



Sanitizing the surface

Ross Industries

Surface interventions require effective chemicals and the technology to apply them

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Surface interventions provide processors an additional line of defense against the pathogens that threaten food safety and consequently, a company's bottom line. Preventing foodborne illness is paramount to maintaining a positive brand reputation and strong relationships with suppliers, distributors and consumers. Breaking down a carcass of any species opens the door for pathogens and implementing surface interventions is the starting point for protection.

Salmonella, *E. coli*, *Listeria* and *Campylobacter* represent the main pathogens of concern for all species, while some pathogens are specific to one species such as *E. coli* O157:H7 found in beef.

"The act of 'cutting' or piercing the surface of meat poses risk because surface bacteria

can be introduced into the sub-surface of meat," says Bob Ogren, vice president of the equipment division at Henderson, Colorado-based Birko. "That is why the application of an antimicrobial prior to these actions is critical."

BUG SPRAY

Mark Swanson, CEO of Birko, puts intervention technology in two categories, the intervention itself and the application of interventions.

"The evolution we are seeing today is driven from two forces – export market access and the requirement to become more precise in the application of interventions," Swanson says.

Swanson says the market access issue makes it difficult to bring new chemical technologies to the marketplace. As a result,

Precise application of surface intervention technology is a priority for processors.



Birko's hot water pre-visceration carcass wash system is used by many processors as a primary intervention.

Birko and other organizations focus their efforts on more precise and efficient use of current chemistries already approved for export.

Jackson McReynolds, Ph.D. and chief scientific officer at Johnston, Iowa-based Passport Food Safety Solutions echoes Swanson on the difficulties of bringing new technologies into the market. “The regulations can be complicated and very expensive to navigate, especially outside the US with regulatory approvals,” he says. “Market access with any food safety technology is essential as meat exports play such an important role in the meat protein value chain.”

Concentrations of chemicals used have gone up as have the number of interventions, says Rob Ames, business development manager for harvest interventions at Lenexa, Kansas-based Corbion. “We’ve evolved from a single-use to a multi-use or multi-hurdle approach to intervention,” Ames says. Corbion has produced its Purac brand of lactic acid for slaughter processing for over 20 years according to Ames. “It’s very effective against *Salmonella*, *E. coli*, *Campylobacter*, really

any pathogen or bacteria that you might have concern for,” Ames says. “Even *Listeria* is affected by lactic acid.”

Corbion also offers a buffered lactic acid-based product to protect against some of the effects of products with lower pH and the consequent discoloration that comes with it. In addition, Corbion offers a peroxyacetic acid-product which takes a different route to kill microorganisms.

“So we pride ourselves on being the leader in the lactic acid space and have a lot of customers who use our products around the world,” Ames says. “We’re new to peroxyacetic acid, but we have what we think is a really compelling portfolio.”

Ames explains the process by which lactic acid-based solutions target bacteria in a low pH environment as having the ability to pass through the cell wall of the target and dissociate once inside. It then acidifies the bacteria cell, damages and kills it.

Once processors cook the meat, Corbion takes a slightly different approach to food safety. The agent is still lactic acid-based, but



Ross Industries' technology gives processors the option to tenderize, perform an intervention step, or both.

now comes in the form of sodium or potassium lactate (salts of lactic acid).

"Lactates in cooked meats are bacteriostatic, which means they inhibit growth and proliferation of bacteria," Ames says.

Corbion's Optiform products (lactate and diacetate) are closer to neutral pH which is necessary to make desirable processed meats. The lactate molecules surround bacteria cells and subsequently dissociate releasing lactic acid which enters the bacteria cell wall. Bacteria then exhaust their energy trying to increase pH within the cell. This method of intervention prevents any bacteria that might be present on cooked product from putting

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energy into proliferation and multiplication.

Because of the nuance involved with each plant's individual situation, Corbion goes into the plant to assess a customer's needs and work with equipment manufacturing partners and equipment technicians to ensure the most efficient, effective solution.

"There's so much to do with how these antimicrobials can work best with respect to

concentration, pressure, water temperature, flow, application point, etc.," Ames says. "There are a number of things that need to be known that we can advise on remotely. Yet when we get into the plant, we pick up on things and we know how to adapt our system to their need."

SHOOT TO KILL

In addition to Birko's chemical offerings, carcass wash cabinets from Chad, a subsidiary of Birko since 2011, provide processors with the equipment needed to apply solutions. "Unfortunately there is no 'one-size-fits-all' intervention process," Ogren says. "The best defense is to utilize a multi-hurdle approach. We accomplish this through strategically placing intervention equipment throughout the harvest floor."

