FEBRUARY 2021

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AWAKENING A BEAST

MONOGRAM FOODS RETURNS TO THE ACQUISITION GAME

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COVER STORY

Awakening a beast — After a multi-year break, growth monster Monogram Foods has returned to the acquisition game and already snapped up two processing plants in six months — including long-time partner Quality Food Processors in Denison, Iowa.

DEPARTMENTS

On the cover — Standing in front of the 28-truck smokehouse in Denison, Iowa, are, from left to right: Rudy Quintana, production superintendent, Monogram Quality Foods; Tim Christopherson, director of operations, Monogram Foods; Duanne Hauschildt, operations manager, Monogram Quality Foods; and Eric Kohler, general manager, Monogram Quality Foods.

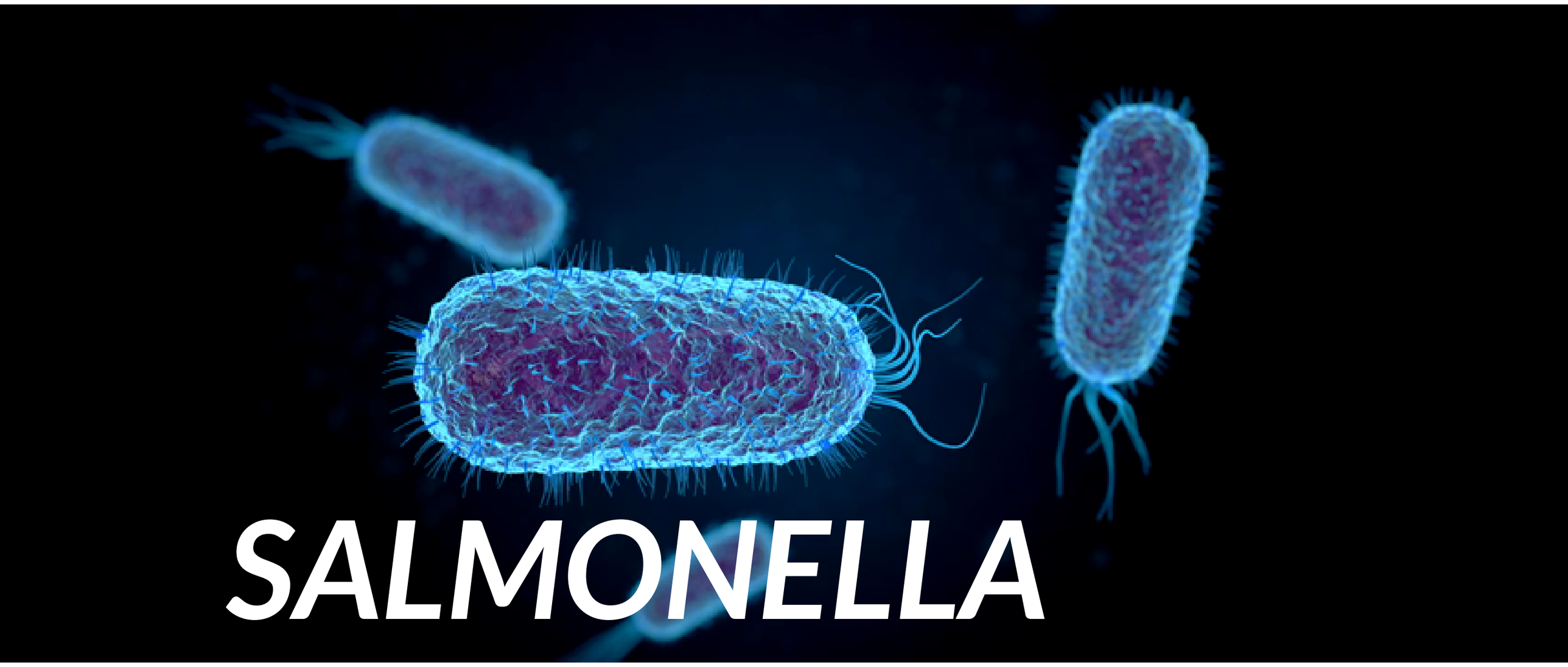
FEATURED CONTENT

TECH TOPICS

NEW FROM NATIONAL PROVISIONER VIDEOS

Andy Hanacek, Editor-in-Chief of The National Provisioner, talks with Mike Levengood, V.P., Chief Animal Care Officer and Farmer Relationship Advocate for Perdue Farms. Levengood discusses the poultry company's four pillars of animal care and the company's strategies in maintaining good animal care and good relationships with its farmers.

CHECK OUT OUR AWARD-WINNING ONLINE VIDEOS



SALMONELLA IS LIKELY FSIS' NEXT BIG TARGET

BY SHAWN K. STEVENS
FOOD INDUSTRY COUNSEL LLC

The year 2007 often is, non-affectionately, referred to as "The Year of the Recall." In 2007, there were a total of 23 recalls of USDA-regulated beef products for the presence of *E. coli* O157:H7, amounting to more than 35,000,000 pounds of beef products being recalled. Many of those recalls were triggered by large-scale outbreaks, which resulted in countless lawsuits and years of prolonged litigation.

At the time, the industry was still struggling with how to respond to a pathogen that was considered to be naturally occurring in cattle, inherent on farms and in feedlots, and nearly impossible (so, it seemed at the time) to control. Indeed, only a few years earlier, experts were proclaiming that trying to eliminate *E. coli* O157:H7 from the beef supply by adopting new regulatory requirements which were virtually impossible to satisfy would be like trying to eliminate airline crashes by having Congress repeal the laws of gravity. The objective of a near O157:H7-free beef supply, many argued, would be too costly and too impossible to achieve.

Fast-forward nearly 15 years to 2021, which was witness to only two recalls for *E. coli* O 157:H7. When looking at least year's data, and each of the years since about 2012, it would appear that the beef industry has learned to effectively control *E. coli* O157:H7 in finished products. These accomplishments were the result of more careful dressing procedures, additional interventions, and the diversion of larger volumes of product when *E. coli* O157:H7 positives were encountered during production. The "seemingly" impossible was, thus, not actually impossible.

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With *E. coli* O157:H7 now handily under control, *Salmonella* now accounts for a growing number of foodborne illnesses in U.S. consumers. Whether those illnesses result from poultry products (often the most likely culprit), raw ground beef products, or other non-animal products (such as nut butters, spices and produce), the stark reality is that *Salmonella* in the food supply is not an issue that will be going away soon. Thus, as it relates to raw animal products, we predict that, in the coming months and years, FSIS will begin to tighten the standards and issue new regulatory requirements designed to further control *Salmonella* in the meat and poultry supply.

As we move further into 2022, the industry should continue to do an amazing job processing and shipping the safest beef products the world. But beware, it may not be long before we have a new, seemingly impossible task to overcome. With O157:H7 in the rear-view mirror, *Salmonella* appears well-positioned to become FSIS' next target.

AWAKENING A BEAST

AFTER A MULTI-YEAR BREAK, GROWTH MONSTER MONOGRAM FOODS HAS RETURNED TO THE ACQUISITION GAME AND ALREADY SNAPPED UP TWO PROCESSING PLANTS IN SIX MONTHS — INCLUDING LONG-TIME PARTNER QUALITY FOOD PROCESSORS IN DENISON, IOWA.

BY ANDY HANACEK
EDITOR-IN-CHIEF

Even a superstar needs a breather sometimes.

After a roughly 15-year run of unparalleled acquisitive growth — and numerous awards for what today might be called "beast mode" growth (including The National Provisioner's Processor of the Year Award in 2017) — Memphis, Tenn.-based Monogram Foods began to focus its improvement efforts inward, tightening up its strategies, improving its operations and generally staying on the acquisition sidelines as it prepared its next moves.

Fast-forward four years, and Monogram's "hibernation" ended, when in June 2021, it completed the acquisition of Quality Food Processors (QFP) in Denison, Iowa — a plant that had been supplying bacon the previous five years to Monogram's Harlan, Iowa, plant only 27 miles south on Route 59.

"Because QFP in Denison supplied products for the Monogram Foods' Harlan plant, these teams had been working together for years, and we've had a customer relationship with one another for a long time," explains Karl Schledwitz, chairman and CEO of Monogram Foods. "These plants do fit hand in glove, they're close to each other, and they offer so many synergies, it was a natural fit. This is probably the most seamless integration of an acquisition we've ever had."

