading Valladolid company in the production of fresh potatoes in Spain with a 19.1% market share and a turnover of over EUR88m.

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A New Age for Potatoes

In anticipation of this year's edition of the Europatat Congress, I talked to Raquel Izquierdo de Santiago, managing director of the European Potato Trade Association about the most pressing issues of the industry today, as well as about the upcoming congress.

By Dan Orehov

What should participants look forward to, at the upcoming Europatat Congress this year?

The Europatat Congress has become a key gathering for all potato professionals on the edge of a new potato season. Under the title "A new age for potatoes", this year's Congress will explore the possibilities and barriers to successfully make the most of digitalization in the potato sector. Key speakers from both the business and the European institutions will share with the audience their insights on the benefits for sustainability and the economic potential that digitalization can offer to companies. Besides the professional working program, our Congress will also offer plenty of opportunities for networking, such as the exclusive Cocktail & Gala Dinner that will take place at the beautiful BELvue Museum with a view over the gardens of the Royal Palace. In addition, Europatat members will have the chance to review the different activities of the Association during the meetings of the various Europatat Commissions (seed potatoes, early and ware potatoes, packers, technical and regulatory issues and RUCIP). These sessions will also feature different guest speakers.

Which are the main topics for discussion that you have prepared and what determined you to choose these themes?

This year's event will be organized around the theme "A new age for potatoes" with the key word of the day being digitalization. With this topic, we want to convey to the sector, our members and participants, that digitalization is not only a business buzzword, but that digital technologies have the potential to help tackle important economic, social, climate and environmental challenges facing the EU's agri-food sector, while offering a huge advantage for companies, including those in the potato sector. High-tech and digital solutions are

"Europatat, together with the relevant bodies in Belgium, France and Ireland, have launched a promotion campaign to put fresh potatoes back in the minds and lives of millennials, under the title "Potatoes, prepare to be surprised – Europe's favorite since 1536."

gaining ground not only at the producer level but also along the whole supply chain. The use of digital technologies and big data throughout the potato chain can have a huge potential to mitigate increases in environmental costs stemming from higher standards. In our view, research and innovation is one of the key drivers to enhance competitiveness along the whole food supply chain, and it is also an important factor in generational renewal, particularly in agriculture. Future research should help producers to apply digital and innovative instruments such as remote sensing applications and artificial intelligence technologies on their farms and crops.
Even though one of the main priorities of the new European Commission is to achieve a digital transformation for all the sectors of the economy including agriculture, there are still significant gaps in the knowledge, applications and perceptions around these technologies that need to be addressed. Therefore, digital education for agri-food businesses must be a key component of the EU's strategy for the upcoming years.

Please discuss Brexit and the impact this can have on the entire European potato industry.
Europatat members are highly concerned by the future of trade in potatoes between Member States of the EU-27 and the UK. The UK imports annually about 255.000 tons (EUR 112 million) of fresh or seed potatoes, of which around 191.000 tons (EUR 84 million) are from the EU-27 countries. The largest proportion of UK imports are by far the frozen products, such as frozen chips, which are not counted for above and come entirely from the EU-27. Regarding UK exports of potatoes, these concern mostly seed potatoes, and almost 70% in volume (around 205.000 tons) and over 60% of value (around EUR 84 million) is sent to the EU-27 countries. Therefore, it is of outmost importance for our sector that the negotiations result in securing the most stable situation as possible on what refers to volumes and values currently traded, and that the EU-27 operators do not loose competitiveness in the UK and international markets. For this reason, Europatat has sent a position paper to the EU-UK negotiation team of the European Commission on which the sector calls on the EU to make a priority the amendment of current EU legislation in order to include the UK as one of the third countries from which the EU can import seed and ware potatoes.

"Potato traders and packers are improving skills machine-operators to limit packaging losses, as well as choosing optimal packaging materials that preserve the quality of potatoes while reducing the amount of plastic used."

What are the current challenges, facing the European potato industry at present, besides Brexit?
The concern regarding food sustainability along the whole supply chain has been increasing in the political agenda in the past years. There is a need to secure a fair, healthy and environmentally-friendly food system, a message that the potato sector fully endorses. In this sense, our sector is already taking responsibility towards relevant EU ambitions such as a better management and reduction of chemical plant protection products; reduction of plastic packaging while ensuring that no food waste is generated; promotion of sustainable food consumption; or the transition towards a more sustainable storage and transport.
Research and innovation can provide solutions for sustainable food systems and market opportunities. For instance, new technologies such as new plant breeding techniques can contribute to various goals of the European Union by saving land resources and reducing crop protection products while stabilizing and increasing crop yields to provide food security. However, a coherent European policy and regulatory framework for sustainable food systems should be developed to face all these challenges and to achieve a sustainable food system.

What initiatives are in place, or will be introduced in the coming years, with regards to creating a more sustainable potato industry, supply chain and come up with solutions that help reduce food waste.
The European potato sector is already contributing to the sustainability of the supply chain and the transition to a circular economy, which includes the reduction of food waste. Potato traders have already put in place specific strategies to reduce both the generation of potato waste and the environmental impact of their commercial activities. For instance, breeding companies are constantly involved in the research of new potato varieties with higher yields and less susceptible for diseases and defects. Potato traders and packers are, for example, improving skills machine-operators to limit packaging losses as well as choosing optimal packaging materials that preserve the quality of potatoes while reducing the amount of plastic used. The potato sector is also jointly creating alternative range options for out of size potatoes.

How do you believe the ban of CIPC will impact the European potato industry?
The European potato sector is indeed facing a major challenge. On the one hand, it is important to prevent possible cross-contamination of potatoes that are stored or transported in installations that used to work with CIPC. On the

other hand, it is also important to gain knowledge of the use of alternative means. Besides proper cleaning practices, many storage facilities will most likely also have to be modernized in order to make use of alternative means possible.
In cooperation with various umbrella organizations in the supply chain at European level, Europatat has been very involved in the exchange of knowledge and input to have a workable future strategy. We are now awaiting further information from the European Commission regarding a temporary MRL and a protocol of sampling and cleaning that should allow growers, trade and processing to store and market potatoes without risk and provided that they do not longer use CIPC.

What initiatives are you taking or will be taking, in order to raise awareness of the benefits of potato consumption among all generations, especially the young adults?

Fresh potatoes remain Europe's most popular main meal carbohydrate and are deeply anchored in the food habits of the European Union, however nowadays they face two main obstacles: a long-term decrease in their consumption; and a stagnation of their image as a traditional food. To slow down this consumption trend, Europatat, together with the relevant bodies in Belgium (Flanders), France and Ireland, have launched a promotion campaign to put fresh potatoes back in the minds and lives of millennials (people between 18 and 34 year old living on their own, co-habiting or with young families). Under the title "Potatoes, prepare to be surprised – Europe's favorite since 1536", the joint initiative, which is co-financed by the European Commission under the EU Promotion policy, has just started and will run until December 2022. Young consumers in other EU countries will also be reached thanks to the translation of recipes into Italian, German, Spanish and Polish. The campaign's backbone will be Instagram and a common website, but other social media channels such as Facebook, Pinterest or YouTube will be also used to provide tips and tricks on how to easily integrate potatoes into millennials' daily lifestyle. The message of the campaign will be clear: potatoes fit in a modern, healthy and sustainable lifestyle of millennials, because they are a tasty, versatile and have good nutritional and health benefits! •

"Europatat members are highly concerned by the future of trade in potatoes between Member States of the EU-27 and the UK. Therefore, it is of outmost importance for our sector that the negotiations result in securing the most stable situation as possible on what refers to volumes and values currently traded. "

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Keeping an Eye on Water Evaporation

The main challenge with the drying process is the time required for starting and stopping the process, mainly on larger dryers, in view of the required stabilization of the drying process during these phases.

By Dan Orehov

The fast migration of water during the drying process is most important to achieve a highly efficient drying process. By creating a thin layer on the drying surface of a drying drum, the water migration can be fast and homogeneous. By the equal thermal treatment of the product, the final dry product has an extreme low water activity, which inhibits the bacterial growth during storage. By this aspect, the drum dryer process is unique and not comparable by any other drying process. The equal treatment also ensures a lump free instant product at reconstitution, comparable with fresh prepared potato puree in appearance, consistency and taste.

BALANCING THE AIR FLOW DISTRIBUTION

According to representatives from Andritz Gouda, the evaporation of water depends on the heat input to the potato mash, the temperature of the potato mash fed to the dryer, the consistency of the potato mash and the exposure of the potato mash to the air that need to absorb and evacuate the moisture, as well as the condition of that air, its temperature, velocity and humidity. The boundary layer of saturated vapor above the product layer being dried inhibits further evaporation and therefore this boundary layer will need to be broken to create the condition for further evaporation of the potato mash. In order to achieve a uniform moisture profile, the density and film thickness must be uniform over the width of the dyer, as well as the condition of the surrounding air. A well distributed flow of fresh air supply will need to be balanced with the water vapor containing air being extracted. After evaporation of the almost dry film is an important aspect for obtaining the desired uniform moisture profile in combination with a high output. "The Andritz dryers enable a fast filling and controlled emptying of the dryers by which off-spec product, that has to be sent to waste, is kept to an absolute minimum," says Alexander de Jager, Industry manager at ANDRITZ Gouda B.V. "Our main focus in potato processing is on key equipment for the production of final consumer products, such as dryers and milling equipment to produce flakes and granules, and the processing of potatoes for the production of a wide range of modified starches and derivatives. But what needs to mentioned here as well is that Andritz not only provides dryers for certain applications, but also provides complete system solutions covering also up- and downstream processes such as sedimentation, centrifugation, filtration, and solidification," the added.

FOCUSING ON SAVING RESOURCES

Effective drying is obtained by using saturated steam. The new generation steam boilers are capable of using alternative fuel, like biomass, that often is available from the production plants operating the steam heated dryers. Other methods of drying can be considered in the near future, such as electrical heating and induction heating. The knowledge about various drying and thermal treatment technologies within Andritz, such as in the Separation and Pulp & Paper business areas, creates a platform for further innovation on drum technology, the company says. By extraction of heat from the continuous vapor flow, heating of the required process air can be realized, thus creating a more efficient drying process. Compact mechanical-electrical drives make it possible to replace air driven machine elements. When high pressure cleaning is applied, this can cause aerosol contamination in the surrounding area and creates high risk of bacterial growth in a high hygiene zone. Food producers that recognize this risk apply dry cleaning and only perform fumigation once or twice per year. When an atmospheric drum dryer will be totally enclosed and designed for CIP with smooth surfaces and heated walls, as the Andritz vacuum drum dryers, a CIP procedure will be possible in the future, making the cleaning activities operator independent. As potatoes are more and more used in other food products, like baby food, the need for adapting the production environment and production regime will move along, such as the need to introduce barriers and access locks for entrance to a pressurized drying room.

Alexander de Jager also says that an enclosed drum dryer installation with defined boundaries of the drying process will require full automation to control all required adjustments based on strategically positioned sensors to ensure product of a constant quality, i.e. density, film (flake) thickness and residual moisture. Automation of pre-heating, start-up and shut-down procedures are minimum requirements, are already realized today with Metris addIQ control systems from Andritz. In relation to this the constant quality of the potato mash is to be monitored for anticipating on the machine setting to realize an optimum output. In a modern dryer, the machine condition is monitored to maximize uptime and predict the necessary service intervals to maintain output and quality of product, as well as an interrupted production during the life time cycle of the dryer. Lastly, in view of the increasing demand for potato flakes, the demand for more efficient dryers is inevitable.

"A high rate of moisture removal depends on a good heat transfer of the energy of the steam inside the drum to the outside surface temperature. In addition, a good evaporation area is needed, which is reached by means of the extremely large surface of the drum."

Dustin Dwight Tummers

CONSISTENCY IS A CHALLENGE

One of the main issues mentioned by the companies contacted for this article is the challenge to produce a consistent flake quality at the highest possible capacity. With years of experience and lab drum trials, Tummers has developed the perfect drum to make this combination work.

"A high rate of moisture removal depends on a good heat transfer of the energy of the steam inside the drum to the outside surface temperature. In addition, a good evaporation area is needed, which is reached by means of the extremely large surface of the drum," says Dustin Dwight Tummers, marketing specialist at Tummers Food Processing Solutions. On the other hand, there is a defined balance between running

high capacity and high quality, which often counter each other. Based on long years of experience and our in-house laboratory drum trials, we have found the perfect balance between these two features," he adds.
Improving the heat transfer factor of the drum has enabled Tummers to run at lower steam pressures, which is more sustainable. And they have improved the condensate return system, allowing better usage of the valuable energy which is still in the condensate. Furthermore, the focus of innovation is on capacity and hygiene, which is why the company has increased the size of their market leading flake drum by 10% and substantially improved the capacity per square meter, by improving the heat transfer. This combination allows processors to make a significant step up in producing higher capacities on a single drum. The other improvement aspect of Tummers' flake drum is hygiene, with food safety as the main driver, but also enabling longer times between cleaning stops, which further increases the yearly line production.

