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An interview with
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Zoetis

“Amplon creates a low-pH or high-acid environment — it’s applied at a 1.3 to 1.5 pH.”

Early intervention critical for effective control of *Campylobacter* in poultry processing

Q: USDA’s Food Safety and Inspection Service (FSIS) will be publishing new performance standards for allowable limits of *Campylobacter* in chicken parts and whole carcasses. What can poultry processors do to further reduce the prevalence of this bacterial foodborne pathogen?

SM: The poultry industry has been struggling with *Campylobacter* ever since FSIS started using a more sensitive test for detection of *Campylobacter* in chicken rinsate samples. Several USDA-approved bacterial interventions are available for managing *Campylobacter*, but they need to be used at the right time during processing. They need to be applied early in processing, before chickens are in the cut-up area, because that’s when *Campylobacter* bacteria appear to be most vulnerable.

Q: You’ve done a lot of work with a product called Amplon. Why the focus on that antimicrobial?

SM: Amplon is a unique blend of H_2SO_4 (sulfuric acid) and buffering salts. It has the antimicrobial benefits of a strong acid but minimizes the potential adverse effects of an acid on chickens, personnel and equipment.

It’s been shown to be effective against typical poultry pathogens[1] and is approved by FSIS for use as an antimicrobial, acidifier and processing aid in poultry-processing water. Amplon also offers flexibility — it can be used as a dip, wash or spray.

Q: How does Amplon work?

SM: Amplon creates a low-pH or high-acid environment — it’s applied at a 1.3 to 1.5 pH. It gets into bacteria through osmosis and penetrates bacterial cells. The cells then try to neutralize the pH and get it back to 7.0. But in doing so, they use a lot of energy and literally work themselves to death.[2]

Q: Is there evidence that Amplon is effective against *Campylobacter*?

SM: Yes. A study was conducted at the University of Arkansas’ pilot processing plant.[3] The objective was to see how effective Amplon was in reducing *Campylobacter* during processing.

continued

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Q: How was the study set up?

SM: Investigators began by sampling birds to get a baseline on the load of *Campylobacter* coming into the plant. Then they employed several steps to control the pathogen.

First, they used an Amplon post-pick spray after feather picking, followed by an Amplon dip after evisceration prior to chilling. Peracetic acid (PAA) was used in the chiller.

After the chiller, there was another dip intervention using either Amplon or PAA so the two could be compared.

Q: Did the interventions with Amplon reduce incidence of *Campylobacter*?

SM: Yes, and they demonstrated the advantages of using Amplon during the first processing steps. Poultry plants aim at a 1 log CFU/ml reduction during each intervention. The intervention with Amplon spray after feather picking significantly reduced *Campylobacter* by 3.25 log compared to the baseline ($P < 0.05$).[4]

After evisceration, the Amplon dip significantly reduced the remaining *Campylobacter* by 1.15 log ($P = 0.026$).[5] The carcasses then went into the chiller, which was treated with PAA, where *Campylobacter* was reduced by less than 1 log.[6] This is not a significant difference compared to pre-chiller levels and was no surprise because interventions are more effective when carcasses are hot.

Q: After the chiller, did the results with Amplon or PAA differ?

SM: Both reduced *Campylobacter* significantly — the Amplon dip by 1.52 log ($P = 0.008$),[7] and the PAA dip by 2.22 log ($P < 0.05$).[8]

Q: So, based on the results of this study, when do you recommend using Amplon?

SM: The best time for the first intervention is immediately after feather removal, when birds are hot after scalding and before evisceration. After evisceration and prior to chilling is another good opportunity to use Amplon.

It also makes the most sense from a carcass-handling standpoint. Even if only a few carcasses coming into the plant are contaminated with *Campylobacter*, the bacterium will spread unless it’s controlled at that point in processing. It’s best to catch it early.

Q: Most poultry-processing plants in the US are already using PAA for managing foodborne pathogens. Why introduce another antimicrobial?

SM: Our experience indicates that along with treating at different points during processing, it’s important to change the chemistry used. By adding Amplon, bacteria are hit with different kill mechanisms. That often leads to more effective and sustainable bacteria-control programs.

As FSIS raises the bar for controlling *Campylobacter*, the poultry industry needs to consider every tool available and rethink the timing of antimicrobial interventions.

1 U.S. Department of Agriculture, Agricultural Marketing Service, Sulfuric Acid Handling, 2012 May 1.

2 Lund P, Tramonti A, De Biase D. Coping with low pH: molecular strategies in neutralophilic bacteria. FEMS Microbiol Rev 2014;38:1091-1125.

3 Kim SE, Park SH, Lee SI, Owens CM, Ricke SC. Assessment of Chicken Carcass Microbiome Responses During Processing in the Presence of Commercial Antimicrobials Using a Next Generation Sequencing Approach. Nature.com/scientific reports. 2017 Feb 23.

4 Park SH, Kim SE, Lee SI, Rubinelli P, Roto S, Shi H, Owens CM, Ricke S. Evaluation of Antimicrobial Effects on Pathogen Reduction on Chicken Carcass during First Processing. Poster presentation, International Association for Food Protection. 2016 Aug 1.

5 Ibid.

6 Kim SE, Park SH, Lee SI, Owens CM, Ricke SC. Assessment of Chicken Carcass Microbiome Responses During Processing.

7 Park SH, Kim SE, Lee SI, Rubinelli P, Roto S, Shi H, Owens CM, Ricke S. Evaluation of Antimicrobial Effects on Pathogen Reduction.

8 Kim SE, Park SH, Lee SI, Owens CM, Ricke SC. Assessment of Chicken Carcass Microbiome Responses During Processing.

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toolbox

Toolbox is a series of interviews with veterinarians and other technical specialists about their experiences managing antimicrobials, vaccines and other tools for poultry health. It is produced by the editors of *Poultry Health Today*® on behalf of the US Poultry Business of Zoetis.

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