Todd Hansen, who previously owned QFP and is now an equityholder in Monogram Foods, says the acquisition injected a lot of optimism and opportunity for the Denison team.

"[The acquisition] allows everybody to think differently around the way the business and processes go, and we probably didn't have that same level of opportunity as Quality Food Processors, because we ran very lean," he says. "It's also very enlightening that QFS gets to participate in the process, because the team brings a lot to the table, and the synergies between the two teams are helping Monogram Foods get to a level where one plus one equals four."

With all the familiarity between the teams coming together, Schledwitz relays that it hasn't taken long at all for Monogram Foods to begin designing its future in west-central Iowa. Monogram is entering "beast mode" in that realm as well.

"Planning sessions about how to expand both plants are actively happening now, but what happens is really unique here," he says. "When we expand the Harlan plant, it increases demand for our Denison tea, which is where the 'one plus one equals four' truly happens.

The monstrous smokehouse in the Denison, Iowa, plant holds 28 trees of product, equivalent to one truckload of bellies and the amount of trees they can fit in one blast cell.

"It's not usually the case in other plant expansions that, when you expand a plant, you automatically have increased demand at another one," he adds. Yet, the growth of Denison, both yesterday and tomorrow, isn't tied specifically to Monogram Foods. The Denison plant has made a name for itself over the years with a variety of customers in the segment.

"[Bacon] continues to grow, and it does not appear to have an end in sight," Schledwitz says. "We're very fortunate to have aligned with some customers that are also growing, but the combination of being in the right category with the right customers is a recipe for success."

Hansen says the plant's reputation has spurred success since it shifted to bacon processing in the early 2010s. (The plant had housed a wide variety of processing operations since it was built in the 1970s as a beef plant.)

"The consistency of our operations has been very solid, and our color has always been good and consistent," he explains. "We limited the formulas we would run, fine-tuned them and reached a high level of consistency."

Eric Kohler, general manager of Monogram Quality Foods, believes that QFP's approach to its partnerships added to the reputation that plant developed.

"We listened, we were careful on changes, and we didn't move too fast, because we didn't want to upset the apple cart," Kohler says. "We got very consistent on the processes, but there are improvements that can still be made, and with the resources of Monogram Foods, we can pursue them in a very structured way."

The Monogram team expects investment to ramp up for the Iowa facilities, but it's not as though QFP wasn't willing to invest before the acquisition. In fact, in January 2020, the plant finished a significant and unique installation of a monstrous smokehouse capable of holding 28 trees of pork bellies — equivalent to the size of a large truckload and the number of trees Denison could hold at one time in the blast freezer. According to Kohler, the team discussed a variety of options for size and number of new smokehouses, but kept finding concerns over consistency from batch to batch.

"Rather than having individual, different cook jobs [on product coming in the same shipment], we wanted to take variation out of the process. So, instead of having four smokehouses handle smaller batches from the same supply, with all the variables, we built one large smokehouse to handle the entire batch," he says. "Although the changeover is longer, there are fewer changeovers and less handling of the trees each time."

Continuous improvement of processes and lines will be the norm moving forward, says Kent Kring, senior vice president of Operations for Monogram Foods, but innovation doesn't always come in the form of changing out equipment.

"In this case, innovation revolves around understanding what both plants can bring to the table and how to maximize that," he explains. "For example, changes made to the steps taken here in Denison for trimming, will help produce a better product at a lower cost and higher quality in Harlan."

> **"FOR A COMPANY LIKE MONOGRAM FOODS THAT IS WILLING TO INVEST TO GROW, MAINTAINING THE HIGH QUALITY OF THE WIDE VARIETY OF PRODUCTS IT OFFERS IS CRUCIAL.**

Of course, the challenges around attracting and retaining employees in today's job market mean Monogram Foods has its eyes on automation in both the Denison and Harlan plants, Kohler says.

"We've been complimented over the years by almost every customer about the quality of our product, but there are a lot of manual labor jobs with repetition motion on the floor that can be automated," he says. "So we have to automate processes we can — but without hurting the quality of the product."

For a company like Monogram Foods that is willing to invest to grow, maintaining the high quality of the wide variety of products it offers is crucial. Schledwitz believes the Denison and Harlan plants are poised to blast through the challenges that still linger from COVID-19 and any other issues that arise.

"I am so proud of what Denison and Harlan did, not only integrating this last year, but in the midst of COVID, like every other plant in this country, they were facing their challenges with hiring people," he says.

Schledwitz and the leadership at Monogram Foods expect to have much more to be proud of in coming years, starting with its second acquisition in six months (announced at presstime) — this one in Dickson, Tenn.

Notice has been served to industry: The Monogram beast has been awakened and is back on patrol for more aggressive growth opportunities.

2022 Seafood Report

THE BREAKTHROUGH CONTINUES

SEAFOOD SALES STAY STRONG, TWO YEARS AFTER THE COVID-INDUCED LOCKDOWN RENEWED CONSUMER INTEREST IN THE CATEGORY.

BY ELIZABETH FUHRMAN

Fresh seafood experienced phenomenal dollar sales percent growth of 6.3% to $7.1 billion, for the year ending Nov. 28, 2021, according to Chicago-based IRI. This remarkable sales growth continued the massive sales growth the category experienced in 2020 and as the total meat category dipped a couple of points, says Chris DuBois, IRI's senior vice president of Americas protein practice leader. In turn, looking at dollar sales percent growth vs. two years ago, fresh seafood jumped 31.3% for the year ending Nov. 28.

Fresh seafood volume sales for the 52 weeks ending Nov. 28 remained flat, while volume sales percent change vs. two years ago grew 21.6%.

Frozen seafood also grew 4.1% in dollar sales to $7.3 billion for the year ending Nov. 28, but grew 40.4% vs. two years ago. Frozen seafood volume dipped 1.1% off of 29% volume growth vs. two years ago.

"The frozen segment is doing exceptionally well, as consumers are still opting for frozen or shelf-stable options that can help reduce trips to the grocery store and foodservice operators aim to reduce food waste," says Megan Rider, the Alaska Seafood Marketing Institute (ASMI)'s domestic marketing director.

Shelf-stable seafood with $2.5 billion in sales is not quite the success story of the other two segments. It experienced an 11% drop in dollar sales vs. a year ago, but 6.5% gains vs. two years ago. Shelf-stable seafood volume decreased 12.1% vs. a year ago, but volume grew 2.6% vs. two years ago. The data suggests that consumers aren't stocking up on shelf-stable tuna and salmon as they were in 2020, DuBois says.

At almost 20% of sales, value-added seafood is a very large component of the category, especially shrimp and salmon, and is more than double the percent value of added sales in the regular meat case (approximately 8 percent for total meat), IRI's DuBois says.

EATING MORE SEAFOOD

The good news continues as 41% of consumers want to consume more seafood in 2022, according to a recent IRI survey.

"2020 was a breakthrough year for seafood and not just the frozen seafood that you get in boxes, but fresh seafood really had a good year," DuBois says. "What happened is that people were hesitant to buy seafood because they were always afraid to cook it. What we saw is that people tried new things and learned how to cook more new proteins, new dishes, new recipes, and fish became a big part of that. That barrier to education fell down during Covid for both frozen and fresh, and this year it will continue."

Early in the pandemic, as many foodservice operations were put on hold, consumers turned to home cooking to get their seafood fix, trying out new species and becoming familiar with various cooking techniques, Rider says. According to ASMI's 2021 research with Datassential, half of consumers were cooking seafood more in 2020 than they did the year prior, and 26% purchased seafood for the first time during the pandemic. "And while we are beginning to see the foodservice industry rebound and contribute to overall seafood sales, consumers continue to cook at home just as often," she says.

photos courtesy of Alaska Seafood Marketing Institute

The continued pandemic also has put attention on healthy foods and supply chains. Seafood is low in saturated fats and high in omega-3 fatty acids, and wild seafood is low in contaminants, and, if sourced from regions like Alaska, protected from overfishing, Rider says. "This adds the value of sustainability that consumers are increasingly seeking from the food they eat," she explains.