"The side shields of the applicator rolls generally have some leakage, which is a point for regular cleaning. Tummers has developed an innovative new side shield, which is greatly reducing this leakage. Other areas of improvement on the new drum are the cleanability of the so called back shield, the autotrax and the vapor hood," says Dustin Tummers, adding that "rinse in place is a nice feature, which is incorporated in the new design, but the main focus in our development was to reduce build-up of contamination. With typical cleaning intervals of three to four months, it's more economic to extend these intervals then to shorten the cleaning stop by a few hours."
To conclude, depending on the production volume and dry solids content of the feed, several dryer sizes are possible. However, mechanical restrictions do not allow a production rate higher than 1,000kg of dry product per hour. Lastly, aerosol contamination needs to be eliminated during the drying process, which remains one of the most important steps in potato processing. •

"Our main focus in potato processing is on key equipment for the production of final consumer products, such as dryers and milling equipment to produce flakes and granules, and the processing of potatoes for the production of a wide range of modified starches and derivatives."

Alexander de Jager, Industry manager at Andritz Gouda B.V.

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Lab Testing for Drying Success

Aldo De Tuoni

The drying step is key to achieving a high-quality product for a variety of process industries. It is of vital importance to keep processing on a uniform and optimized regime for most of the time, maintaining precise parameters needed to achieve a target moisture.

By Aldo De Tuoni, PE, CEM, senior process engineer serving food, feed and industrial markets.

Extreme process variations have the potential to impact the safety and the reliability of the process line, as well as the profitability of a company. Drying tests can be a path to success.

PICKING THE RIGHT SOLUTION

When choosing simple process equipment, such as a pump or a fan, it is only necessary to know some

"For food applications, tests that consider food safety are paramount. Drying, roasting, heating, toasting and tempering, can have a direct impact on food stability. In many cases, a thermal process acts as kill step destroying potentially harmful microorganisms."

pressure and flow requirements in order to select the right model from a manufacturer's catalog. But the selection process is far more complicated with thermal processing equipment because there are multiple ways to introduce a product to hot air. Combined with an infinite array of products and processes that depend on thermal processing, along with their different forms and sizes, finding correlations or empirical equations for every situation is extremely difficult.

If the product is widely known and the dryer is part of a processing line that has not changed in recent years, the drying equipment has likely been tested numerous times. But for a new process and product, the possibility of drastic changes in processing variables makes testing mandatory. From small scale pilot dryers to state-of-the-art laboratories, a supplier expert in thermal processing will have knowledge of the widest range of technologies.

Laboratory testing helps identify processing challenges and the appropriate technology. For instance, if product sticks to the dryer surface, clumps, becomes brittle and breaks, or produces fine dust, testing will enable the drying manufacturer to design a drying process that will avoid specific problems. It also helps the plant process engineer plan processing equipment needed before and after the dryer.

Tests can examine small amounts of raw or wet product under different temperature, air flow and air humidity patterns. A test unit should be capable of changing the quantities of initial product, and the experimental data should be able to be scaled up to an industrial size process. The test unit should also allow flexibility, to split the process into zones or stages, which will allow process conditions to change in every zone.

IDENTIFYING THE DRYING CURVE

This is the most important information to gain from testing because it tells how fast a product will dry under very specific conditions. Conducting experiments that change processing conditions will help determine the optimal strategy for drying, and this is equally important with a new or existing process where testing on a smaller scale would save money on wasted product.

"Laboratory testing helps identify processing challenges and the appropriate technology. For instance, if product sticks to the dryer surface, clumps, becomes brittle and breaks, or produces fine dust, testing will enable the drying manufacturer to design a drying process that will avoid specific problems."

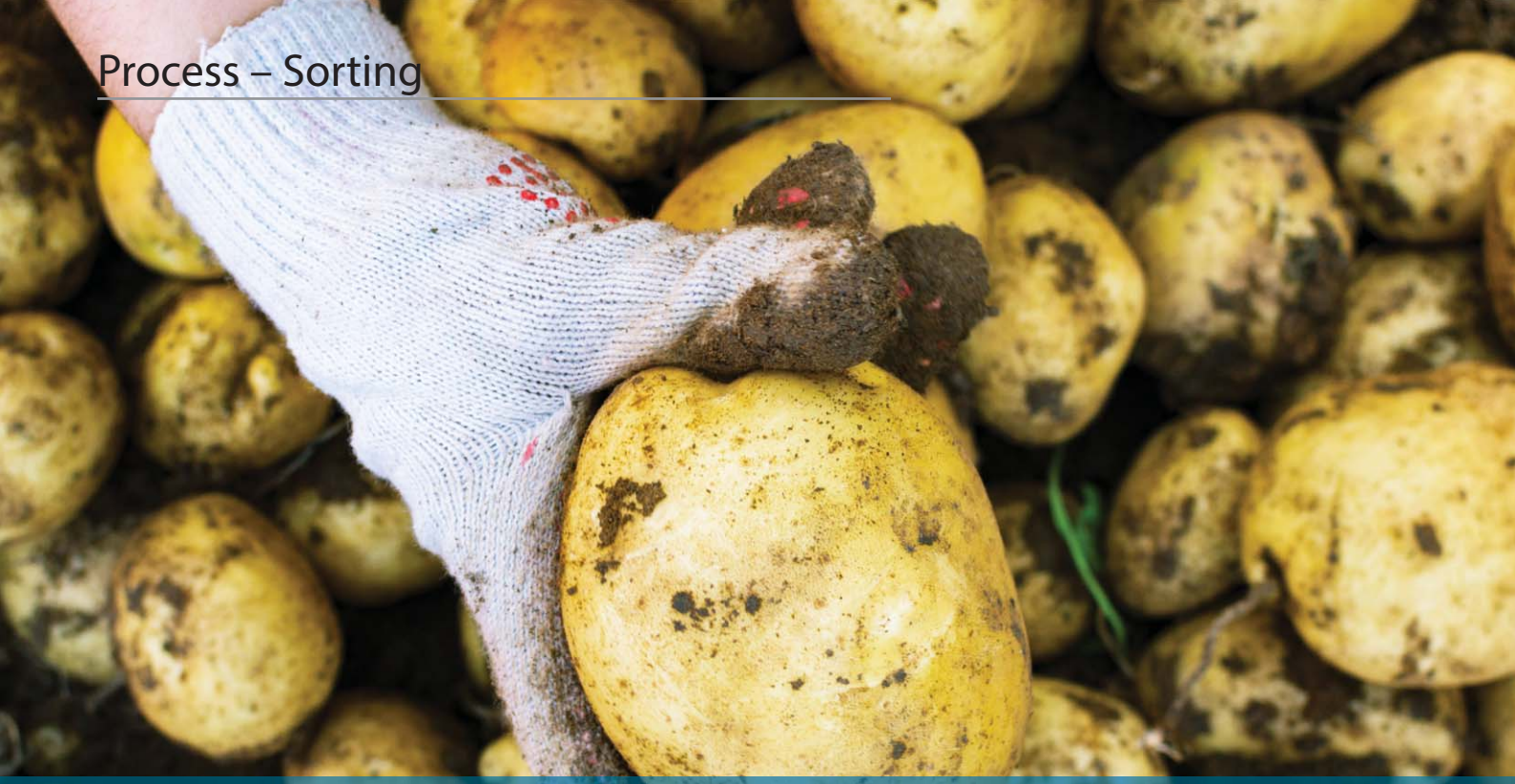
Product development is probably the most interesting but most challenging experience any research team can face, and brings many questions. How will the product react to heating, cooling, tempering, humid air and agitation? How can the product achieve the desired characteristics? And, is the test product representative of what can be processed in the production line? The answer to this last question is yes, if the exact same technology is designed for production by a reliable manufacturer of thermal processing equipment. But what if a company acquires an old facility or used equipment and needs to adapt the existing equipment to a new product? In this case, the original equipment manufacturer can provide guidance through small scale testing.

THE IMPORTANCE OF FOOD SAFETY

But there are times when a process must be modified upstream for the drying process. For instance, a drastic change in product formulation, a change in raw materials, or a change in a fundamental upstream process—such as a change in a reactor or a catalyst in the chemical industry—can dramatically impact the process and cost of the final product. Testing can determine the best way to counteract the negative impacts on the drying process by identifying the variables to change inside the drying process or outside of it. Test can also simulate changes before they happen, to determine what the impact will be on the process and the product.

For food applications, tests that consider food safety are paramount. Drying, roasting, heating, toasting and tempering, can have a direct impact on food stability. In many cases, a thermal process acts as kill step destroying potentially harmful microorganisms. Running a test under special conditions, using a surrogate organism identical to the real pathogen in its biological response, can determine the processing conditions--temperature, air velocity, retention time and thickness of the product-- necessary to achieve a safe process.

From confirming product characteristics and determining precise parameters to scale up, to verifying food safe processing, lab testing is essential. Experienced applications engineers with global state-of-the-art laboratories can provide the expertise needed for drying success. •



Identifying Foreign Material with the Latest Technology

In digital sorting, to optimize performance, the system must be designed specifically for the products being sorted and properly sized for the application. It must also be well maintained by the user to prevent diminishing performance.

By Dan Orehov

In digital sorting, performance is typically measured as a 'defect removal rate' as well as a 'good-to-bad ratio.' Sophisticated sorters typically achieve defect removal rates of 90 to 99 percent or higher. The good-to-bad ratio often ranges from 1:4 to 1:10 and is sometimes as high as 1:50 or 1:100. These results depend on the nature of the product, the effectiveness of the sorter's infeed and the pitch of the sorter's ejection system, among other things.

CHALLENGES FROM A TO Z

The primary challenge associated with sorting wet potato products comes from the splatter that can obstruct sensor windows, light sources and backgrounds, which hurts the sorter's performance. For whole potato sorters, the biggest sanitation challenge comes from dirt. Here, high-performing mechanical pre-cleaning solutions and the sorter's mechanical design help to overcome the challenge.

In the case of Key Technology, for sorting whole potatoes, the Herbert Oculus sorters were recently added to the Key sorting product range. Inspecting tubers with 360° vision, Key's Herbert Oculus sorters detect color defects, diseases and surface abnormalities. This includes skin discoloration, green and dark colors, bumps and notches, mechanical damage, common scab, cracks and black dot. Oculus is ideal for sorting pre-peeled whole potatoes, either unwashed or washed, in or immediately following storage to eliminate defects and FM and identify the dimensional profile of incoming raw whole potatoes to improve downstream processes. For potato strip sorting, Key's VERYX® continues to lead the industry with the most advanced features. As the world's only sorter that is able to inspect product entirely in-air with both top- and bottom-mounted cameras and laser sensors, VERYX achieves sustainable all-sided surface inspection to detect and remove more FM and defects. "For whole potatoes, the 360° roller system on the Oculus sorter achieves 20 percent more potato surface inspection to improve sort efficiencies and offers gentler handling than traditional cascade sorters. Compared to other 360° sorters, Oculus is the only sorter that can reach capacities of up to 80 metric tons per hour," says Karel Van Velthoven, Advanced Inspection Systems Product Marketing manager at Key Technology.""For potato strips, VERYX is our best-selling digital sorter. Featuring sustainable all-sided surface inspection, unique multi-sensor Pixel Fusion™ and the highest resolution cameras and laser sensors on a digital sorter, VERYX removes more FM and the right amount of product defects to make grade while virtually eliminating false rejects to maximize yield," Van Velthoven adds.

