



An interview with  
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## Despite similar labels, PAA products not all the same

**Q:** Virtually all poultry and beef processing plants in the US make extensive use of peracetic acid, or PAA. Why?

**DS:** PAA is a food-grade antimicrobial and sanitizer that helps kill microorganisms or inhibit their growth. It's an organic compound — the product of vinegar and hydrogen peroxide — and can also be used with organic meats.

Over the years, PAA has proved to be highly effective against naturally occurring foodborne pathogens including *Salmonella*, *Campylobacter* and *Escherichia coli*. And like all processing aids, it's been subjected to rigorous testing and the approval process of USDA and FDA. It's an invaluable tool for any meat company's food-safety program.

**Q:** Are all PAA products the same?

**DS:** That's the general assumption. All PAA products used in the US are made in the US, where chemical manufacturing is closely monitored and tightly regulated. The chemical industry also has high standards for quality control. So, if you look at a PAA product's label and it lists a 22% concentration, you'd like to believe that's what's inside the container.

**Q:** You sound like you have some doubts.

**DS:** I do. For reasons I just mentioned, I'm reasonably confident that all or most 22%-PAA products have a 22% concentration when they leave the manufacturer. However, as valuable as the product is, PAA is volatile and can degrade. This can and will happen to all PAA products over time. The question is how fast it occurs.

**Q:** Is there any way to know a PAA product's actual concentration?

**DS:** Yes, most meat companies have the ability to routinely test PAA concentration and make adjustments, as needed. But as with anything else, you have to be aware of the problem before you can correct it. And I believe there is a serious stability problem with many PAA products.

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**Q: Why the grim outlook?**

**DS:** In a recent 3-month study, we analyzed five PAA samples collected from US meat processors. These were real-world samples — obtained directly from contacts in the industry, not the manufacturer. All of the products we sampled were estimated to be about 2 weeks old.

**Q: How did you evaluate the products?**

**DS:** Once we obtained the samples, we stored them under the same conditions for up to 80 days. Over the duration of the test, we monitored each product’s PAA concentration using the industry standard method for PAA titration. We also looked at the vapors emitted from the products. The results were disturbing, if not alarming, and warrant the meat industry’s attention.

**Q: What exactly did you find?**

**DS:** First, we learned that the stability of PAA products varied substantially — far more than we ever imagined. In fact, under the conditions of the study, the half-life of each product tested — that is, the number of days the product took to degrade to half of its original concentration — varied from 19 to 394 days.\* Think about it: That’s a range of less than 3 weeks for one PAA product to about 13 months for another.

**Q: That’s quite a wide range, but one bad sample can throw off the numbers. What was the average half-life of the products sampled?**

**DS:** Not counting the top product at 394 days, the other four PAA products had an average half-life of less than 43 days. If you look at the lowest three products, the average half-life was just over 33 days. Put another way: These products lost half of their concentration 9 to 10 times faster than the top product in the sampling.

**Q: What does that mean for meat processors?**

**DS:** They need to be aware of the problem and carefully track how long their PAA product has been sitting in the processing plant or, for that matter, how long it was in the manufacturer’s warehouse before it arrived. That’s going to play a huge role in the product’s concentration. That’s worrisome when you think about the potential ramifications.

**Q: What are your primary concerns?**

**DS:** I have two major concerns, the most obvious one being the hidden cost to the meat plant. If you want a PAA concentration in the chiller of, say, 1,000 ppm and your product is losing concentration, you're going to have to crank up the feed rate and use much more product than expected to maintain that concentration. If the product has degraded to 11%, for example, you'd need to use twice as much product.

It can work the other way, too. Let's say your PAA isn't keeping pace and you've turned up the pump to 10 to compensate for the loss in concentration. Then you bring in a new tote that's more concentrated, but your feed rate is still on a high setting. Now your PAA concentration is too high, which could affect meat quality and yield.

**Q: And your second concern?**

**DS:** Food safety. What happens if the PAA tote on the line was at 20% to 22% on a Friday and falls to half that by Monday? Sure, you can make adjustments to the pump and ask your QA team to monitor the concentration closely, but the product is still continuing to degrade. The processing plant could potentially ship a tremendous amount of poultry out the door on Monday but not catch the problem until Tuesday, Wednesday or Thursday. What happens to all that meat that was shipped? Now you've created a potential health risk for consumers, and if people get sick, the cost of recalling the product and the resulting liability could be staggering. It could even shut down your plant.

**Q: What are the take-away messages for meat-processing plants?**

**DS:** Four of the five production samples we tested lost half their stated potency anywhere from 19 to 46 days. That opens the door to higher costs and possibly less control of naturally occurring foodborne pathogens.

The bottom line is that PAA is and will continue to be a valuable antimicrobial for the meat industry. It's important for processors to test concentrations frequently. They also need to be mindful of the costs associated with turning up the PAA feed rate to compensate. Using a high-quality PAA with greater stability will help you stay on budget and ensure safer meat products for your customers.

\* The 394 value was extrapolated from the data measured up to 80 days. All the other products reached their half-life in the testing period, so they are measured values.

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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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