For example, consumers are more likely to purchase seafood that is wild and sustainable, with 86% of consumers agreeing they would buy seafood over other proteins if it was wild-caught. Additionally, 85% agree they would buy more seafood if it was sustainably sourced, according to Seafood Success Powered by Alaska Retail Consumer Research, a 2021 report from Datassential/ASMI.

Seafood Fresh Fish by Species

Product	Dollar Sales	Dollar Sales % Change vs YA	Volume Sales	Volume Sales % Change vs YA
FRESH FINFISH	$3,809,888,050	7.7%	437,126,247	1.1%
FRESH SALMON	$2,428,651,409	10.7%	255,737,510	6.3%
FRESH CATFISH	$230,018,845	-2.2%	37,700,938	-13.5%
FRESH COD	$216,838,485	5.7%	25,239,589	2.4%
FRESH TILAPIA	$206,949,398	-4.0%	43,542,187	-11.1%
FRESH TUNA	$101,933,382	14.6%	10,745,429	13.1%
FRESH LOX/SMOKED SALMON	$98,752,940	9.4%	3,639,832	8.6%
FRESH TROUT	$92,253,613	6.1%	9,823,585	5.3%
FRESH HADDOCK	$68,219,004	2.8%	7,330,469	-1.9%
FRESH SWORDFISH	$37,651,460	2.8%	3,088,741	0.4%
FRESH CHILEAN SEA BASS	$10,359,291	16.7%	494,392	-8.3%
FRESH SHELLFISH	$2,562,435,254	2.0%	284,671,925	-3.8%
FRESH CRAB	$915,021,109	-2.2%	65,956,823	-20.0%
FRESH LOBSTER	$431,247,350	3.1%	49,890,184	-2.4%
FRESH SCALLOP	$120,979,513	-8.7%	7,914,371	-13.4%
FRESH SHRIMP	$944,800,317	5.9%	117,283,592	2.0%

Source: Information Resources Inc. (IRI), www.iriworldwide.com

INNOVATION IN SEAFOOD

Innova Market Insights, in Arnhe, the Netherlands, tracked the launch activity of U.S. fish and seafood products. In 2020, activity was at average levels compared with previous years. A dip of new products occurred toward the end of 2020 and beginning of 2021, at which new releases began to increase again. Key new product development trends that are driving this category are:

- gravitation toward fish and seafood owing to high protein and omega-3,
- demand for convenient food solutions,
- wild-caught claims,
- locally and sustainably sourced launches,
- ethnic and exotic recipes (for example, pickled sea urchin), and
- traditional tastes.

Top fish and seafood areas with the highest recorded growth tacked within the category's launches considering their compound annual growth rate (CAGR) from the fourth quarter 2016 to the third quarter of 2021 are herring with 32% growth, scallop with 19% gains and mackerel with a 6% increase, Innova reports. Additionally, the GMO-free claim thrives with 46% CAGR from 2016 to 2020. Innova also finds that spicy and smoked flavors are on trend along with more fish and seafood appearing in pouches, which recorded 13 percent CAGR from 2016 to 2020.

In foodservice, ASMI is seeing a greater attention to waste reduction, so in addition to using frozen seafood, operators are aiming to use the whole fish, for example, by using fish cheeks and collars in stews or other dishes. Within retail, recent advances in packaging, particularly vacuum seal skin packing, continue to improve to maintain freshness, flavor and appearance of seafood, and in the interest of sustainability, producers like OBI have recently updated their packaging to be completely recyclable.

"As consumers continue to desire high-protein alternatives, there are also some exciting new products coming to market, such as noodles made entirely of wild Alaska pollock, for example," ASMI's Rider says.

> SEAFOOD IS LOW IN SATURATED FATS AND HIGH IN OMEGA-3 FATTY ACIDS, AND WILD SEAFOOD IS LOW IN CONTAMINANTS, AND, IF SOURCED FROM REGIONS LIKE ALASKA, PROTECTED FROM OVERFISHING

GROWING THE INDUSTRY

In order to move the industry forward, ASMI says the segment must emphasize taste and health benefits that consumers crave along with focusing on sustainability, as consumers are increasingly dedicated to seeking out seafood that is sourced responsibility. The number of sustainability-focused seafood shoppers jumped from 29% in 2019 to 41% in 2021, according to the 2021 FMI Power of Seafood Report/Nielsen IQ.

Innova sees seafood has opportunities in more value-added and premium options along with leveraging the awareness of the health benefits of omega-3 fatty acids and moving toward sustainable packaging, e.g., BPA-free, plant-based packaging. Moving forward, the industry will see increasing concerns around sustainability, plant-based eating and alternatives in the market, and rising consumer demand for local and fresh produce, Innova says.

In terms of trends, ASMI expects to see new ways of preparing seafood with a focus on ease, as consumers stave off cooking fatigue. For example, the idea that most seafood can be cooked straight from frozen or other tips that have taken off on social media in recent months.

IRI's DuBois expects the seafood category to have another great year that looks similar to 2021. This year, pricing also might have a slight effect on seafood sales as supply chains have been challenged and transportation costs have skyrocketed. DuBois believes the industry has done a great job of engaging consumers, though, and now it can build on that progress.

"The biggest thing is getting variety into the cases and just continuing to grow the base," he says. "The more you get consumers a little bit more variety, the more they are going to be excited and continue to come back to the case."

IT DON'T COME EASY...

BY ANDREW LORENZ
WE R FOOD SAFETY!

I am of the hope that, sooner rather than later, we can stop proclaiming each year "crazy" or "unusual" or some other superlative. What I wouldn't give for a normal, easy and successful year in food safety, where challenges weren't so mountainous and issues weren't new. Yet, here we are, entering 2022, after another crazy, unusual, unprecedented year of challenges and issues facing the meat and poultry industries. The industry has quickly learned that food safety challenges come in all shapes and sizes, but with the right approach, people and mix of technology, any processor can overcome these issues to produce safe product that keeps consumers coming back for more.

THE LABOR CHALLENGE

Over the last year, the single biggest challenge facing the meat and poultry industry has been a severe deficit of employees — more so than in "normal," non-pandemic times. This is not unique to our industry, which you know if you've been through an airport and seen temporarily closed shops, or had manufactured items shipped slowly or outright delayed. However, it is certainly having just as negative an impact on the meat and poultry industry as it is in those other examples.

The deficit is wide, particularly among skilled food safety professionals; qualified and motivated technicians, managers and directors are in short supply. Competition for their skillset and work ethic is coming from outside the meat and poultry industry. And that competition is fierce. Meanwhile, the cost of employees continues to skyrocket, putting enormous pressure on the price of products. The erosion of margin is very real, and we have not seen a lot of media discussing that issue.

According to the Web site Glassdoor.com, a food safety specialist has an average salary of $43,160[*1]. By comparison, a retail distribution employee makes $45,000[*2]. Mid-size and smaller processors are struggling to keep up with that explosion in costs.

In one small community, the local bank (yes, the bank) hired away most of an establishment's retail crew at approximately double the salary. How and why? Well, the bank simply was impressed with the fact that they are such hard workers, so they recruited them with what must have been "an offer they couldn't refuse," based on their work ethic, and trained them up on the banking knowledge they needed. Fast-forward seven months, and the processor is still struggling to replace those hard workers. Another facility in a different town has been unable to find the right candidate to replace their FS&Q director for more than a year, despite offering a salary package that is 20 percent higher than the posted average.

Processors are combating the deficit in a few ways, from training operations employees on how to perform food safety tasks to implementation of automation, including systems that can handle FS&Q data and inspection (think, vision systems and automated data collection). Operations employees or a vision system can record the data, after which a trained FS&Q manager reviews the data in real time, which cuts the number of employees needed to ensure products are safe and meet specifications.

Technology is moving fast, which has automation enthusiasts excited; but now, the supply chain is backed up. This may not be completely new, but it is something that is slowing down implementation of solutions and that planners must take into account. We encourage processors be proactive when planning purchases and to work with vendors earlier in the process to ensure equipment is actually available when needed.

THE BROKEN GOVERNMENT: PROMISES, PROMISES

In June 2021, the U.S. Department of Agriculture (USDA) announced[*3] more than $55 million in grants to help small and very small meat and poultry plants improve their facilities and systems to achieve federal or state inspection. Then in July, USDA further announced[*5] it would issue $500 million in grants to the industry.