DETECTING FOREIGN MATERIAL

One of the most important characteristics that modern optical sorters must have is flexibility. In fact,

sorters must be able to identify any kind of defects even if they have the same color of the product. In order to do so sorters should have many frequencies, analyzing the light by reflection, fluorescence and translucency, and make shape and dimension analysis.
Representatives of Raytec say that machines can offer an efficiency very close to 100% on foreign bodies and higher than 90% on the other defects. On discarded products Raytec guarantees the presence of maximum 5-7 good potatoes every 100 rejections for whole potatoes and 15-20 good units every 100 rejections for cut potatoes.
"We are more and more focusing on the precise detection of length and shape of frozen french-fries. In this case the presence of short or curved fries makes the difference between a second quality product and a premium one. Since our peculiarity is the high definition and the very low margin of error, this sector is a fertile ground to invest in," say Raytec representatives. "One of the most important innovations in the potato sorting sector is the application on unwashed potatoes. The most relevant problem consists in separating potatoes from stones because they are both covered with soil and the tubers underneath are invisible. The optical sorter RAYNBOW uses its high-speed double vision system to remove stones, soil clumps, green and rotten potatoes and its effectiveness has been recently proved in our installation at AKP Group in North Lincolnshire, UK," they add.
Raytec has a wide range of optical sorters for potatoes which are able to respond to the different needs of the potato processing phases. The RAYNBOW model is, for example, applied for washed and unwashed potatoes, so it collocates at the beginning of the processing line. RAYNBOW can sort peeled potatoes but, to detect very small dots, Raytec designed the optical machine Dryce with an optical resolution of only 0,3x0,3 mm and finger ejectors.
For processed products, for instance, the models SPRAY, DISCOVERY and CURIOSITY can be used for chips, french-fries and cut potatoes in general. CURIOSITY deserves a particular mention not only because it is the company's latest model, but also because it is the only machine which responds to the new American guidelines dictated by representatives of the major GDO, fast-food chains and other important players in the food processing sector. Moreover, Raytec can also provide solutions for sorting frozen french-fries and other cut potatoes. In fact, the model DRYCE, thanks to its high-resolution cameras that examine the product using the "free fall double side view" system, is able to analyze 100% of the surface of each product.
"All our sorters can be equipped with a double reject system, in this way we can differentiate wastes from second quality products which can be destined to other process like potato puree, flakes and croquettes. This procedure not only reduces wastes and contributes to improve the sustainability in food processing, but it is economically efficient for companies," Raytec representatives say. "Raytec's machines can offer an efficiency very close to 100% on foreign bodies and higher than 90% on the other defects. On discarded products Raytec guarantees the presence of maximum 5-7 good potatoes every 100 rejections for whole potatoes and 15-20 good units every 100 rejections for cut potatoes."
Coming back to Key Technology, with the acquisition of Herbert Solutions earlier this year, the company has added whole potato sorting technology to their family of world-class equipment and enhanced their portfolio of potato processing solutions. The Herbert Oculus for whole potato sorting enables Key to

"Suitable for both wet and frozen potato strips, a Sort-to-grade-enabled sorter recognizes and categorizes every surface defect and the dimensional characteristics of every individual strip and makes each accept/reject decision based on how it will impact the aggregate 'in the bag' grade, as defined by the processor."

Karel Van Velthoven, Key Technology

offer a broader set of integrated systems throughout the potato value chain that will advance the customers' product quality, production efficiency and yield. Key's Herbert Oculus sorter has a leading position in the fresh pack potato industry and is quickly gaining traction in potato processing plants inspecting pre-peeled whole potatoes.
Moreover, the VERYX sorters are ideal for wet and frozen potato strips and specialty potato products, and Key's Optyx sorters continue to lead the potato chip/crisp industry. Beyond their state-of-the-art sorters, they have a range of mechanical solutions that we can integrate pre- and post-sorting to optimize the customers' product quality, yield and process efficiencies.
"For whole potatoes, Key's Herbert Oculus sorter is capable of sorting up to 80 metric tons per hour, depending on the potato variety, which is a higher throughput than any other 360° full-surface whole potato sorter on the market. For potato strips and specialty products, our family of VERYX sorters includes systems of various widths to satisfy a wide range of capacity requirements. The largest VERYX is the B210, which features an inspection area that is 2100-mm wide and offers a production capacity in excess of 23 metric tons of product per hour, depending on the application," explains Van Velthoven.
Most foreign material (FM) from the field, such as rocks and dirt, is removed by mechanical systems prior to the cutters, so downstream digital sorters can focus on FM that is inadvertently introduced during production, either from faulty equipment upstream or careless operators. Unlike other suppliers in the market, Key offers both optical sorters and mechanical grading solutions, so their customers benefit from a seamlessly integrated customized solution from one source.

KEEPING SANITATION IN MIND

Keeping a sorter clean helps maximize FM and defect removal and minimize false rejects to improve food safety and increase yield. On VERYX, Key positions sensors, light sources and backgrounds away from product splatter. This innovative design helps keep these surfaces clean, enabling us to configure VERYX to achieve full-surface inspection sustainably throughout the longest production cycles in the most demanding, high-volume environments using entirely in-air top and bottom viewing.
At the same time, Raytec representatives say that the company is always attentive to the latest food safety standards. For this reason, it has created a new machine that makes its strength in the totally hygienic concept. CURIOSITY, presented at

"Machines can offer an efficiency very close to 100% on foreign bodies and higher than 90% on the other defects. On discarded products, Raytec guarantees the presence of maximum 5-7 good potatoes every 100 rejections for whole potatoes and 15-20 good units every 100 rejections for cut potatoes."

Raytec

Cibus Tec in 2019, is the first belt sorter which can replace its conveyor belt in only five minutes. In addition, the sliding guides of the belt can be disassembled without the use of tools for a deep and hygienic cleaning out of the machine. This technology has been adopted precisely to meet the hygiene measures promoted in the United States and Raytec is sure that could be adopted as a technological standard for all kind of food sectors.

THE WASTE ISSUES

To reduce waste and improve sustainability, potato processors are increasingly using sorters equipped with powerful Sort-to-Grade (STG) software. Suitable for both wet and frozen potato strips, a STG-enabled sorter recognizes and categorizes every surface defect and the dimensional characteristics of every individual strip and makes each accept/reject decision based on how it will impact the aggregate 'in the bag' grade, as defined by the processor. By controlling the output for defect types and strip lengths that must be managed to a particular grade or "spec," STG accurately maintains the most complex final product specifications without operator intervention while increasing yields by one to three percent and enabling processors to eliminate mechanical length grading. Moreover, because each processor is unique, there is no 'must have' list that applies to everybody. Having said that, Key Technology concludes that some popular options are as follows:

1. Combine laser scanners and color cameras on a sorter to detect the widest variety of FM and defects.
2. Leverage sensors with higher resolutions to detect smaller FM and defects.
3. Add Pixel Fusion to find the most difficult to detect FM and subtle defects while minimizing false rejects.
4. Combine top- and bottom-mounted sensors to see all sides of each object to detect and remove more FM and defects.
5. Add Sort-to-Grade software to achieve the most complex final product quality specifications without operator intervention while increasing yield and eliminating mechanical length grading equipment.
6. Add Information Analytics software to turn a sorter into a data center that collects, analyzes and shares production and product data with the enterprise to optimize line management. •

Welcome to The Optical Sorting Revolution

Alain De Puydt

Today's sophisticated sorting technologies are making processing lines more flexible and controllable, which is improving yields. **Alain De Puydt, Area Sales Manager of TOMRA Food** explains.

Advances in optical sorting technologies are bringing profound change. Sorters have been recognized for years as a vital way of protecting food safety and product quality, but now these machines also serve other important purposes which make a positive contribution to the processor's bottom-line. Sorters still perform a vital role, of course. By eliminating foreign material and quality defects from processing lines, sorters prevent the kind of food scandals that can harm consumers' health and brand reputations. But more than this, the latest sorters also make it possible to switch quickly from one product batch to another, minimize downtime during long processing runs, and maximize yields. These broad-ranging capabilities are made possible by diverse defect-detection technologies and computer processing power. Pulsed LED light sources, high-resolution cameras, near-infrared cameras and lasers are all deployed by today's sorting machines. These differing technologies make sorters capable of different tasks, but always the goals are the same: produce which meets exactly the required specification, and maximum use of resources.

"In the quest for zero waste, potatoes initially ejected from a main processing line will often be sent to a processing line for flakes, to be used in specialty products such as hash browns and croquettes."

SORTING SOLUTIONS DIFFER

Determining the best sorting solutions for each individual processing line depends on three key parameters: product specification, capacity, and resources. As every processor knows, parameters can vary from one job to another depending on the end product and its specification. The sheer volume of raw materials that must be pushed down the line can also vary greatly. And the characteristics and quality of the potatoes coming onto the line can vary, with some batches containing a higher percentage of defects such as green or discolored skins, or bruising, or rot. These are many variables – but all can be taken care of when defining the sorters' functions and tailoring the sorters' control settings. To share an insider's insight into the technologies employed by state-of-the-art sorters, and the remarkable efficiencies they achieve, I am going to look here at four types of platforms often used by potato processors. These are

developed by TOMRA Food, one of the leading innovators in the optical sorting revolution.

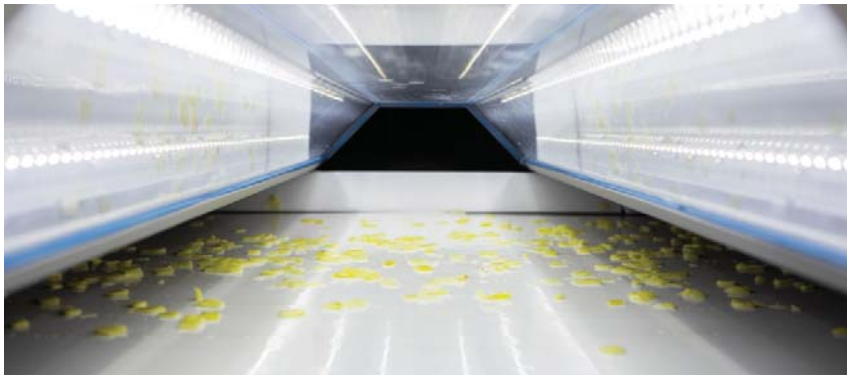
A PRE-SORTER IS THE FIRST STEP

The first type of sorting machine needed in potato processing is a pre-sorter, located where the potatoes are received and before they are fed onto the line. Some large farms also use this type of machine before delivering the potatoes to the processor. As an example of how this type of machine works, I refer here to the TOMRA 3A, which provides a clean-up immediately after the freshly harvested crop has passed through a grader and soil removal equipment. This type of sorter employs an 'in-flight' inspection and rejection process to detect and remove stones, soil clods and other debris from the incoming product. It is designed to operate at high capacity, yet moves the product gently enough to prevent damage. Mechanical finger ejectors remove defects in a way that prevents collisions with neighboring potatoes as they fall into the area for accepted product, and the 'accept' conveyor captures, decelerates and exits the good produce without product collisions or bruising. Unwanted green potatoes can also be identified at this stage, thanks to a sophisticated imaging system with color-detection capabilities. Solid-state, pulsed LED illumination technology with high resolution cameras is able to distinguish between organic matter (the crop) and inorganic matter (foreign material). For reliability, this optical system has minimal moving parts when in operation, and the fully-sealed camera enclosure is tolerant to challenging conditions such as dust.

"Advances in optical sorting technologies are bringing profound change. Sorters have been recognized for years as a vital way of protecting food safety and product quality, but now these machines also serve other important purposes which make a positive contribution to the processor's bottom-line."

FLAKE SORTERS ALSO REMOVE QUALITY DEFECTS

In the quest for zero waste, potatoes initially ejected from a main processing line will often be sent to a processing line for flakes, to be used in specialty products such as hash browns and croquettes. This necessitates the use of a flake sorter to detect and reject any remaining defects. The TOMRA 3C is a good example of a machine well-suited to this task – and of how conventional sorting has been revolutionized by dual-sided detection. Combining double-sided RGB (red, green and blue) cameras with high-intensity, focused LED lighting makes it possible to detect the subtlest color and shape defects. It takes only milliseconds for this machine's intelligent rejecting system to get rid of all defects. A 'shooting' air ejection system with a high-speed valve ensures high-precision rejection with extremely low false rejects. Good produce falls directly into one slot, while defective produce is diverted to another slot for rejection. This ensures the output product is of consistent, high quality.



TARGETING PEEL AS WELL AS FOREIGN MATERIAL

In addition to removing foreign objects and quality defects, it is also essential to have process control over peel. To take care of this there is a machine specifically designed for potato processors, the TOMRA 5A, which removes more than 98% of all foreign objects in product streams after washing and peeling. This machine not only ensures food safety by minimizing the risk of food contamination further down the line, but also dramatically reduces the risk of foreign objects damaging the cutting equipment or otherwise causing a line stoppage.

The sorter given as an example here is an in-air sorting machine equipped with top and bottom banks of optical sensors to view each individual object in flight. Using a combination of pulsed LED, camera, and NIR, it performs targeted spectroscopy with 1mm precision. Machine parameters can be set to precisely alter the accept/reject levels for subtle defects, discolorations and blemishes, as well as for product size and shape.

Another useful feature of this machine is the ability to accurately identify peel with a peel control module, and if desired also feed a mechanical re-work line. The Peel Control Module calculates optimal steam times and continuously conveys this information to the steam peeler. The result, without any need for operator supervision, is lower peel loss and less food waste, at the same time as maximizing steam-peeler yield.

UNPRECEDENTED PRECISION OF CONTROL

Another breakthrough in the optical sorting revolution has given potato processors unprecedented precision of control over their sorters. Sort2Spec allows operators to easily adjust sorting criteria to the required food quality (including shape and size) so that the unnecessary disposal of useable produce is eliminated, further enhancing yield and profitability.