Along with the integrated interventions offered by Birko/Chad, a top priority in plants is to ensure production and quality are at the highest levels for the facility.

"We carry out an exhaustive plant assessment prior to manufacture to ensure the efficacy of our equipment," Ogren says. "Chain speed, rail height, spacing of carcasses, etc., are variables we consider when determining which intervention or interventions to recommend."

Hot water pasteurization has also proven to be an effective intervention process for Birko. The multi-hurdle approach comes into play when a processor combines a hot water pasteurization process with an antimicrobial spray cabinet, thus improving results further. "As an additional safety measure, some plants apply one antimicrobial intervention before the cooler and a different antimicrobial after the cooler on the cut floor," Ogren says.

Spray cabinets for interventions must have the ability to withstand the punishment that harsh chemicals can cause. Materials and design play a major role in ensuring that a machine used for surface intervention will last long enough under harsh conditions to achieve positive return on investments.

"Surface intervention treatments are rough on equipment," says Bryan Barner, director of sales at Ross Industries, Midland, Virginia. "We have designed and built our machines to withstand the abuse or the harshness of the antimicrobial solutions that are run through them on a daily basis. That's really the big thing with machinery for this application, it has to be

able to hold up to the solutions. Most of them are acidic and aren't metal's friend."

To maximize effectiveness and minimize waste, spray coverage and overspray both play roles. Ross spray cabinets use loosely woven belts to ensure complete coverage along with fan and conical spray patterns to control and direct the spray. Another important aspect to consider is waste, not only in terms of cost, but labeling as well.

"In conjunction with the Univ. of Oklahoma we did a study on our system to ensure the belt speed, spray pattern and volume of spray all worked together to prevent overspray and waste yet provide complete coverage without applying too much," Barner says. "Especially in beef, over applied solution can be absorbed by the meat and affect the way a processor has to label the product."

Recently, Passport Food Safety developed a proprietary, automated delivery system known as the Convoy Elite. The system pumps and blends hypobromus acid to specified concentrations depending on operational needs. "The closed loop system also allows the end user to more easily measure and manage hypobromus concentration levels at various interventions and produce a report that can be used for FSIS certification," McReynolds says.

FOOD SAFETY'S FUTURE

Food safety's importance continues to rise in the eyes of consumers. This means food producers need to not only maintain high levels on this front, but continue to improve.

"With the enormous value in brand equity, food safety is no longer just as important as other aspects of the business, food safety is becoming the driver of the business," Swanson says. "Consumers want safe food and a recall or event not only means downtime and lost business, it means a decline in the trustworthiness of your brand.

"If we look into the crystal ball, our view is that food safety will continue to demand greater knowledge and expertise in all areas (sanitation to intervention application), is becoming more technical in nature and requires more precision in application."

Birko continually works to improve its application equipment and make it easier to clean and maintain, Ogren says. "Additionally because the problems we encounter change

frequently, we continually refine our antimicrobial formula to mitigate the risk of new pathogens that may be found on product," he adds.

New methods of application are also in the pipeline at Birko. "Birko is very excited about a new patented method for the application of antimicrobials," Ogren says. "This new

"If you get too much on there, you have to claim it as a marinade." - BRYAN BARNER

method is currently awaiting validation, but if successful, will radically change the way antimicrobials are applied."

Ross Industries also has come out with a new system that improves on its tenderizer/intervention cabinet design. The new engineering eliminates cabinet and tubular construction and provides a more open, sanitary and hygienic construction. In addition, new features will allow users to disengage the tenderizer and use the cabinet for intervention-only with ease.

"Presently, if someone is using a tenderizer in-line with intervention, they have to pull the tenderizer out or remove the head to run product that needs to have intervention application but not be tenderized," Barner says. "This tenderizer will allow them to simply turn the head off and continue to run the machine as a stand-alone intervention cabinet."

The poultry side of the industry has started looking more into surface interventions as well, according to Barner. He says that unlike beef, which focuses the intervention on keeping pathogens from making their way to the center of the meat, poultry interventions are driven more by increasing shelf life. But regardless of species, or why companies continue to strive for greater food safety solutions, American consumers dictate the advancements through their demand for safer food.

With food safety topping the list for consumers and producers alike, surface intervention technology will continue to make strides toward better and more efficient solutions. "Our focus is to bring innovation to the market that can be used through the food chain - from the barn to the meat counter," McReynolds says. 