In November, USDA announced[*4] it had approved $32 million of the $55 million offered five months prior. However, as of Jan. 1, 2022, no one I know has been able to find any company that has actually received any of the June grant money — and the $500 million July grant process still hadn't been announced.

But that's not all! On Jan. 3, 2022, President Joseph Biden announced[*6] $1 billion to increase competition within the industry. But there have been no details on that yet either!

Those are just the grants administered by USDA. Grants awarded through the Small Business Administration (SBA) also seem to be moving in fits and starts, with some businesses receiving grant money within days and other waiting months.

These promises and then failure to follow through have left a very sour taste in the mouths of small and mid-size processors. Although members of the House and Senate are pushing to get funds into the hands of those that need them, the USDA and SBA simply are not staffed to handle this many applications and don't have the electronic systems needed to move with efficiency. Often, too, the process itself is overly complicated and fails to have feedback mechanisms.

TECHNOLOGY CHANGES

Three years ago, we saw a movement to consolidate software away from stovepipes; everyone wanted to go into the integrated Enterprise Resource Planning (ERP) type system. Then the hackers showed up and started targeting the meat and poultry industry.

In response, we are seeing companies wanting separate systems for food safety, production and finance. In most cases, data is still entered one time but utilize multiple databases to segregate and control access. Not surprisingly, this adds cost and complexity to systems but also the multiple levels of security required in today's world.

As companies become more reliant on the Internet of things (IoT) to record data, we are seeing a definite shift away from the one-size-fits-all mentality; data integration with definitive data flow lanes that can be locked down are becoming the normal during system upgrades.

MOVING FORWARD

From my discussions throughout the industry of late: I am hearing requests for tangible improvements to food safety. Some examples of that include remote temperature monitoring integrated to product flow; *E.coli*/STEC confirmed results in less than 8 hours, real-time production alerting and scheduling, etc. In each case the goal has multiple facets to include reduced employee workload, increased productivity, and minimization of human error.

The shortage of personnel is acute, and really is at a crisis level — and there's no change on the horizon that I see anywhere. Rethinking how FS&Q operations are conducted is critical. Do you want to push data collection and action down to your operations teams, automate tasks, or implement some combination of the two? Can you get the right equipment to help reduce your reliance on employees? Can you secure your data and segregate access points to assure data integrity and security?

This year, you must take a very hard look at your operations as a whole and make structural changes to how you operate. Making these decisions now is going to be critical for future success.

1-https://www.google.com/search?q=What+is+the+salary+of+a+food+specialist

2-https://www.google.com/search?q=what+is+the+salary+for+walmart+distribution+center

3-https://www.usda.gov/media/press-releases/2021/06/21/usda-invests-552-million-grants-increase-capacity-and-expand-access

4-https://www.usda.gov/media/press-releases/2021/11/22/usda-invests-32-million-strengthen-us-food-supply-chain-solidifies

5-https://www.usda.gov/media/press-releases/2021/07/09/usda-announces-500-million-expanded-meat-poultry-processing

6-https://edition.cnn.com/2022/01/03/politics/biden-meat-processing-industry/index.html

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LOOKING BACK. PRESSING FORWARD. ALWAYS INNOVATING.

EFFECTS OF MODIFIED ATMOSPHERIC PACKAGING ON GROUND CHICKEN COLOR AND LIPID OXIDATION

BY KATHRYN HEARN[1], MORGAN DENZER[1], RACHEL MITACEK[1], NAVEENA B. MAHESWARAPPA[2], CONNER MCDANIEL[1], RAVI JADEJA[1], GRETCHEN MAFI[1], ALI BEKER[1], ADEL PEZESHKI[1], RANJITH RAMANATHAN[1]

[1]OKLAHOMA STATE UNIVERSITY, [2] INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Consumers utilize visual appearance to assess wholesomeness and freshness of muscle foods. Although chicken has lower myoglobin content than beef or pork, visual perception is relevant in evaluating the quality of ground chicken. Packaging technologies can change the perception of meat products.

Specifically, modified atmosphere packaging (MAP) changes the gaseous environment around the product and thus can influence the pigment presented to consumers. Ground meat products have an increased susceptibility to color changes and lipid oxidation, off-flavor development, due to the increase in surface area exposed from the mechanical action of grinding. Therefore, it is extremely important to maintain the color of ground products.

The poultry industry utilizes high-oxygen (HiOx)–modified atmospheric packaging (MAP) (70% to 80% O2 and remaining carbon dioxide [CO_2]) to promote appearance. However, greater O_2 concentration accelerates lipid oxidation and premature browning in cooked meat. Premature browning is defined as the premature denaturation of proteins and changes in color before the product reaches a safe internal cooking temperature. This can cause a health concern for consumers as they will potentially consume product that has not reached the lethality temperature for most microorganisms.

In this study, three types of packaging were used: traditional polyvinyl chloride (PVC) film, a high-oxygen (HiOx)–modified atmospheric packaging (MAP; 80% oxygen + 20% carbon dioxide [CO_2]), and a carbon monoxide (CO)-MAP (0.4% CO + 19.6% CO2 + 80% nitrogen) on ground chicken. Sixty 100g patties of a finely ground chicken product were formed manually, 20 for each packaging type.

Instrumental color measurements (Lightness, redness, yellowness, reflectance and Chroma or color intensity) were taken on the surface of the product on days 0, 1, 2, and 4 of retail display. Additionally, a trained panel conducted visual color evaluations on days 0, 2, and 4. The panelists repeatedly evaluated each ground chicken patty to assess muscle color and discoloration. Lipid oxidation (rancidity levels), pH and microbial growth were determined on the first and last day of display. Fatty acid profiles were determined on day 0 to characterize saturated and unsaturated fatty acids. The pH was normal for poultry ranging from 5.97 to 6.06.

Ground chicken in traditional PVC overwrap packaging had a greater pH than the modified atmosphere packaging types. The lower pH of the two modified atmosphere packaging types could be explained by the breakdown of the included carbon dioxide into the water fraction of meat, increasing carbonic acid. Fatty acid analysis indicated that ground chicken has 72.8% unsaturated fatty acids and 27.2% saturated fatty acids. With this higher proportion on unsaturated fatty acids than beef or pork, chicken is more susceptible to lipid oxidation, off-flavor development. In addition, the release of pro-oxidants during grinding can further accelerate oxidative changes.

Instrumental color analysis indicated both HiOx-MAP and CO-MAP had greater redness than traditional PVC on day 4 of storage. Visual panelists noted less surface discoloration in CO-MAP than PVC and HiOx-MAP on day 4 of storage. Limited discoloration allows for consumers to be more willing to purchase the product for an extended amount of time. Furthermore, changes in lean color scores were more noticed during 4 days of storage in PVC than CO-MAP and HiOx-MAP. Lipid oxidation was greater in PVC and HiOx-MAP than CO-MAP. HiOx-MAP had the highest levels of lipid oxidation as previously found leading to premature browning. Ground chicken in 0.4% CO along with 19.6% O_2 and 80% N_2 maintained a bright light-pink color preferred by consumers without inducing lipid oxidation.

The current research suggests that packaging in CO-MAP provides an opportunity for the industry to extend the shelf life of ground chicken. The consequence of extended shelf life in these packaging technologies can lead to a more sustainable food supply and in return provide protein sources for an ever-growing population.

For more information, please see the authors' work published in Meat and Muscle Biology: Kathryn Hearn, Morgan Denzer, Rachel Mitacek, Naveena B. Maheswarappa, Conner McDaniel, Ravi Jadeja, Gretchen Mafi, Ali Beker, Adel Pezeshki, Ranjith Ramanathan, "Effects of Modified Atmospheric Packaging on Ground Chicken Color and Lipid Oxidation" Meat and Muscle Biology 5(1). p.36, 1-9. doi: https://doi.org/10.22175/mmb.12599."

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THE INDUSTRIAL INTERNET OF THINGS

FIGHTS COLLECTIVELY FOR FOOD SAFETY

With traceability and quality standards in the food industry constantly rising, meat processors are under increasing pressure from customers and regulatory bodies to trace every batch back through the supply chain. Traceability requirements in the Food Safety Modernization Act (FSMA) require companies to act quickly in the event of a recall. The FDA further added the New Era for Smarter Food Safety Blueprint, consisting of four main pillars centered around traceability, tools for outbreak prevention, retail modernization and food safety culture. The influx of automation along with expanding Industrial Internet of Things (IIoT) technology can prevent unsafe meat and poultry from making it out of plants and onto grocery and retail shelves.