The best example of this is the TOMRA 5B, typically used for wet and individually quick-frozen (IQF) processed products. As these products move along this machine's belt, foreign material and produce imperfections can be detected by on-belt surround cameras, laser, and off-belt cameras. The cameras provide a 360-degree view and are capable of detecting the smallest defects. The off-belt laser detects up to 99% of foreign material. When changing product type, the machine will automatically change pressure, mechanical settings, and sorting program, resulting in minimal change-time and optimal settings for each type of product.

BETTER SOFTWARE IS DRIVING THE HARDWARE

A technological revolution has also been taking place in software and controls. Now we have easy-to-program control features which only a few years ago would have been the stuff of dreams. To give just a few examples: Sort-to-Length ensures that French fries meet a pre-determined grade; reverse sorting recuperates good product from recovery streams; Smart Sort helps operators easily define color specifications and detection settings; Dynamic Cloud gives a real-time view of all the materials the machine is assessing as defects, so that detection settings can if necessary be fine-tuned; and Sort2Spec makes it easy to sort batches to different qualities – for example, AAA grade and B grade French fries.

The technical revolution has also brought us SCADA systems, which connect sorters to a control center for continuous monitoring of machine parameters and health, and also the possibility to change sorting program following the command of the entire production line. Next to this, a web-based platform is now available which turns sorters into connected devices that generate valuable data and process this into actionable information. And machine networking and machine self-learning, already finding their way onto sorting machines in other applications, will soon also be seen at potato processors.

The optical sorting revolution is especially beneficial for potato processors because it is accompanied by different technical advances. These advances are so significant that processors, whether family businesses or international companies, really benefit from their implementation. •

"The optical sorting revolution is especially beneficial for potato processors because it is accompanied by different technical advances."

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Consider a Greener Future

Alongside highly automated systems, sustainability seems to be top of the agenda with the all-important goal of reducing the environmental impact of their packaging and operations. Be it the implementation of bio-degradable packaging materials or reducing waste throughout the packaging process, it is all influencing the roadmap towards a cleaner, greener future.

By Dan Orehov

In recent years, technology and features of VFFS packaging equipment have clearly evolved to meet this demand. For example, packaging systems incorporating single serration jaws, successfully help manufacturers reduce film consumption by reducing the film length required per bag. Providing major film savings due to their smaller seal area, the single serration jaw allows an increase in bag volume while maintaining the same bag length. In addition, the jaws have a smaller profile meaning they require less jaw heat and produce a faster seal time; thus, leading to increased throughput and enhanced performance. The innovation has helped numerous snack manufacturers successfully reduce the consumption of biaxially oriented polypropylene (BOPP) film, which while recyclable, is non-biodegradable.

"In today's environmentally-concerned climate, equipment must combine efficiency gains and energy savings – and that includes conveyors. Arguably one of the most crucial pieces for equipment on the production line, conveyors are responsible for transporting the product from one end of the production line to the other - connecting the different processes in a smooth, continuous flow. Energy efficient conveying systems are therefore critical to any operation when it comes to ensuring greater productivity and efficiencies," says Anurag Mitra – Product Marketing manager, tna. "The tna's roflo® transfer and distribution series possesses a host of sustainability features that make it environmentally conscious and cost-effective. Featuring an efficient and sustainable design that is underpinned by an absolute minimal use of moving parts, such as gear boxes, timing belts and couplings for a longer lifecycle, manufacturers can benefit from reduced maintenance requirements and the associated costs. Fewer modules required to transfer product and a natural frequency also means reduced energy costs and minimal detrimental impact on the environment. On standard tna roflo® 3 modules, compressed air – an inefficient energy source – has been eliminated, while the series also utilizes an auto-stand-by feature when no product is present, to reduce utility costs further and make the operations more sustainable," he adds.

PLENTY OF OPTIONS

As the inventor of the world's first rotary, continuous motion, high-speed VFFS system, tna's robag® 3 series is founded on three key principals: performance, flexibility and simplicity. And this is true for every one of their product developments. With a focus on performance, tna says they can help our customers deliver increased packaging speeds, reduced waste, greater efficiency, reliability and productivity. Meanwhile, their principal of simplicity ensures that all

equipment is designed with ease of use in mind – from intuitive programming and operation to simplified film systems for effortless film threading and stainless-steel construction for ease of cleaning. Finally, flexibility is a key attribute – particularly in the packaging arena. The ability to switch between different packaging types and formats quickly and easily is imperative for brand owners to be able to meet changing consumer demand while ensuring minimum downtime between production runs.
"The consumer backlash against plastic is a driving force for the industry in looking for fit-for-purpose alternatives. While reducing waste is currently top of the agenda, various brands have already started innovating alternatives. In some markets, for instance, mushroom packaging has been developed as an alternative to Styrofoam, and seaweed packaging is being praised as an alternative to film. Though neither of these materials are yet in use on a broad scale, it is certainly something of which the industry needs to be aware, particularly packaging equipment solution manufacturers, since VFFS systems should have the ability to run these alternative materials to meet brand owners' requirements," Mitra adds.

"Our range of equipment includes the advanced RV multihead weigher and next generation Inspira bagmaker combination, TSC-RS sealtester, DACS force balance checkweighers, IX-GN x-ray inspection systems, ACP 700 case packer and a DACS-GN carton checkweighers."

Ishida representatives

TRACKING AND TRACING

Tracking and tracing of produce throughout the complete supply chain is already present with many of our customers. Due to real-time connection between weighing and packaging machinery and the customers' ERP system, any identification can be printed on the package. In this way, a pack sold in the supermarket contains an ID and can always be led back to the grower/ packer.
"As an integral solutions provider in the field of weighing and packaging equipment, IoT is affecting our business hugely. We see that communication with and between machines is becoming more and more important and asked for by our customers. Management information is nowadays available on PC and app and packers can monitor the performance of their machines real time. But switching on and off machines remotely is, due to safety regulations, not available and we do not see that changing quickly," according to the Manter company representatives.
Manter specialists also say that it is becoming increasingly difficult to find people that are willing to do repetitive work, all over the world. The only way to answer this trend is to automate the packing processes. Therefore, those active in the agro segment ask to automate packaging machines from semi-automatic to fully automatic, while also observing a growing demand for integration between machines, such as between packing and palletizers. This is one of the reasons why Manter took an equity stake in palletizer manufacturer Solidtec recently. By this acquisition, they are able to synchronize the operation of two separate, but related operations. This saves time in changing packing sizes. Lastly, in the consumer packing segment, the same trend can be noticed.
"At Manter, we divide the market for packaging potatoes in two segments. On the one hand there is the agro-segment, where (seed) potatoes are packed in bigger bags of e.g. 25kg per bag. In this segment, our main customers are seed potato growers and packers that are exporting their product mostly in jute and net bags. The second segment is the market of consumer packaging. Packers focus on small packs (up to 2,5 or 5kg per pack) and are active in washed and sometimes peeled potatoes. We have a complete range of weighers for this segment with a capacity up to 100 packs per minute," explain Manter representatives.

"The tna's roflo® transfer and distribution series possesses a host of sustainability features that make it environmentally conscious and cost-effective. Featuring an efficient and sustainable design, manufacturers can benefit from reduced maintenance."

Anurag Mitra – tna

On the same note, Ishida believes that the current anti-plastic sentiment among consumers is leading potato chip producers to seek alternative packaging materials to the current multi-laminate foils. For the pack manufacturers, the challenge is to find materials that are able to maintain what has already been achieved in terms of on-shelf presentation and maintaining product quality and freshness. Undoubtedly, stringent retailer standards and consumer expectations – along with the means to complain to a wide audience via social media – means serialization and traceability have become an important part of many snack manufacturers' quality control procedures. The latest smart technology can enable every pack to be fully identified with detailed information such as the temperature of the sealing process and, if x-ray inspection has been used, the individual x-ray image of the pack contents. This will provide comprehensive monitoring of product and pack quality, particularly when new pack materials are being trialled or introduced. It will also simplify a recall or investigation of a complaint. In addition, this technology can be used for marketing opportunities, particularly interaction with consumers at the point of purchase. By using their smartphone to scan a code on the pack, consumers can find out more detailed information about the product, including details of the variety of potato used and the farm where it was grown.

"Ishida was the inventor of multihead weighing technology in the 1970s and its introduction to the snacks sector was undoubtedly a game changer in terms of maximizing speeds and minimizing product giveaway," say company specialists. "We have continued to be at the forefront of new product developments since then, creating even faster and more accurate machines to enable snacks manufacturers to maximize throughput and efficiencies. Whereas in the early 1980s our weighers, combined with twin bagging systems, could achieve a top speed of 110 weighments per minute for a 25g bag of chips, today it is over 270 for snacks products, with accuracy now to within 0.1g of the target weight. Ishida remains the world market leader in snacks packing technology, with fully integrated solutions for the feeding, weighing, packing, inspection and case packing of snacks. Our range of equipment includes the advanced RV multihead weigher and next generation Inspira bagmaker combination, TSC-RS sealtester, DACS force balance checkweighers, IX-GN x-ray inspection systems, ACP 700 case packer and a DACS-GN carton checkweighers," they add.

To conclude, in the potato chips sector, demand continues for packing equipment solutions that maximize speed, efficiency and throughput. As a result, there came the introduction and ongoing enhancement of increasingly sophisticated and fully integrated snacks packing lines, that are able to deliver the highest levels of productivity performance, system efficiency, pack presentation and pack quality. •

"As we are an integral solutions provider in the field of weighing and packaging equipment, IoT is affecting our business hugely. We see that communication with and between machines is becoming increasingly important."

Manter representatives

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Potato Chips Will Experience Moderate Growth

In 2018, the consumption of potato chips in Eastern Europe amounted to 376,000 tons, approximately equating the previous year. The total consumption volume increased at an average annual rate of +1.4% from 2007 to 2018; the trend pattern remained relatively stable, with somewhat noticeable fluctuations being recorded over the period under review.

By Indexbox

The most prominent rate of growth was recorded in 2011 when consumption volume increased by 8% y-o-y. The volume of potato chips consumption peaked at 382,000 tons in 2013; however, from 2014 to 2018, consumption remained at a lower figure.

AN EXPANDING MARKET

The revenue of the potato chips market in Eastern Europe amounted to USD971M in 2018, going up by 1.5% against the previous year. This figure reflects the total revenues of producers and importers (excluding logistics costs, retail marketing costs, and retailers' margins, which will be included in the final consumer price). Overall, potato chips consumption, however, continues to indicate a relatively flat trend pattern. The pace of growth appeared the most rapid in 2011 with an increase of 16% y-o-y. The level of potato chips consumption peaked at USD1.2B in 2013; however, from 2014 to 2018, consumption stood at a somewhat lower figure.

RUSSIA, UKRAINE AND ROMANIA - THE LARGEST CONSUMERS

Russia (123,000 tons) remains the largest potato chips consuming country in Eastern Europe, comprising approx. 33% of total volume. Moreover, potato chips consumption in Russia exceeded the figures recorded by the second-largest consumer, Ukraine (61,000 tons), twofold. The third position in this ranking was occupied by Romania (59,000 tons), with a 16% share.

From 2007 to 2018, the average annual growth rate of volume in Russia totaled +4.0%. In the other countries, the average annual rates were as follows: Ukraine (+1.1% per year) and Romania (+0.6% per year).
In 2018, the amount of potato chips imported in Eastern Europe amounted to 100,000 tons, growing by 10% against the previous year. The total imports indicated resilient growth from 2007 to 2018: its volume increased at an average annual rate of +5.1% over the last eleven years. The volume of imports peaked in 2018 and are expected to retain its growth in the immediate term.
According to market research conducted by IndexBox, imports of the seven major importers of potato chips, namely Poland (16,000 tons), Ukraine (14,000 tons), Russia (12,000 tons), the Czech Republic (10,000 tons), Belarus (9,000 tons), Hungary (9,000 tons) and Slovakia (8,000 tons), represented more than two-thirds of total import.
From 2007 to 2018, the most notable rate of growth in terms of imports, amongst the main importing countries, was attained by Poland (+11.4 per year) and Ukraine (+7.4 per year), while imports for the other leaders experienced more modest paces of growth. Poland, Ukraine and the Czech Republic, therefore, emerged as the largest and fastest-growing importers of potato chips in Eastern Europe. Russia, meanwhile, constituted large importer where the volume of imports declined slightly over the last decade.

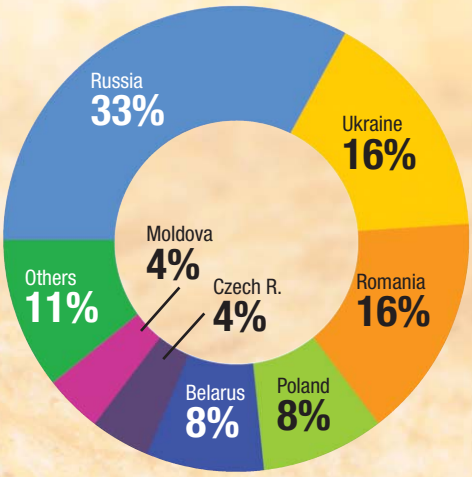
"Population and income growth in Eastern Europe are set to remain rather modest, which is to determine the overall trend pattern of potato chips consumption."