As traditional manufacturing evolves, the implementation of industry 4.0 will be a vital solution that helps meat processors attain these goals. The foundational concepts of industry 4.0 are data, connectivity, continuous monitoring and process optimization. A comprehensive deployment of an Industry 4.0 strategy requires a high level of operational integration, according to the Automation Timeline: The Drive Toward 4.0 Connectivity in Packaging and Processing white paper produced by PMMI, the Association for Packaging and Processing Technologies. If properly implemented and applied, however, IIoT can address food safety issues and ensure equipment runs effectively and safely.

According to the white paper, applying IIoT to predictive maintenance can be extremely useful to meat processors by implementing IIoT devices that track and store different variables related to a given piece of machinery such as operating temperature, timing and vibrations. The IIoT system then analyzes that information using advanced algorithms and historical data to predict effectively when the machine needs maintenance or is on the verge of failure.

Some preventative maintenance systems will even shut down machines that are about to fail, reducing the chance of injuring employees or damaging themselves, leading to costly repairs. With this technique, meat processors can reduce or eliminate downtime from machine failure or damage and reduce the overall cost of machine maintenance. This change could provide significant savings for large, industrial food processing companies and smaller food producers that rely heavily on single machines.

Internet-connected sensors can measure critical control points such as time and temperature set points in real time and send notifications if left unmet. This real-time IIoT technology can quickly detect food safety issues so meat processors can deal with them internally before they even get to the point of recall. Tracking sensors help companies closely monitor food safety data points, ensuring efficient cold chain management. This data enables the supply chain to cooperate to become compliant with local and global regulations. By using automated Hazard Analysis Critical Control Points (HACCP) checklists during the production, manufacturing and transporting process, meat processors have access to consistent, meaningful data that empowers them to implement food safety solutions.

IIoT Line Functionality –The Vision of Future Manufacturing

Another critical benefit of IIoT is its ability to provide staff with remote access to critical systems, even if they are not onsite. For example, workers can remotely react and adjust to cold storage temperatures, preventing product loss and other sensitive food items from the wrong environmental conditions. Remote tech can also alert team members when a delivery has arrived, possibly decreasing the time cargo needs to wait before further processing and lowering the risk of the meat going bad.

FSMA also outlines that manufacturers must identify hazards, define preventative controls to eliminate or reduce the risk, determine process parameters for these controls and then implement and continue to monitor the process. Monitoring ensures corrective actions are taken to verify the system is working correctly. Preventive controls for physical hazards often include metal detectors and X-ray detection systems designed for food products. Because product characteristics differ in proteins, sourcing the correct inspection and detection technology for each application is also essential to ensure products are contamination-free.

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MARINADES ADD LIFE, AND CHALLENGES, TO MEAT AND POULTRY MERCHANDISING

MORE PROCESSORS ARE INJECTING MARINADES INTO MEAT AND POULTRY TO CREATE HIGHER-MARGIN ITEMS WITH ADDED FLAVOR, BUT OPERATORS MUST ADHERE TO STRICT GUIDELINES IF THEY ARE TO SUSTAIN QUALITY AND SHOPPER INTEREST.

BY RICHARD MITCHELL
CONTRIBUTING WRITER

The injection of marinades into proteins is adding spice to the often-dry meat and poultry merchandising sector. Many time-starved shoppers and consumers seeking convenient and exciting meals are willing to pay extra for the value-added selections that result in more tasty, juicy, and tender products, analysts note. More retailers, meanwhile, are using marinated meat and poultry as attractive differentiators that generate greater revenues and trigger larger basket sizes.

The share of consumers purchasing valued-added selections, which includes marinated proteins and prepared options like pre-seasoned and pre-cooked meats, rose from 37% in 2016 to 68% in 2021, states the Power of Meat 2021 report. The Power of Meat is published by the Arlington, Va.-based Food Marketing Institute and the Washington, D.C.-based Foundation for Meat & Poultry Research & Education, and prepared by 210 Analytics LLC, a San Antonio-based market research and marketing strategies firm.

"People are tired of the same-old, so offering something different can be a very welcoming change to their routine," says Anne-Marie Roerink, 210 Analytics principal, adding that marinated meat as a center of the plate option also "inspires" the purchase of additional meal components.

To help generate greater meat and poultry sales, retailers are offering more unique marinade flavors, such as apple bourbon and zesty lemon and ginger, and Roerink notes that more seasonal and ethnic options and a wider variety of marinated products, ranging from rotisserie chicken to seafood, also is driving sales.

Yet, despite the popularity, a significant base of consumers still is wary of marinades, including many baby boomers who suspect that some merchandisers may be using marinades to disguise meats that are older or of poorer quality, Roerink says. Retailers can help alleviate the issue by listing such product information on packages as the date of development and the grade and cut of meat, she states.

> **NEEDLES THAT PENETRATE MEAT AND POULTRY TOO MANY TIMES ADD EXCESSIVE SOLUTIONS, CAUSING PRODUCT ADULTERATION, AND CAN RESULT IN CONSUMERS PAYING A HIGHER THAN NECESSARY PRICE FOR THE MEAT BECAUSE OF THE EXTRA WEIGHT**

A FINE LINE BETWEEN SUCCESS AND FAILURE

To maintain quality, it also is critical that operators not inject too much, or too little, marinade into meat and poultry, says Norman Marriott, emeritus professor in the College of Agriculture and Life Sciences at Virginia Polytechnic Institute and State University (Virginia Tech), in Blacksburg. Not only can excessive or lower levels negatively impact flavor, but higher amounts of marinades can cause waste while processors risk exceeding regulatory mandates that govern the maximum amount of liquid solutions allowed in products, he states.

Having consistent levels of marinade throughout a cut also enhances the eating experience, Marriott notes, and is typically dependent upon the operating speed and injection rate of equipment.

"Needles that penetrate meat and poultry too many times add excessive solutions, causing product adulteration," and can result in consumers paying a higher than necessary price for the meat because of the extra weight, he says. Ensuring that injection needles are the proper size and contain the appropriate number of holes for dispensing liquids is vital as well, Marriott states.

"If the conveyor goes too fast, there might not be enough marinade injected," he says. "If it moves too slowly, there could be too much. That is where the proper design of equipment and machine adjustment and coordination comes in."

The optimal needle length and width will vary in accordance with the type and size of the product undergoing injection, Marriott states, noting, for instance, that the requirements for thick ham differ from those for thin-sliced bacon.

In addition to ensuring systems are operating efficiently, processors must thoroughly clean and maintain the equipment to prevent the accumulation of microorganisms that can result in spoilage or foodborne illness, he says, which necessitates training and supervising employees on the most effective sanitary methods.

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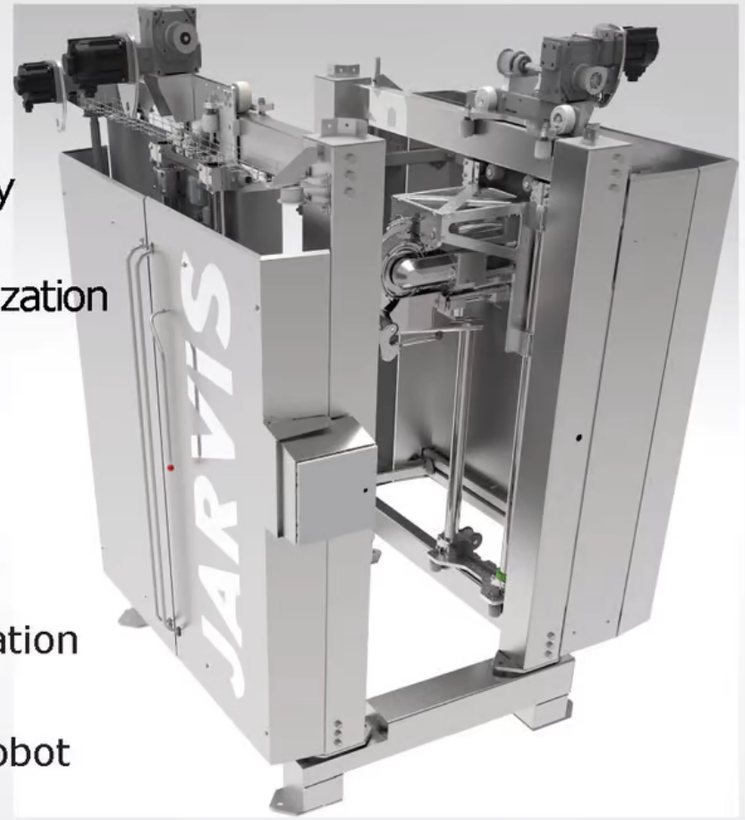

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TO THE BONE

CARCASS CHILLING TEMPERATURES AFFECT MEAT TENDERNESS, JUICINESS AND TASTE.

BY MEGAN PELLEGRINI
CONTRIBUTING WRITER

Is temperature a selling point? It could be.

Prime, Choice, Select. Consumers are certainly familiar with USDA grades based on meat marbling, fat and the animal's age. But how many know about pH levels? Chilling methods? Temperature?

Probably not many. Carcass chilling temperatures affect meat tenderness, juiciness, taste and quality, which are determined by pH levels. A low pH can cause a lighter color and decreased water retention in meat, while a high pH has a darker color and less drip loss.

"In the United States, there isn't a large focus on how the carcass is chilled, compared to how long the meat is aged, how much marbling it has, etc.," says Chris Fuller, USDA meat consultant and processing plant advisor at Fuller Consulting, based in San Diego, Calif. "Other countries like Australia have pH standards and address how they relate to quality."

Chilling times and temperatures impact how quickly rigor mortis sets into the carcass, Fuller says. If cold is applied too early, the meat will shorten and toughen. According to "Beef Carcass Chilling: Current Understanding, Future Challenges," by Texas A&M's University's Jeffrey W. Savell, Ph.D, the optimal pH level is usually reached around 24 hours postmortem.

High chilling temperatures cause faster rigor mortis, while low chilling temperatures slow development. Electrical stimulation can be used to increase rigor mortis or raise temperatures in carcasses.

So, pH drops faster in slower chilling methods for beef, and falls slower during faster chilling, according to Savell. Pork processing for that reason uses rapid chilling, minimal processing time and no electrical stimulation.

"The market is so saturated with Choice, Angus and Prime, which all have similar programs," notes Fuller."It would be great instead for beef producers to have another form of differentiation by offering information on their pH levels, chilling times and temperatures."

PREVENTING PATHOGENS

Chilling also plays an important role in the food safety of raw and ready-to-eat products.

"Carcass chilling systems that are designed with proper spacing and chilling capacity are important to control growth of pathogens like *Salmonella*," says Robert Delmore, Ph.D, interim director of undergraduate programs and professor in the Department of Animal Sciences at Colorado State University, in Fort Collins, Colo. "Additionally, when we manufacture ready-to-eat products such as sausage and lunchmeat, we must have the ability to appropriately lower the temperature (chill) of the product to prevent the growth of *Clostridium perfringens*."

Processors should also know how their carcasses are chilling — both on the external surface and the deep muscle temperature — using temperature probes, to prevent food safety concerns and meat quality issues, says Delmore.

"The biggest challenge with larger carcasses is the ability for systems to chill down to the center of the carcass," Fuller says. "Plants are having to upgrade their systems to chill faster. And there are always challenges with condensation."

Finished products today can be in a suspended state (not frozen but close) for 90 days, notes Fuller. "With high-tech systems, the temperature of rapidly frozen products can hold steady for six to seven months," he says. "This extended shelf life allows for increased distribution to retailers."

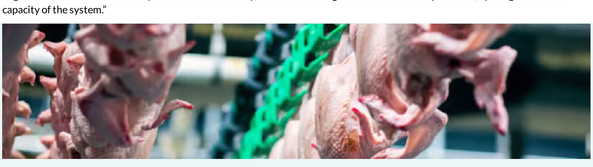
> EXISTING PLANTS SHOULD WORK WITH THEIR ENGINEERS TO DETERMINE WHAT IS OPTIMUM FOR THEIR FACILITY, WHEN CONSIDERING NUMBER OF CARCASSES PER COOLER, SPACING AND OVERALL CAPACITY OF THE SYSTEM.

DESIGNING PRODUCTION LINES

Meat companies can use freezing and chilling systems in a variety of locations in a processing line, such as grinders with a nitrogen injection system or an individually quick-freezing tunnel.

"We are lucky that we have a host of equipment suppliers that can help a processor determine where in the manufacturing process is the best location for a freezing or chilling system to meet their product goals," Delmore says. "Grinders and blenders designed for chilling or chill tunnels are often important parts of large-scale patty production lines."

Today's larger animals lead to larger carcasses. "There is no doubt that the heavy weights of beef carcasses we have today (840 pounds and up) must be considered when placing carcasses in a hot box," Delmore says. "Existing plants should work with their engineers to determine what is optimum for their facility, when considering number of carcasses per cooler, spacing and overall capacity of the system."



BY LAND OR SEA

Poultry birds are chilled with air or water chillers. The air-vs.-water debate continues today over which is most effective.

Air chillers individually chill each bird, while water tanks hold multiple birds at a time. Consequently, some say less bacteria can spread through air chilling, up to 80 percent less according to a University of Nebraska study.

"Time, temperature and agitation define the chilling process for poultry," says Mark Christie, Ph.D, director of process development and improvement, Simmons Pet Food, based in Siloam Springs, Ark., and former employee of a large poultry processor. "Both air and water chillers remove temperature; however, water chillers have a faster rate of heat transfer."

In recent years, water-chiller technology has improved by adding a "rocking" motion to massage the bird carcasses moving through initial start of the chilling process. "The bulk of the moisture picked up in the bird is mostly around the skin and muscle; it's not penetrating deep into the meat," says Christie.

With air chillers, the air agitates the birds. Sanitizing agents are in the chilling water and can also be applied to birds as they leave the coolers further enhancing food safety.

Each system has its own costs. Expenses for water chillers include a higher water bill and labor for sanitation purposes, if they don't use Clean-in-Place (CIP) systems. Air chillers may lead to a higher power bill with their electric costs.

"You cannot say one is better than the other, based on energy costs without a full utility analysis," says Christie. "Water chillers have a smaller footprint because of their faster temperature transfer, while more real estate is needed for air chillers."

To that end, "I've seen that some European processors are spraying the air with water to help drive heat out during air chilling and reducing moisture loss," Christie says.

"A lot of it comes down to following standard operating procedures that are known to work," says Christie. "If the machines can handle 5,000 pounds an hour, then only run 5,000 pounds an hour. Take care of what you have and it will take care of you."

REPLACING PHOSPHATES

PHOSPHATE SUBSTITUTES INCREASING IN MARINADES AND BRINES.

BY ELIZABETH FUHRMAN
CONTRIBUTING WRITER

Phosphates are one of the most well-known and least understood ingredients in meat marinades and brines. Because they aren't allowed in organic and natural products — and consumers are pushing for substitutes in other items — expect to see more phosphate substitutes in the future.

"While most ingredients directly manage added water in the formulation, phosphates manage the muscle food proteins and thus the water already inherent in the meat tissue plus additional formula water," says Wes Schilling, Ph.D, professor of food science, Mississippi State University.

Phosphates have a number of functions, which makes them unique. "They are basic compounds that raise the pH of meat mixes," says Joseph G. Sebranek, Ph.D, Charles F. Curtiss Distinguished Professor in Agriculture and Life Sciences, Iowa State University, in Ames, Iowa. "This allows greater swelling of the meat structure to increase space between proteins. The increased space in the meat structure means the meat will absorb and hold greater amounts of water, similar to how a sponge absorbs and holds water."

They increase the emulsifying capacity of the meat and allow for more space to bind water in marinated products, Schilling says. Phosphates also "function as a buffer and resist pH changes when acids are added to the meat product," he says.

Moreover, they control some bacteria growth and help meat resist oxidation, Sebranek says.

> MOST OFTEN, MULTIPLE INGREDIENTS ARE NEEDED TO REPLACE THE FUNCTIONALITY OF PHOSPHATES, AND USUALLY AT A MUCH HIGHER PRICE. POLYSACCHARIDE MIXES, FIBERS AND PROTEINS ARE COMMON SUBSTITUTES.