The potato chips import price in Eastern Europe stood at USD2,746 per ton in 2018, rising by 6.5% against the previous year. In general, the potato chips import price, however, continues to indicate a slight decline.
The growth pace was the most rapid in 2008 when the import price increased by 15% y-o-y. In that year, the import prices for potato chips reached their peak level of USD3,671 per ton. From 2009 to 2018, the growth in terms of the import prices for potato chips remained at a somewhat lower figure.
Prices varied noticeably by the country of destination; the country with the highest price was Lithuania (USD4,088 per ton), while Poland (USD1,505 per ton) was amongst the lowest. From 2007 to 2018, the most notable rate of growth in terms of prices was attained by Hungary, while the other leaders experienced a decline in the import price figures.

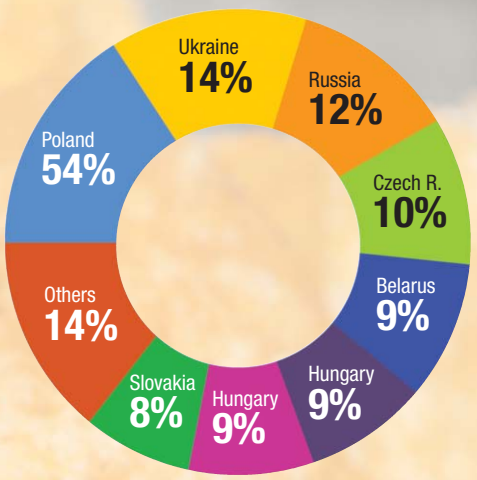
FRANCE, GERMANY AND THE NETHERLANDS - THE LARGEST EXPORT MARKETS

In 2018, approx. 114,000 tons of potato chips were exported in Eastern Europe; rising by 18% against the previous year. Overall, potato chips exports continue to indicate a resilient increase. Over the period under review, potato chips exports reached their peak figure in 2018 and are likely to continue its growth in the near future.
Poland was the major exporter of potato chips exported in Eastern Europe, with the volume of exports

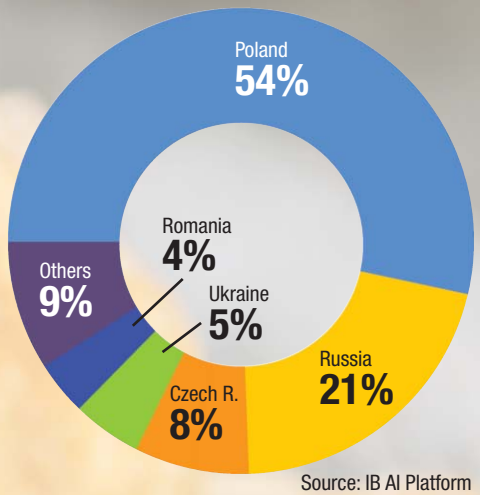
Consumption, by Country, 2018 (%, based on kg)



Imports, in Physical Terms, by Country, 2007–2018 (%, based on kg)



Exports, in Physical Terms, byCountry, 2007–2018 (%, based on kg)



Source: IB AI Platform

finishing at 61,000 tons, which was approx. 54% of total exports in 2018. It was distantly followed by Russia (23,000 tons), the Czech Republic (9.4,000 tons) and Ukraine (5.4,000 tons), together creating a 34% share of total exports. Romania (4.3,000 tons) and Belarus (2.9,000 tons) took little shares of total exports.
Exports from Poland increased at an average annual rate of +14.3% from 2007 to 2018. At the same time, Belarus (+31.3%), Romania (+20.5%), Russia (+12.9%) and the Czech Republic (+6.4%) displayed positive paces of growth. Moreover, Belarus emerged as the fastest-growing exporter exported in Eastern Europe, with a CAGR of +31.3% from 2007-2018. By contrast, Ukraine (-1.1%) illustrated a downward trend over the same period. Poland (+41 p.p.), Russia (+15 p.p.), the Czech Republic (+4.1 p.p.), Romania (+3.3 p.p.) and Belarus (+2.4 p.p.) significantly strengthened its position in terms of the total exports, while the shares of the other countries remained relatively stable throughout the analyzed period. Thanks to the large and increasing volume of exports, Poland featured as the most promising supplying country in Eastern Europe

14k

tons of potato chips were exported in Eastern Europe in 2018.

THE MARKE IS SET TO EXPERIENCE MODEST GROWTH

Potato chips constitute a well-known and popular snack food worldwide, including Eastern Europe. It is consumed both by children and adults as a tasty snack, moreover, salty potato chips are a popular item taken with beer. The market, therefore, is well-established, there are several popular brands in each country which are commonly owned by large multinational companies. Since potato chips already constitute popular food products in Eastern Europe, no prerequisites for a sharp growth in consumption are currently forecast. Population growth remains a key market driver, combined with increases in disposable income, which in turn will contribute to enhanced consumer spending. Despite the increasing economic uncertainty and sluggish economic growth in CIS countries, snack food will enjoy rather stable demand, as people like to relax after work and like to meet at picnics, where some amount of chips is usually consumed.
On the other hand, heightened consumer awareness regarding fat intake and healthy lifestyles may restrain the growth to a certain degree, but this remains income-dependent: higher income groups tend to be more concerned about these issues. However, potato chips are typically consumed in rather small amounts per person and not too often, therefore, those concerns are not expected to make a significant shift in consumer preferences. Potato chips producers constantly create new flavors, change the design of packaging, spend for mass media advertising and use promotional activities to attract consumers' attention, which is to maintain consumer interest to potato chips.
Population and income growth in Eastern Europe are set to remain rather modest, which is to determine the overall trend pattern of potato chips consumption. Driven by increasing demand for potato chips in Eastern Europe, the market is expected to continue an upward consumption trend over the next decade. Market performance is forecast to retain its current trend pattern, expanding with an anticipated CAGR of +1.0% for the period from 2018 to 2030, which is projected to bring the market volume to 423,000 tons by the end of 2030. •

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The Market Provides Equipment for Every Need

Seasoning is an integral part of any snack, including potato products, as it is a way to differentiate and create interest in the end result.

By Dan Orehov

The seasoning systems most commonly used in savory snacks include:

- Conveyor-based dusting system
- Drum-based single-stage dry flavor application
- Drum-based two-stage oil and dry flavor application
- Drum-based slurry.

According to Heat and Control, the key to great seasoning coverage is consistent flow with process control. So, what is the right flavoring system for the different snack products?

Dry only systems are used on products that have natural tack

- Fried potato chips and crisps
- Fried pellet snacks.

Oil and dry systems are used on snacks that do not have natural tack

- Tortilla chips
- Corn chips
- Mini rice cakes or other dry puffed products
- Popcorn
- Baked chips and crisps
- Extruded snacks.

Slurries

- Extruded snacks
- Popcorn
- Puffed snacks.

The specialists at Heat and Control say that seasoning systems fall into the following 3 categories:

In-kitchen seasoning systems typically have a large capacity and are used where minimal flavor changes are required, they include two stage or slurry systems.

On-machine seasoning systems are used for one stage coating and are ideal for applications where many flavor changes are required.

Belt coating systems are used primarily for salt only application.

IN-KITCHEN SEASONING SYSTEMS

In-kitchen or process seasoning systems consist of a large coating drum, seasoning metering device and a seasoning spreader device. They are ideal for core products on process lines that change flavors once a shift or less. These systems are great for high volume products and designed for continuous product flow.

The advantages of an In-kitchen system:

- Ideal for large production lines that have a few flavor changes
- Most consistent seasoning
- System can be rolled in and out of the line
- Typically less expensive.

ON-MACHINE SEASONING SYSTEMS (OMS)

On-machine seasoning is seasoning application at the weigher (sometimes referred to as on head). An OMS system comes pre-assembled and mounted to a platform prior to shipping, allowing it to be quickly set in place and connected to utilities at the plant so production can begin without delays. Benefits include, ease of operation, sanitation, cleaning and simple to use, as well as newer designs to provide excellent coverage. OMS systems apply seasonings to snacks just before they enter the weigher to increase production versatility. They allow processors to run a different flavor on each bagger, running multiple flavors at one time leads to smaller warehousing requirements. Fryers continue to run during flavor changeovers and with higher packaging equipment efficiency experienced. These systems are

typically used for salt only. They require less capital outlay than the more sophisticated In-kitchen and OMS systems and are simple to use.

DUST-ON/OVER THE BELT SEASONING

Spray Dynamics® metermaster salt applicator dispenses powdered and granulated salt over-product on a moving belt with consistent and repeatable accuracy. Two-stage systems are employed when the natural or process induced tack is not present on the product to be flavored. Oil is sprayed onto the product prior to adding the dry flavor. The temperature of the product is very important to how much oil stays on the surface, similarly the dry flavor coverage is totally dependent on oil coverage. "An all-in-one package, the two-stage seasoning - in-kitchen system can handle large product volumes. If temperature is critical the placement is flexible. This system is the best choice for high absorption products," Heat and Control experts explain.

TWO STAGE SEASONING SYSTEMS

The two stage seasoning – oil in-kitchen and dry flavor on head has the following advantages:

- Short dry flavor changes
- Oil spraying confined to the kitchen area
- Allows for time adjustments between oil and dry
- More flavors can be produced at one time

The two-stage seasoning – oil and dry flavor on head (OMS) also has some advantages:

- Short flavor changes
- Works well with low fat and high absorption products
- More flavors can be produced at one time.

The Spray Dynamics two-stage coating system provides consistent, uniform application of liquid and dry coatings on extruded, baked, frozen, and fried products.

DRY DUST APPLICATORS

There are various types of dry flavor applicators that can be used for applying seasoning to snack products and these include scarf plate dispensers and electrostatic systems. Scarf Plate Feeders are easy to operate, easy to clean and can work with most products, creating a consistent curtain of seasoning. On the scarf plate feeder, the bias is cut on a vibratory or horizontal motion conveyor, and a screw feeder is used to feed the spice at the desired rate. Electrostatic applicators work by applying a static charge to the powder, oil or slurry as it is being sprayed onto the base product. As the flavorings and coatings become 'negatively' charged, they repel each other making a nice curtain or spread of seasoning. Electrostatic applicators offer a reduction in dry powder usage, even coverage and a cleaner working environment.

SPRAY APPLICATORS

Pulsing sprays are a proven economical, simple but highly accurate system with a small footprint. They include a piston pump with adjustable cavity size. Spray Applicators - continuous air assist atomize low pressure liquid using air. The air is added around the annulus or internal mixing chamber and is typically low pressure creating a continuous stream of oil. The system works well with a PD pump and flow meter and is good for high oil rates. "With spray applicators, continuous oil spray systems getting an even coating of oil on each piece is key to flavor adhesion and appearance. Processors should use as many nozzles as practical to apply to more pieces at once. If using a pulsing system keep rate above 150 pulses per minute and make sure continuous systems have balanced pressure to each nozzle. Always spray on tumbling product," say Heat and Control specialists.

"No matter the size of your project, we can help you integrate it to your needs. From a single unit to a complete packing hall with complex seasoning handling requirements, Rosenqvists can design and supply your complete seasoning and distribution system."

Göran Wadsten, Rosenqvists

SLURRY APPLICATORS

When product specifications call for more oil than seasoning, a slurry is typically used. Typically, oil is more than 60% of the slurry weight. Mixing tanks are required as many ingredients including salt will not dissolve in oil and constant mixing is required. Most slurry applications require a soak, time for the oil seasoning mix to be absorbed in the base product. The advantages of using a slurry applicator is the correct mixing of several liquid and dry powder ingredients in proportion. They also work well on extruded and pellet type products.

SEASONING AND DISTRIBUTION

According to Rosenqvists, the company offers four different standard configurations of their seasoning system. All four can be designed and customized for any coating need. Slow speed, gentle action, and uniform product depth prevent product breakage and ensures optimal coverage for consistency with all types of seasoning. All seasoning systems are built on one skid for ease of installation and the design has been optimized for easy access and cleaning. Their main features include:

- Retractable scarf feeder
- Drum on swivel
- 90 degree turnable seasoning feeder.

In-line or on-head seasoning all options are also available. For dry products, different oil-spray systems are available.

The Seasoning Drum (SDA) has a design that guarantees that the product will be treated/tumbled gently ensuring that all the product in the drum will get the same coverage of seasoning. The result will be an even seasoned product with no wasted seasoning. For the Scarf Feeder, powders, granules and fine products are controlled and handled easily. Designed to convey, dispense, and spread light and fine products accurately, they make a good sprinkling and coating solution. With the capability to handle a broad range of products, including high fat powders, they provide excellent seasoning coverage and are easy to clean and maintain.