These qualities are beneficial in processed meats that are cooked and stored, says Edward W. Mills, Ph.D, associate professor of meat science at Pennsylvania State University, in University Park, Penn. Phosphates, however, cannot be used with organic or natural products. And customers apparently don't want to see them on other labels.

"If you replace phosphates, then you have two big functions to solve: its water-holding function and ability to help meat resist oxidation," Mills says. "I can't say that I've seen any ingredients do both."

Most often, multiple ingredients are needed to replace the functionality of phosphates, and usually at a much higher price, says Schilling. Polysaccharide mixes, fibers and proteins are common substitutes.

To control oxidation and flavor, ingredients such as spice extractives, rosemary extract and oil are utilized as antioxidant materials, Mills says. Green tea blends and cherry powder extracts can also help maintain beef's red color.

"Modified food starches and protein ingredients like a whey protein mix will increase water binding," Mills says. Other possible substitutes to increase yield are carrageenan and oat and plum fiber mixes.

At this point, phosphate substitutes are already commonly used. But, "I also don't believe there is such a thing as a phosphate replacer," says Schilling. "I would call them phosphate substitutes because phosphate's functionality is the gold standard and cannot be replaced."

Phosphate substitutes will continue to be used because it is what customers (i.e., food companies, retail, foodservice) are demanding and because consumers do not want them on labels because of a perceived negative connotation to them, Schilling says.

"There's a major perception by consumers that phosphates are chemical compounds," Sebranek says. "Consumers are driving the market and they are willing to pay for what they want, so we need to pay attention."

As manufacturers experiment with phosphate alternatives, they are finding that there isn't one easy replacement and duplicating phosphate's functions will take multiple ingredients. In the meantime, perhaps consumers could learn more about phosphates, as well.

"Phosphate is naturally in the body and without adenosine triphosphate (ATP), we couldn't live," says Schilling. "Phosphate is not a bad ingredient just like salt is not a bad ingredient. They just need to be used responsibly and consumed responsibly."

TRAY SEALING BACK ON THE RISE

BY CHIP BOLTON

I recently spoke with a veteran packaging executive whose experiences span enough years that his notions on trays are well informed by practical knowledge and businesslike candor. His take on the direction of trays and tray sealing reveal how food packaging reflects so much about how we view meals and meal planning.

Today's protein products are looking to demonstrate added value, however you picture it, as a differentiator among a consumer base whose varied tastes, desires and expectations are constantly shifting. Keeping the supply chain satisfied with successful legacy products is hard enough. Recent circumstances continue to teach us that. Now amplify that headache with constant pressure to pump new entrants into the system to satisfy shoppers morphing work styles and lifestyles and to quell their voracious appetites for fresh menu options. Suddenly nimbleness and flexibility are more than valued business qualities. They're prized packaging attributes.

"The future for premade trays looks like they're going into a lot of on-the-go ready meal and convenience applications where a robust package and low entry investment are vital," the executive explains. He thinks tray sealing is back on the rise after experiencing some displacement from rollstock. "I see reports that say, globally, the growth rate in the tray-sealing business is greater than 5% for the next decade. And a lot of that ends up in North America. We're the greatest importer of tray sealers."

This tray rally is based on several things. COVID is one of them, sparking so many to keep working from home even when they no longer may be required to do so. "There's more food delivery. It's also the convenience that Millennials are looking for. Also, premade trays are very flexible in their application. You can do multiple formats like MAP and VSP."

> **THIS TRAY RALLY IS BASED ON SEVERAL THINGS. COVID IS ONE OF THEM, SPARKING SO MANY TO KEEP WORKING FROM HOME EVEN WHEN THEY NO LONGER MAY BE REQUIRED TO DO SO.**

All of this seems in line with the general truth that it's the product and how it's processed that points to the proper packaging format. "As an example, you'll find bone-in cuts in pre-made trays MAP, but you'll also find them in a flexible package loaded with nylon to prevent leakers. What's the asset that the processor has and what's the flavor of the retailer? What do they prefer to see the product in?" The good news is that the tide is rising for everyone. Thermoform trays are growing, too, at a rate of better than 5% for the next decade, according to the source. Seafood applications such as salmon and haddock fillets appear to be a rich growth segment for semi-rigid trays with VSP on top, in addition to the more recognized applications like shingled deli meats and cheeses.

Tray formats have found their market niches as bags and film did. It's less of a direct competition among tray formats and more of what works best for the products and the business and helps deliver the most value to shoppers.

Will there ever be a great conversion from tray sealers to thermoform? Someone with tray sealing might say, let's get a rollstock machine if they have the volume numbers. Everyone I know with rollstock also has tray sealers. They give you flexibility and additional capacity. When new business comes along, it may take a while to receive a new roll stock machine and get it installed and qualified. In the meantime, you can meet that demand with a tray sealer. Once you've moved production to the rollstock machine, you can use that tray sealer to generate more new business. I think those who have tray sealers stay with them and those with roll stock stay with them. They will remain an effective mix.

And that's the crux of trays and tray sealing: finding and maintaining a mix that best satisfies the needs of the supply chain and insistent consumers.

REMOVING PHOSPHATES FROM YOUR SANITATION

DOESN'T HAVE TO COMPROMISE EFFECTIVENESS

BY BRAD BRAY, R&D AND INNOVATION MANAGER, BIRKO

Phosphates have been a fundamental ingredient in cleaning and sanitation chemicals for years. While banned in consumer products like dishwashing detergents due to their potential for water pollution, phosphates are still a principal ingredient in sanitizers for food processing facilities. The continued use of phosphates is primarily due to their efficacy in cleaning formulations which are critical for food safety.

However phosphate-containing chemicals pose a significant threat to the environment if left untreated in wastewater. Along with tightening regulations from local municipalities and the EPA, this means meat and poultry processors will need to reduce their use and discharge of phosphates. The good news? With recent innovations in sanitation chemistries, beef and poultry processors now have more phosphate-free chemical options at their disposal—that are equally efficacious to conventional chemistries.

Here's a deeper look into the reasons for change and the new options for meat and poultry processing facilities.

PHOSPHORUS AND ITS IMPACT ON THE ENVIRONMENT

The main concern around phosphate usage is the potential for water pollution. As early as the 1960s and as recent as this year, the Great Lakes region and areas across the United States have grappled with the effects of phosphorus in wastewater runoff, including contaminated drinking water and even dead zones in lakes, rivers and other bodies of water critical to surrounding areas. Phosphorus is a naturally occurring mineral essential to living organisms. But when excess quantities are present in surface waters it promotes algae blooms, which deplete the water's oxygen and cause fish, plants and other life in the waterway to die. This process is called eutrophication, and it occurs when untreated wastewater containing phosphates enters a larger body of water.

Lake Erie algae bloom in 2020. Photo credit: Great Lakes Echo.

Efforts to curb phosphorus pollution in various industries began in the 1970s with the Clean Water Act, the first major legislation to address water pollution, according to the EPA. The EPA revised the Clean Water Act in 1990 to include regulations specific to the Great Lakes. Since then, several states have adopted individual bans or stricter rules on phosphate use.

Despite these regulatory measures in place, pollution in the Great Lakes and other bodies of water remains a problem, along with yearly toxic algae blooms. Industries that generate large amounts of phosphorus—including using phosphates in cleaners, detergents or sanitation—should prepare for tightened regulations.

REDUCING PHOSPHATE USE WITH PHOSPHATE-FREE AND ENZYME-BASED CHEMISTRIES

There will likely always be some amount of phosphorus emitted into wastewater from natural substances such as bones or spillage from phosphate injections. However, meat processors can substantially reduce phosphates in wastewater by using phosphate-free sanitation.

Until recently, this option wasn't as viable for processors as it is now—conventional phosphate-containing chemistries are highly effective, economical, and multi-purpose, which are qualities difficult to achieve with other chemical formulations. These chemistries also break down soils, remove hardness from water and prevent deposits and films from building on surfaces.