"Rosenqvists are a full system provider. We combine all our products to build custom made systems according to your requirements. All systems supplied are operated from an HMI system developed by Rosenqvists based on our vast know-how and experience. No matter the size of your project we can help you integrate it to your needs. From a single unit to a complete packing hall with complex seasoning handling requirements, Rosenqvists can design and supply your complete seasoning and distribution system," explains Göran Wadsten.

"With spray applicators, continuous oil spray systems getting an even coating of oil on each piece is key to flavor adhesion and appearance. Processors should use as many nozzles as practical to apply to more pieces at once."

Heat and Control

For distribution, Rosenqvists offer their Vibratory Conveyor, which uses electromagnetic drives resulting in highly reliable units that virtually eliminate maintenance and downtime. The tailor-made controller allows variable product speeds enabling regulation of product flow rates. Suiting a broad range of applications and offering gentle product handling with minimal maintenance, the unit will add value to the processing line. Perfect for modular distribution systems with proportional end gates to feed on-head-seasoning.

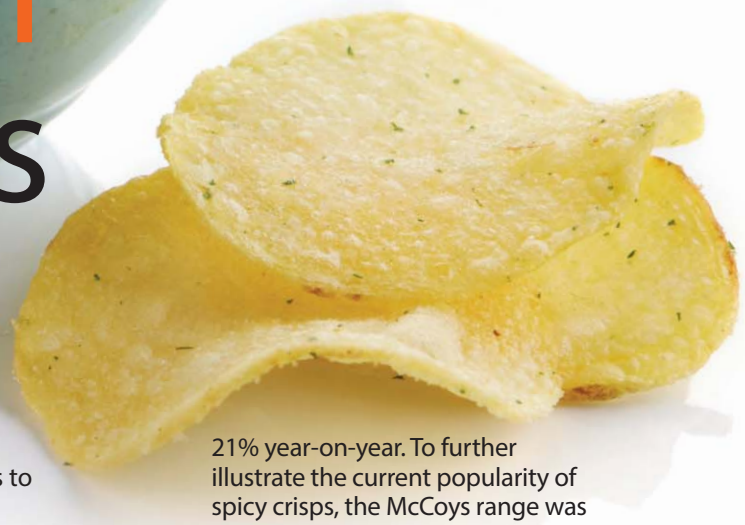
The Horizontal Motion Conveyor handles the most delicate products. With the possibility to have long pan lengths, up to 30 meters, combined with different gate and lane configurations gives a cost-effective option compared to a modular distribution system. The possibility to reverse product direction and the ability to place the drive at either end or even below the conveyor make the it suitable for most layouts. Its self-cleaning pan and its ability to replace several conveyors, reducing transfer points, are two important factors when considering a new conveyor for potato products. The company also supplies flighted Z-elevators, for large elevation changes.

"In addition, we supply a range of belt configurations including normal transport belts and weighing belts. We only use food grade belts with the correct flight design to suit your application and capacity. The steelwork is always manufactured in stainless steel. We work with both modular and flat belts and can include many options including CIP and catch pans. If desired we can also supply bucket elevators in various sizes and configurations including with multiple discharge points," concludes Wadsten. •

Jonathan Thomas

Cashing in with Chips

Bolder flavors and crunchier textures are aiding demand for potato chips, **reports Jonathan Thomas.**



Potato chips (or crisps, as they are more frequently called in markets such as the UK) remain one of the most popular forms of snack food throughout the world. The market remains sizeable – it is currently valued at around USD29bn, with annual growth is expected to average more than 3% until the middle of the present decade, when sales should reach around USD35bn. This is despite the competition the sector faces from other forms of snack foods, many of which are gaining traction in many parts of the world. Examples include nuts, popcorn, confectionery, fruit, biscuits, dairy products (e.g. yoghurts and cheese) and hot-eating snacks (such as microwaveable sandwiches). Some of the world's largest markets for potato chips and crisps include western countries such as the US and the UK, as well as various emerging economies (e.g. China, Brazil and Russia). Value sales in the US are worth around USD9bn per year, equivalent to around a third of the total market for salty snacks. Despite its size and maturity, the US market continues to expand, with value sales increasing by around 2% per annum. In the UK, meanwhile, penetration amounts to around 93% of the population, with consumers eating around 178 packets of crisps per annum on a per capita basis. According to data from Kantar, value sales were worth around £950m in 2019.

FLAVOR TRENDS

Flavor remains an important selling point for potato chips and crisps throughout the world. In many western markets – such as Western Europe and North America – the market is experiencing greater innovation and experimentation with hotter, bolder flavours which provide more novel and interesting taste sensations. Much of this is being driven by younger consumers.
In the UK market, for example, sales of potato crisps with 'hot' flavors are currently growing by around 29% per annum. As further evidence, the Max Strong range owned by PepsiCo's Walkers (which is marketed as a suitable accompaniment to beer and includes flavors such as Chilli & Lime and Hot Chicken Wings) is growing by 21% year-on-year. To further illustrate the current popularity of spicy crisps, the McCoys range was extended with a new Fiery Steak flavor in February 2020. This was launched in response to data from Nielsen which claimed that flavor was the leading purchase driver within the potato crisps category. Early the previous year, the Walkers range had been extended with new BBQ Pulled Pork and Sriracha varieties. These were developed after the company used insight tools to identify which flavors were trending amongst UK consumers. Partly due to recent innovation efforts such as these, there now exists a huge and diverse range of flavors within the UK potato crisps sector – for example, there are believed to be up to 75 varieties of cheese and onion, as well as over 120 for meat-based flavors. Despite these recent trends, however, traditional favorites continue to dominate the UK market. In value terms, plain and/or ready salted varieties accounted for over a quarter (26%) of overall sales in 2019, according to data from Kantar. This ranks well ahead of cheese and/or

onion and meaty flavours, both of which held a 17% value share during this time. This figure decreases to 10% for salt and vinegar.

This data correlates with sales of many of the leading brands within the UK market. Within the Tyrrells range, for example (which is owned by KP Snacks), four leading flavors account for between 70% and 80% of the brand's sales. These are Lightly Salted, Salt & Vinegar, Cheddar & Chive and Sweet Chilli. In the out-of-home market, beef-flavored crisps are consistently one of the top three performers in terms of both sales and annual growth. Slightly different conclusions were presented in the 2019-2020 version of the Waitrose Food & Drink report, which polled the opinions of around 2,000 people. According to this, cheese and onion is currently the UK's favorite flavor, ahead of salt and vinegar and ready salted. The report also presented some notable findings by region – for example, the West Midlands is the only part of the UK where ready salted outweighs cheese and onion in the popularity stakes, while Sour Cream & Onion is a favorite in East Anglia. Consumers in both the South-East and Wales tend to prefer salt and vinegar crisps to cheese and onion, while 7% of people in the former expressed a liking for Marmite-flavored crisps.

Other, more recent flavor trends evident in the UK and elsewhere have included the launch of potato crisps with sweet flavors – one example was Ham with a Spiced Cola Glaze under the Tesco Finest range, as well as strawberry and Christmas pudding crisps. Alcoholic drinks (examples of which include prosecco, wine and gin) continue to inspire flavor development within the category, especially at certain times of the year such as Christmas. On a related note, these festivals and occasions have also influenced flavor development within the potato crisps market. In recent years, the Walkers range has been extended in the UK during the seasonal period with festive-themed flavors, such as Pigs in Blankets, Turkey & Stuffing and Brussel Sprouts.

In the large US market, a large percentage of the population still appears to gravitate towards plain-flavored potato chips as a first choice, rather than actively seeking out novel or innovative flavors. In 2019, plain varieties of potato chips were eaten by a leading 58% of the US population, equivalent to around 188 million consumers.

That said, the choice of flavors within the potato chips sector is believed to be increasing in the US market, as is the case elsewhere in the western world. Barbecue appears to a notable favorite, eaten regularly by just over a quarter (26%) of US consumers in 2019, or around 86 million people.

This figure decreases to 21% for Sour Cream & Onion and less than 20% for mainstream flavors such as Salt & Vinegar and Cheese. Despite the continued popularity of plain-flavored potato chips amongst US consumers, there is evidence of a gradual shift towards products with more novel tastes, especially amongst the younger age groups whose diets tend to be more cosmopolitan. The market is currently witnessing a growth in demand for bolder spicier flavors, examples of which include salsa, habanero, teriyaki, Wasabi and

"The desire for different textures has also contributed to the growth of the market for batch-fried products, or kettle crisps/chips as they are often called."

UK Potato Crisps Market by Flavor (% value), 2019

Flavor	%
Plain/ready salted	26
Cheese and/or onion	17
Meaty	17
Salt & vinegar	10
Chilli	5
Prawn	3
Others	22
Total	**100**

Source: Kantar

Leading Potato Chip Flavors in the US by number of consumers and penetration, 2019

Flavor	Cons. (m)	Penetr. (%)
Plain	188	58
Barbecue	86	26
Sour cream & onion	70	21
Salt & vinegar	49	15
Cheese	38	12
Jalapeno	27	8

Source: Statisa/Trade sources

horseradish. Unusual flavors have also started to appear in greater numbers – one example from 2019 were Honey-Butter potato chips from Wire Foods.

Flavor innovation is also widespread in many Asian markets, where tastes can be quite different to western palates. During the autumn of 2018, the Lay's range in China was extended with a new flavor based on durian, a strong-smelling fruit native to the region. This followed from the appearance of durian-inspired dishes brought out by foodservice operators such as McDonalds, KFC and Pizza Hut. At around the same time, Lay's also introduced potato chips coated with salted egg yolk in the Chinese market. These have since been launched in Malaysia. Similarly extravagant and unusual flavors exist in the nearby Japanese market. Some local specialties include Nori Shio (a combination of seaweed and salt), Jagariko (baked potato and butter) and Wasabeef (a combination of beef and Wasabi), as well as Pizza and Hot Chilli. In the developing Indian market, the most popular flavors are based around salt, pepper and chilli.

FORMATS & TEXTURES

Value for money appears to be a key purchasing influence for consumers in western markets such as the UK. For in-home consumption occasions, multipack crisps account for an estimated 70% of total market value, ahead of sharing bags (26%). Over the last decade, the popularity of larger packaging formats geared towards sharing occasions has been on an upwards trend, driven by the rising frequency of in-home socializing and 'the big night in.' On a related note, data from Waitrose's latest Food & Drink report indicates that 46% of UK consumers regularly eat crisps with some form of dip. This habit is most apparent amongst Londoners, since over two-thirds (68%) of consumers in the capital prefer to eat crisps in this way. In contrast, people in the Yorkshire/Humberside region are least keen on eating crisps with a dip. Sour cream is the most popular variety of dip, mentioned by 21% of respondents, ahead of other types such as tomato salsa and houmous.

Texture also represents a frequent source of innovation within the market for potato crisps and chips. Based on recent activity by some of the market's leading suppliers, thicker, ridge-cut products appear to command a sizeable following amongst consumers. The UK's leading brand within this sector is McCoys, which is regularly purchased by 33% of the country's households. Brand owner KP Snacks produces over 1.8 million packs per day, with up to 1,500 packs believed to be purchased every minute on average. According to the latest version of the Waitrose Food & Drink report, thick and crunchy crisps are most popular in the South-West region of England, where 40% of consumers expressed a preference for this type of texture.

The desire for different textures has also contributed to the growth of the market for batch-fried products, or kettle crisps/chips as they are often called. These are prepared using a process known as batch cooking,

"Barbecue appears to a notable favorite, eaten regularly by just over a quarter (26%) of US consumers in 2019, or around 86 million people."

29%

is the average sales growth of spicy-flavored chips in the UK in 2019.

which results in harder and crunchier products. In the UK, recent data from YouGov found that the Kettle Chips brand drew a favorable response from 67% of consumers, with descriptions such as 'classy', 'tasty' and 'good quality' mentioned. The Kettle Chips brand scores most highly with younger adults – for example, 75% of millennials are positively inclined towards Kettle Chips, compared with 66% of Generation X consumers and 60% of baby boomers. By gender, 70% of females were positively disposed towards the brand, compared with 64% of men.

HEALTH-RELATED NPD

Pressure from the health lobby remains as strong as ever, with the result that manufacturers of potato crisps and chips are under sustained pressure to offer consumers products with improved nutritional profiles. This has led to 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 ingredients and products manufactured using a baking (rather than frying) process. The fact that crisps and chips are continually linked with poor diets means that this trend is unlikely to abate any time soon.