Fortunately, some food safety providers have discovered alternative phosphate-free formulations that offer similar effectiveness against food soils, along with other benefits that phosphate-containing chemistries don't have. New enzyme-based sanitation chemicals, for example, effectively remove soils while offering a friendlier solution for use on soft metals. In cleaning aluminum, brass or copper with phosphate-based chemistries, food processing facilities might be compromising food safety in their formulations to avoid damaging equipment. We've seen the same or greater efficacy against food soils at near-neutral pH levels with enzyme-based solutions, making these solutions safer to use on equipment.

Phosphate-free chemistries are also more sustainable than their phosphate-containing counterparts. Beyond getting ahead of water pollution and wastewater treatment costs, processors that choose enzyme-based chemistries are also selecting a more sustainably produced product. While phosphorus must be mined, enzyme-based chemistries are produced using a fermentation process. To deliver enzyme-based solutions, chemistry suppliers will culture bacteria to excrete enzymes, utilizing fewer resources than phosphate production.

However, it's important to note enzymes and phosphates are not mutually exclusive—there may be some products that contain both enzymes and phosphates. Look for chemistries labeled "phosphate-free" or talk with your chemical supplier to find an appropriate replacement for your sanitation chemicals.

ANOTHER WAY? EVALUATE YOUR WATER AND CHEMICAL USAGE

Another vital effort in preventing phosphates from entering waterways is cutting back on water usage. Beef and poultry processors use enormous amounts of water to produce their products, which contributes to the pollution problem and adds unnecessary costs. Using less water and consistent optimized concentrations of chemicals can help processing facilities decrease their wastewater holistically, thereby avoiding associated costs and negative environmental impacts.

Small efforts such as regularly replacing water nozzles make a notable difference. Processors can realize significant water and chemical savings by automating sanitation processes, as well. Facilities could utilize automated dispensing equipment, which ensures repeatable, accurate chemical concentrations. These types of equipment help provide excess chemicals from going down the drain, which can reduce wastewater treatment costs if processors are using phosphate-containing chemistries.

Facilities using automated sanitation equipment with enzyme-based or phosphate-free chemistries achieve the best of both worlds. In the end, processors reduce operating costs and improve sustainability holistically, including lowering the number of phosphates in their wastewater.

GETTING AHEAD OF REGULATIONS AND MEETING SUSTAINABILITY GOALS

Decreasing our reliance on phosphates and improving the health of our waterways is no small feat, and regulations will only become stricter. However, processors now have more opportunities at their disposal for minimizing phosphate usage without sacrificing food safety—in fact, they may even improve food safety in some scenarios. As the United States continues to grapple with these issues, facilities that make the switch to phosphate-free chemistries and automated equipment now will only come out ahead.

For more information about Birko, visit https://www.birkocorp.com/.

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THE PANDEMIC'S LASTING IMPRINT ON MEAT CONSUMERS

Throughout 2020, Midan regularly surveyed meat consumers to understand how COVID-19 impacted their meat buying and cooking habits. As the pandemic slogged into the new year, we reached out to consumers again in January 2021 to get a pulse on how their meat attitudes and behaviors continued to evolve.

Several takeaways point to how COVID-19 has made a long-lasting imprint on today's meat consumers:

THE PANDEMIC LOCKDOWN ACHIEVED WHAT THE MEAT INDUSTRY HAS BEEN WORKING ON FOR YEARS: IT GOT AMERICANS COMFORTABLE COOKING MEAT.
And even as shopping and eating habits begin to normalize post-pandemic, a significant number (59%) of meat eaters say they will continue to experiment with different ways to cook meat/chicken.

ACTION STEP: Make the most of the ongoing interest in dining at home - offer easy, visually appealing recipes that help newly confident home cooks find exciting ways to prepare favorite cuts or experiment with less-familiar cuts to spruce up their dinner rotation.

THE ECONOMIC FALLOUT FROM COVID-19 MEANS MORE CONSUMERS ARE TRYING TO MAKE DO WITH LESS.
In January, 33% of consumers reported a decrease in their household income - the highest level since the pandemic started. Of those who have had a drop in income, nearly 60% lost more than a quarter of their income.

ACTION STEP: Anticipate greater demand for budget-friendly grinds, value packs and affordable meal solutions as many consumers look to stretch their dollars at the meat case. More careful budgeting could also translate to fewer consumers eating out as restaurants begin re-opening indoor dining.

THE CORONAVIRUS HAS DRIVEN A SHARPER FOCUS ON PERSONAL HEALTH.
Most consumers claim they are pursuing health and wellness changes in 2021, with 3 in 5 indicating they plan on eating healthier. 55% said they were going to seek out healthier types and cuts of meat/chicken during the next month.

ACTION STEP: Use on-pack labeling and point-of-sale messaging to highlight meat's nutritional profile – it's a critical step in giving health-conscious meat eaters, including flexitarians, permission to eat animal proteins without guilt.

COVID-19 OPENED THE DOOR A LITTLE WIDER FOR ALTERNATIVE MEATS:
The percent of consumers who tried plant-based meats for the first time during the pandemic increased from 16% in July to 23% in January. 27% of consumers indicate they eat plant-based meats regularly (at least monthly) and around 50% of consumers who have at least tried it say they plan to eat it regularly in the future.

ACTION STEP: Plant-based meats are only gaining traction, thanks in part to loud and expensive marketing. To keep animal proteins on the plate, the traditional meat industry must amp up its own consumer communications with unified, consistent messaging.

[1]Online survey of 1,000 U.S. meat and poultry eaters

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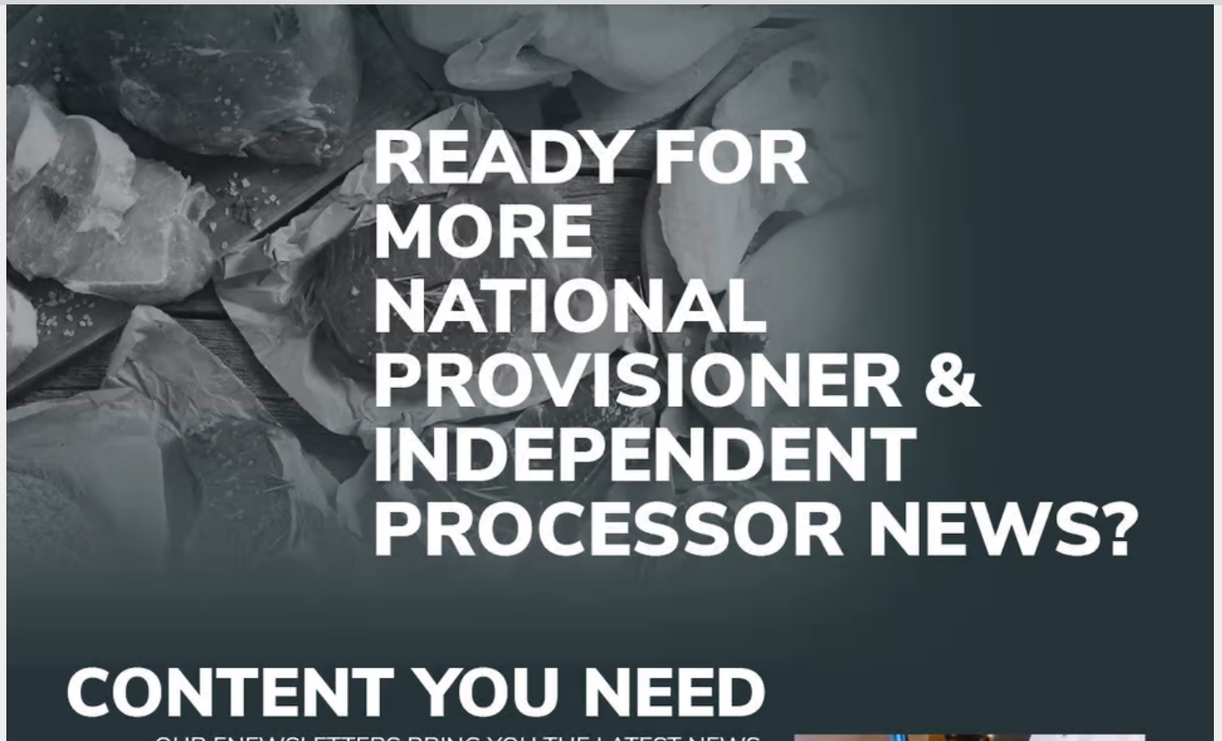

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