One feature of the Walkers portfolio in the UK is its Oven Baked range, whose crisps typically contain up to 50% less fat than their standard counterparts. In July 2019, the Oven Baked range was extended with new vegetable crisps, in Sweet Potato & Paprika and Beetroot & Sweet Chilli flavors. According to the company, these contain up to 40% less fat than regular vegetable crisps. In its domestic US market, PepsiCo's Lay's range includes Better for You potato chips, which contain 50% less sodium than regular varieties.

At around the same time, Tayto Group (which is headquartered in Northern Ireland and produces over 5 million packets of crisps per annum) extended its Golden Wonder brand with Light & Loaded potato crisps, which are manufactured using air popping technology to create a crunchier product. According to the company, these contain up to 50% less fat than regular crisps, as well as 81 calories per pack. Launched in Cheddar Cheese and Smoky Bacon flavors, the new crisps were targeted at in-home social occasions. •

"Organic Means Growing Responsibly"

In this interview with Christa Wagner, director of advertising and promotions for The Little Potato Company, I wanted to hear a trader's opinion on what it means to focus on organic potato growing and also on providing convenience-driven meal solutions to consumers.

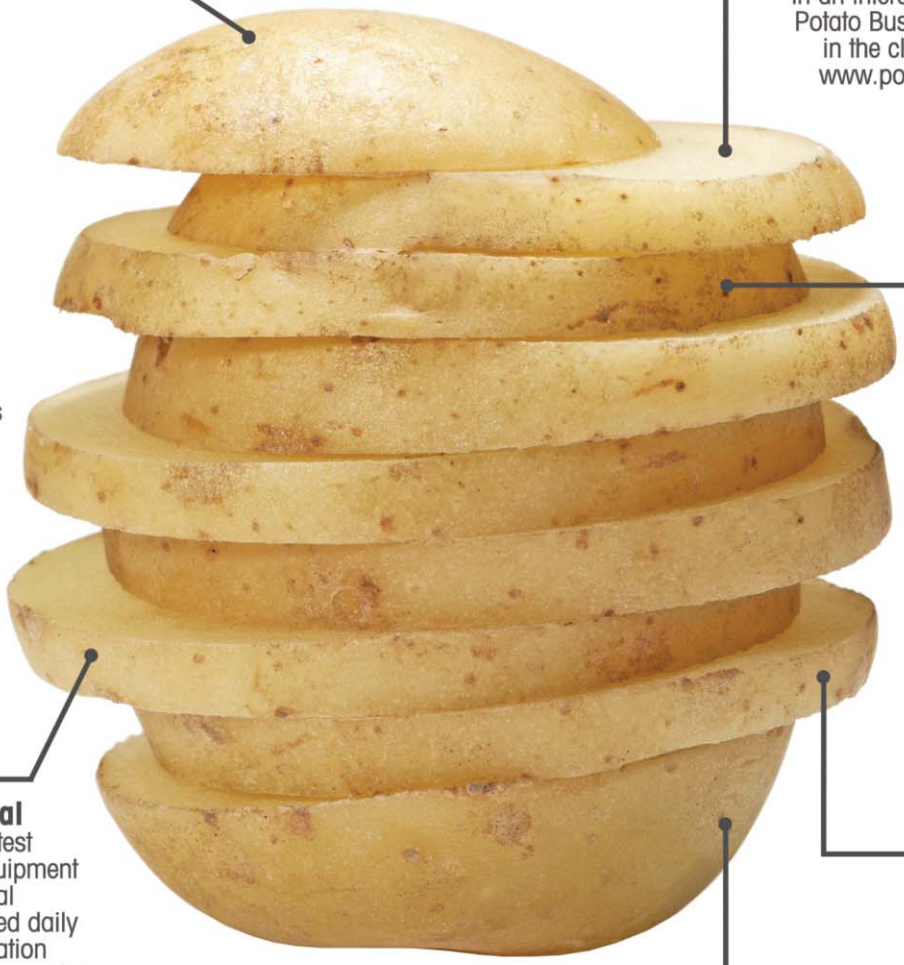
By Dan Orehov

Please detail some of your most successful products. What do you think is the reason(s) behind their popularity?
Our bagged potatoes, like our Dynamic Duo and Terrific Trio, have always been a favorite among consumers because they're extremely versatile to cook with, and they were the first bagged potato option available in smaller-sized 1.5 lb and 3 lb bags. Our Creamer potatoes are all consistently sized so they cook to the same doneness and can be smashed, steamed, boiled, roasted and grilled and have a naturally buttery tasting and a velvety texture, making them a delicious addition to any meal.
Our Microwave Ready kits are also wildly popular because it delivers the convenience consumers are craving. With no washing or peeling required, our Microwave Ready kits contain one pound of our fresh Creamer potatoes that are ready to eat in just five minutes. The value-added enclosed seasoning pack adds a mouthful of flavor to each bite, making it easy for our consumers to have a gourmet-tasting side on the tables in a hurry. It's a huge hit with busy parents!

You recently added a new line of convenience-driven meal solutions, Easy Sides. In R&D terms, how long did it take you to develop this range? Can you offer some details regarding the process?
The development for Easy Sides started when we discovered that one of the biggest pain points when it comes to eating potatoes is that they are too time consuming and complicated to prepare. We also learned that crispy potatoes are the preferred way to eat potatoes, but the traditional method to cook crispy potatoes was too time-consuming, especially on a weeknight. Easy Sides solves the dinner time dilemma of getting a delicious vegetable on the table without sacrificing any of the desired crispy texture because they are pre-cooked sous vide style and ready to heat and eat in only seven minutes.

"Creamer potatoes are a nutritious vegetable packed with essential vitamins and minerals that help support the body, boost the immune system and improve energy levels."

It's all about POTATO



POTATO PROCESSING INTERNATIONAL

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

POTATO BUSINESS 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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E-BLAST

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

SPECIAL PROJECTS

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

A COMPLETE COMMUNICATION PLATFORM

What is the challenge of growing and working with small potatoes, as compared to regular potatoes in terms of methods and equipment needed?
When growing our Little potatoes, the main challenge is ensuring we have the right environment needed to grow true small-sized Creamer potato varietals –We use the proper equipment needed to protect the naturally thin skin of our Little potatoes, which is one of their unique characteristics. All our Creamers are between ¾" to 1 5/8" in size and when sorting, we strive for uniformity of size so consumers can have the best cooking and eating experience.

In what markets are your products present at the moment. Any plans to expand?
We are sold nationally in retailers throughout the United States and Canada. We see a lot of opportunity for continued growth - especially in showcasing our full, innovative line-up.

What are some trends you have recently noticed concerning fresh potato consumption?
Consumers are looking for healthy timesavers. They have less time to prepare meals because their lives are busier than ever, but they are still looking for healthy food options that don't sacrifice taste. Through our consumer research, we discovered that one of the biggest pain points when it comes to eating potatoes is that they are too time consuming and complicated to prepare, so we've taken the complication out with some of our latest product launches. To help people get dinner on the table in minutes, we've developed product solutions like our convenient Microwave and Oven|Grill Ready kits. Consumer are also looking for healthy products in the refrigerated section – it's no longer only about the perimeter. We recently launched Easy Sides, found in the refrigerated section, which are slow cooked sous-vide style and lightly seasoned, so all you need to do is cut open the package and heat them in a skillet for seven minutes and they are ready to eat.

"Consumers are looking for healthy timesavers. They have less time to prepare meals because their lives are busier than ever, but they are still looking for healthy food options that don't sacrifice taste. "

Your portfolio also includes an organic option. Related to that, what are the challenges of growing small organic potatoes compared to standard tubers?
We experience the same challenges as other organic produce growers, and we are fully committed to offering consumers an organic Creamer potato option. Our organic varietals are responsibly grown using the highest standards of sustainable agricultural practices, offering a special combination of flavor and nutrition that our consumers have come to expect from our entire Creamer family.

Can you talk about the health benefits associated with the consumption of Creamer potatoes?
Creamer potatoes are a nutritious vegetable packed with essential vitamins and minerals that help support the body, boost the immune system and improve energy levels. Creamer potatoes are also considered a heart healthy food because they are rich in potassium, vitamin C and fiber. One serving of Creamer potatoes contains more potassium than one banana and one serving of Creamer potatoes (about 5 to 6 potatoes) contains 20% of the Daily Recommended Intake for potassium (around 650 to 680 mg). They also contain Vitamin B6, calcium, magnesium and iron and are gluten, fat, sodium, and cholesterol free, helping to support a healthy body, boost the immune system and improve energy levels. •

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Sustainability High on the Agenda for New Belgian Branch Organization

Following the recent announcement that a new branch organization – Belpotato.be has been created in Belgium, I reached out to Belgapom's Secretary General Romain Cools, to find out more about the new body and its efforts, especially considering that Belgapom is a member of the new Belpotato.be.

By Dan Orehov

What are the main differences between what Belgapom does and what Belpotato.be sets out to do?
Belgapom is the Belgian federation of the potato trade & processing industry. Other links of the Belgian potato value chain (farmers, suppliers of goods & services) are organized in other associations. A federal branch organization, including the regional (Walloon) branch organization FIWAP, is aiming to act as one voice for the Belgian potato value chain towards the authorities, research institutions, consumers and citizens. The Belgian potato sector has evolved to one of the main drivers of the Belgian agriculture and food industry and is facing a number of new challenges (reduction of available plant protection products, sustainability, biodiversity and climate change). A branch organization, according to European law, allows this value chain platform to be created including the possibility to involve all operators, also those which are not a member of the individual industry associations, including the financing of the activities of the branch organization.

"Most economic researches indicate that global demand for potato products will increase. We also see an increased interest to grow potatoes in all parts of the world. On the other hand, trade issues as the 'trade wars' and antidumping cases are creating a negative atmosphere in the sector."

One of the Belpotato.be's stated priorities is to "further strengthen sustainability through innovation." Can you offer a few examples of how the trade association plans to do that?
Belpotato.be is not a 'trade' association, but a 'branch' organization. The innovative "WatchITgrow project" (including crop advice and follow up via remote sensing i.e. satellite data) is a perfect example of a tool to register and improve the qualitative and quantitative aspects of the potato crop, taking into account new knowledge and techniques. More and more research results are being incorporated in this project, which will be also managed by Belpotato.be.

How much of the total planted area in Belgium would you say is dedicated to organic potatoes? Are customers buying more organic potatoes, compared to let's say, five years ago?
The current production of organic potatoes in Belgium has been increasing over the last years. I believe that – certainly for the fresh market – sufficient organic potatoes are available in our country. Demand of organic potatoes for the processing industry is increasing, however demand on international markets for processed organic products is limited compared with demand on the fresh market. On the other side, the Belgian potato value chain is investing since a number of years in more sustainable conventional crop, including the Vegaplan-standard, which has been validated as well by the authorities as the private quality schemes (SAI, exchangeability with the German QS and the Dutch VVAk system.)

How does Belpotato.be plan to help strengthen research and development efforts in the potato chain in Belgium?
The first task is to align and prioritize the need for new R&D projects in close collaboration with the regional and federal research bodies. Looking for new challenges and financing value chain related projects will be the next step to evolve into communication to the operators in the sector. In the past to many results of R&D project were not or poorly communicated, which has resulted in an insufficient impact.

Can you please current characterize the climate around seed potatoes in Belgium and the reasons why Belpotato.be wants to diminish reliance on seed potato imports?
The quality of seed potatoes is a main issue for farmers and traders/processors (as they are often within the contracts suppliers of the seed potatoes). The past years a number of discussions with the (mainly) Dutch seed potato sector have been raised (germination of plants, presence of diseases…), which need a follow up. To avoid that producers are aiming to work with 'farm saved seed', which is not externally controlled but completely legal (if property rights are payed for protected varieties), the availability and assurance of quality seed is crucial. Some believe that producing certified seed in Belgium could be part of the solution (currently the large part of the used seed is important). But also, further consultation

The founders of Belpotato.be

and involvement of the Belgian buyers in Dutch projects could be a step forward.

What is the most important objective Belpotato.be has set out to achieve by this year's end?
The internal working of the board, the development of a future financing scheme and the activity within a number of working groups on contracts, seed, R&D are the first priorities. I believe the branch organization will also see the replacement of CIPC in storing potatoes and the development of the European Green Deal as a priority.

Can you offer some details about the association's current hierarchy?
The branch organization has started with the farmers' associations and Belgapom as a member, together with the Walloon branch organization FIWAP. Within the working groups also other organizations active in the potato value chain can participate. In a further perspective these organizations can also join Belpotato.be (suppliers of goods and services, R&D…)

What are some of the challenges associated with technology and its uses, in order to ensure better coordination in the entire potato chain?
I believe 'transparency' is crucial to get as many operators on board as possible. Once this element is available, communication is also essential. The Belgian potato sector is depending on printed publications originating from the Netherlands or France. Belpotato.be should consider which tools next to the practice centers as PCA or Inagro, should be made available to communicate on new technology and its applications.

What is your view of current economic worldwide and what are its implications for the potato trade in Europe?
Most economic researches indicate that global demand for potato products will increase. We also see an increased interest to grow potatoes in all parts of the world. On the other hand, trade issues as the 'trade wars' and antidumping cases are creating a negative atmosphere in the sector. The potato sector is supporting the European Union in its efforts to continue to invest in trade agreements. Also, the agreement involving a number of countries in the world, to continue the work within the WTO without the USA, who is blocking its activities, is a step forward to counter this negative spiral. •

"Belpotato.be is not a 'trade' association, but a 'branch' organization. The innovative "WatchITgrow project" is a perfect example of a tool to register and improve the qualitative and quantitative aspects of the potato crop."

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Reasons Why Energy Efficiency Is Important

From balancing the airflow to checking the temperature constantly, there are many steps that potato storage operators need to take, in order to ensure that their business is energy efficient.

By Dan Orehov

One big challenge at the moment is the legislation which is making refrigerants with a high global warming potential increasingly expensive until they will eventually be banned completely. This is why the industry is making a change to natural refrigerants. Options are ammonia, CO_2 and propane and all of them have pros and cons. Propane has a low global warming potential, is widely available, has good efficiency in both cold and warm climates, isn't toxic, doesn't require exotic pressures or materials, is already used in the potato storage sector and most important this refrigerant is future proof.

"We are expanding our new line of propane products we are able to deliver cooling capacity from 30 kW up till 550 kW per system with direct and indirect refrigeration systems. This line consists of cost-efficient combined solutions but also more advanced systems that allow free cooling, condense drying, heating and reusing the heat produced during the cooling for other purposes," explains Jan van Magdelgem from Tolsma. "After the drying period, these systems can maintain the product for a long time with minimal weight loss. This means that our customer can sell more product (which is our main focus) but it also counters food

"Balanced airflows are important. One should aim to get as much of the air going out from the fans through the crop as possible, so it brings the respiration heat back to the coil."

Ray Andrews, Crop Systems Ltd

Image of a diry fan that contributes to energy inefficiency

waste that could have been averted if a good storage solution was used," he adds.

STEPS TO TAKE INTO ACCOUNT

According to Ray Andrews, MD at Crop Systems Ltd, operators should check the entire system and make sure all parts are working efficiently, and that the air travels through the crop and there are no short circuits, because that means the air isn't doing its job and the equipment will not function efficiently. Problems could include inefficient coil temperatures, icing up, longer and more frequent de-frosts and increased running periods. Cleanliness of all equipment is crucial – fans need to be clean to run efficiently; underfloor lateral ducts need to be checked professionally to ensure they are distributing the air as required; all refrigeration coils should be washed down as dirt attracts moisture which encourages icing on the coils (including the condenser coils) which will stop them working properly. Furthermore, operators should monitor for damage all the time, inspect for damage every year and repair as required. Some foam types soak up moisture during the storage period, so when the store is empty, operators can leave store ventilation and doors open to help it dry out. Today's insulation is normally 100mm, one should not forget that insulation can stop cold getting into the store, which can increase cooling costs during the winter. Insulation needs to be efficient – but so too does the use of ambient air during cold periods. "Crop Systems Limited offers four key options: TaperStor uses tapering ducts and laterals to achieve balanced airflows throughout the store; for box stores our Posistor system offers effective suction no matter how wide the store's louvres are open; and WarmStor can warm up potatoes coming out of store very efficiently so they are in ideal condition for processing. Our SmartStor controller can be original or retro fit to any store, and enables operators to monitor and manage stores remotely, so they can check whether the store is operating efficiently no matter where they are, and adjust equipment remotely as well. That includes adjusting all fans, louvres and fridges as required; as well as monitoring energy usage and changing settings if needed," says Andrews. Lastly, upgrading the storage system should really be a constant effort – the moment something goes wrong it can be costing you money. Operators need to check if all current systems are capable of delivering cost effective energy use, specifically looking at the COP of the system. They should also check for corroded or damaged coils and refrigerant leaks. If the equipment is still serviceable and has enough power to perform, then one can upgrade the control system, so as to plan the energy usage better and take advantage of lower tariff periods. Above all, the Crop Systems specialists says to avoid defrosts which can consume a lot of energy and remove moisture from the store, leading to weight loss and turgidity. Also operators should remember that newer glycol cooling systems can have 60% less refrigerant content, which – over the lifetime of a typical system – could be equivalent to a large proportion of the purchase cost. "Balanced airflows are important. One should aim to get as much of the air going out from the fans through the crop as possible, so it brings the respiration heat back to the coil. The key is to avoid 'short circuits' – the routes the air might take without passing through the crop. Positive suction systems in ambient systems maintain the airflow through box stores. Tapered ducts and laterals – as used in out TaperStor – use specifically sized gaps to ensure even airflow is maintained throughout the store," Andrews ends. •

"After the drying period, the systems can maintain the product for a long time with minimal weight loss. This means that our customer can sell more product, but it also counters food waste that could have been averted if a good storage solution was used."

Jan van Magdelgem, Tolsma Grisnich

Keeping an Eye on Everything

Store management is a complex process and there are multiple points at which problems and inefficiencies can occur and jeopardize the prospect of success.

According to the latest iteration of the Agriculture and Horticulture Development Board Guide for potato storage managers, it is important to keep a store diary to record general store management information related to all the stocks held within the store. This will include major events such as loading or a chemical application and regular store inspections for condensation, dehydration, rots or blemish diseases.

According to AHDB's Adrian Cunnington, head of Crop Storage Research, where detailed individual stock records are kept, it is unlikely that they and the store diary will come together, unless there is some system set up to link the two. This can be resolved by keeping a detailed record or plan showing where each stock is located in the store. Inspection information can then be linked to stocks located in the problem areas.

"New systems are becoming available to help the store manager to keep records more easily and for these to be available for quality assurance and traceability purposes at a later date," Cunnington adds in the Guide.

STORE MONITORING

Store temperatures and controls should be checked daily. Temperature information is the most critical and a simple log of key probe readings can be kept manually or printed off daily. It is also useful to know how long the hardware has actually been running. Hour meters can be easily fitted to most equipment to provide this information. Stocks of potatoes should be checked weekly.

Many store-control systems now offer facilities to log information electronically. Computer-based control is also commonplace. Ensure the output is in a clear, easy-to-interpret format for the operator to use and understand, so errors are avoided. Make good use of user-friendly features such as touchscreen operation, graphical-user interfaces, web-based data portals and text alerts.

In addition to routine monitoring, there should also be procedures in place to assess the crop regularly and in relation to the specific requirements for the intended market. Within the limitations of access to the crop in store, one should try to take adequate samples to ensure they are representative of the crop. If sampling from the top of the store is required, permanent ladders and walkways should be fitted to allow this to be done in safety.

"Regular servicing of store equipment reduces the risk of breakdowns, which can seriously compromise quality if they occur."

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QUALITY ASSURANCE

Potato production and storage is increasingly subject to quality assurance procedures, such as Red Tractor Farm Assurance, which include traceability, care for the environment and minimization of risk to the consumer. Good record-keeping is also a benefit to management, as it can quickly identify weak points in a production system. Recording systems should be designed so that all of the information on a batch of potatoes is consolidated, enabling the reasons for any problem to be more rapidly identified. All actions taken should also be recorded on the log for that batch.

SERVICING OF STORE EQUIPMENT

Regular servicing of store equipment reduces the risk of breakdowns, which can seriously compromise quality if they occur. It is recommended to ensure that all key equipment is serviced and checked annually. If manufacturer servicing is not possible, verify temperature-recording equipment against a reliable handheld reference thermometer. The guide also says that one should keep service records safely as it is important to be able to demonstrate due diligence in the management of the store, especially if there is a need to demonstrate legal compliance or if there is a contractual problem affecting the quality of the crop.

HEALTH AND SAFETY

AHDB says that there are a significant number of regulations that cover health and safety, which are likely to apply in and around the potato store. Store owners, operators and employees working in potato stores must do everything possible to ensure their own safety and the safety of others. The easiest way to do this is to complete a risk assessment. When assessing risk, it is best to keep matters simple wherever possible, to ensure any measures to improve safety are followed. So, the questions used to identify the risks – and what steps are being taken to minimize those risks – should be straightforward. If measures are inadequate, additional controls may be required.

"Remember: not implementing preventive measures simply to save time or expense is not acceptable in a situation where safety is compromised. Risk assessment is a statutory requirement as part of health and safety legislation. It is relatively straightforward to make and record an assessment of risks in each store," Cunnington is quoted as saying in the guide.

Lastly, an important aspect of the risk management process is the feedback it provides, so if a particular risk is measured and continues to present problems, it can be re-evaluated and further measures taken to minimize it. •

"New systems are becoming available to help the store manager to keep records more easily and for these to be available for quality assurance and traceability purposes at a later date."

2020 FEATURE PLANNING

1 JANUARY/FEBRUARY
Ad closing 10.01/Publishing 24.01

FRUIT LOGISTICA SPECIAL - Key Exhibitors Road Map and Event Agenda

Processes
- Pre-cleaning, Washing, De-stoning
- Cutting, Peeling, Slicing
- Transportation, Product Handling

Expert View
- Cutting it to Perfection
- Automatic Defect Removers Used in Potato Processing

Spotlight
- Potato Varieties for French Fries and Chips

Markets
- Western Europe

Products
- French Fries

Storage Special
- Store Preparation and Hygiene
- Drying and Ventilation

Trade shows: LAMMA UK, Potato Expo USA, Global Potato Conclave (India), International Potato Technology Expo 2020 (Canada)

2 MARCH/APRIL
Ad closing 13.03/Publishing 30.03

INTERPACK SPECIAL - Key Exhibitors Road Map and Event Agenda

Processes
- Drying and Dehydrating
- Sorting, Blanching
- Process Monitoring

Expert View
- The Optical Sorting Revolution
- Advancements in Drying Technologies

Spotlight
- Robotization, IoT and Industry 4.0 in Packaging

Markets
- Eastern Europe

Products
- Classic Chips – Consumers' Favorites

Ingredients
- Batters, Coatings

Storage Special
- Integrated Storage Management Platforms
- Energy Efficiency in Storage

3 MAY/JUNE
Ad closing 15.05/Publishing 03.06

Processes
- Frying and Cooking
- Oil Filtration, De-fattening, Filtering

Expert View
- The Future of Modern Frying Equipment
- Pulsed Electric Field

Spotlight
- The Latest Reports on Acrylamide

Markets
- The US and Canada

Products
- Flakes, Pellets and Mashed Potatoes

Ingredients
- Best Frying Oils

Storage Special
- Humidity and Condensation Control
- Cooling and Freezing

Trade shows:
Starch Expo (Shanghai),
European Association for Potato Research Conference (Poland)

4 JULY/AUGUST
Ad closing 10.07/Publishing 27.07

Processes
- Conveying Systems and Belts
- Cooling and Freezing
- Forming and Extrusion

Expert View
- Cutting it to Perfection
- Traceability and Track & Trace Systems in Processing
- VFFS Packaging Innovation

Spotlight
- Weather and Its Effects on Potato Crops

Markets
- Asia-Pacific

Products
- Extruded, Pasteurized and Formed Potato-based Snacks

Ingredients
- Salt Reduction and Health

Storage Special
- Heating in Storage Facilities
- Monitoring and Quality Control

Trade shows: Potato Association of America Annual Meeting, Potato Demo Day (Netherlands), Europatat Congress

5 SEPTEMBER/OCTOBER
Ad closing 28.09/Publishing 12.10

INTERPOM PRIMEURS SPECIAL - Key Exhibitors Road Map & Event Agenda

Processes
- Batch Frying Equipment
- Optical Sorting Innovation

Expert View
- Improvements and Advancements in Batch Frying Equipment
- Chips Frying Equipment: Investment and ROI

Spotlight
- Food Safety Regulations for Potato Processing Plants
- Cleaning and Sanitation Updates

Markets
- South America

Products
- Batch Fried Chips - The Health Trend and Its Influence on Consumers

Ingredients
- Flavors and Seasonings for Chips and Fries

Storage Special
- Latest Refrigeration Technologies
- Sprout Suppressants in Storage

Trade shows: Potato Europe, Pack Expo

6 NOVEMBER/DECEMBER
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Processes
- Coating, Flavoring, Seasoning
- Conveyors and Conveying Systems
- Turnkey Projects

Expert View
- Complete Lines for Processing
- Innovative Conveyors for Raw and Processed Potatoes

Spotlight
- Saving Water, Energy, Oil during Potato Processing
- Potato Processing Equipment - Key Suppliers Guide

Markets
- Global Market Predictions for 2021

Products
- The Future of Potato Snacks 2021

Markets
- Processed Potatoes Global Market Trends 2020

Storage Special
- Storage Disease Control
- Cleaning and Sanitation Updates

Trade shows: Anuga FoodTec 2021


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