POULTRY HEALTH TODAY®

ISSUE 14

NEWS ABOUT POULTRY HEALTH PRODUCTS

An interview with
Manuel Da Costa, DVM, PhD
Associate Director, Outcomes Research
Zoetis

Good gut health can help minimize *Salmonella* in broilers

Q: Zoetis has been conducting studies about the impact of gut health on the prevalence of *Salmonella* in broilers. What's the connection between the two?

MD: We've known for years that withdrawing or reducing antibiotic use can be related to a higher *Salmonella* prevalence.[1] We also know necrotic enteritis (NE) is a big problem in broilers raised without antibiotics, although NE can also affect conventional flocks.[2] NE is often preceded by coccidiosis, which causes gut damage that enables *Clostridium perfringens* to proliferate, leading to NE.[3]

Q: What was the goal of the studies?

MD: We want to help producers meet USDA's stricter performance standards for *Salmonella* at processing — whether they are raising broilers with or without antibiotics.

> "We want to help producers meet USDA's stricter performance standards for *Salmonella* at processing — whether they are raising broilers with or without antibiotics."

We theorized that if gut health could be maintained and NE controlled, the *Salmonella* prevalence and load would decrease. Toward that end, we tested various interventions to see which ones helped control coccidiosis and NE and if that, in turn, reduced *Salmonella*.

Q: How were the studies set up?

MD: We conducted three controlled broiler-pen studies (Table 1) with Colorado Quality Research.[4] We included bacitracin methylene disalicylate (BMD®) because it's indicated for NE prevention and control. We also tested antibiotic alternatives used in "no antibiotics ever" (NAE) production systems, as well as vaccination against *Salmonella*.

continued

Table 1. Study designs

Treatment groups — 48 pens with 32 birds per pen	Control	Bacitracin methylene disalicylate 55 ppm	Zoalene 125 ppm	Probiotic *Bacillus subtilis* at 1lb/ton	Modified-live *Salmonella* Typhimurim vaccination on day 1 and 10 days of age
Study 1	•	•			
Study 2	•	•	•	•	•
Study 3	•	•	•	•	•

> "Our work indicates broiler integrators should carefully evaluate their gut-health control strategies since they can affect the *Salmonella* prevalence and load."

Q: Were these challenge studies?

MD: Yes. In all three studies, we administered *Eimeria* spp. — various species of the parasite that causes coccidiosis — to birds at 14 days of age. At 18 days of age, we administered *C. perfringens* in feed and *Salmonella* Heidelberg, which was given orally. Controls were challenged but did not receive any interventions for NE or *Salmonella*.

Q: How did you evaluate results?

MD: We looked at lesion scores 3 days after challenge with *C. perfringens*. At 42 days of age — the end of the study — we evaluated performance, mortality and the incidence and load of *Salmonella*.

Q: What were the results in the first study?

MD: In broilers that received BMD, there was a significant reduction ($p < 0.05$) of the *Salmonella* load on boot swabs and in the prevalence of *Salmonella* in carcass rinses. By the end of the study and compared to controls, NE lesion scores decreased, mortality was negligible and feed conversion improved by 6 points.

It's important to note that BMD has no effect on *Salmonella*. BMD is effective against Gram-positive bacteria such as *C. perfringens*, but *Salmonella* is a Gram-negative pathogen. This study therefore provides evidence that by preventing NE with BMD, the prevalence of *Salmonella* may be reduced.

Q: And the results in Studies 2 and 3? Did vaccination or feed additives reduce *Salmonella*?

MD: The modified-live *Salmonella* Typhimurim vaccination effectively reduced the *Salmonella* load and prevalence even in the presence of NE.

Our ability to compare the effect of the feed additives was limited because the *Salmonella* presence in samples we collected was lower than it was in Study 1. Overall, the results with feed additives in Studies 2 and 3 were somewhat variable. The best reductions in *Salmonella* prevalence and load were achieved with BMD, followed by zoalene then the probiotic interventions. In Study 3, ceca and boot-swab numbers were substantially reduced compared to controls. For commercial producers, even modest reductions can have a major impact on *Salmonella* detection at processing.

Q: How can your results help operations with NAE flocks that can't use BMD?

MD: Our work indicates broiler integrators should carefully evaluate their gut-health control strategies since they can affect the *Salmonella* prevalence and load. Vaccination against *Salmonella* is an effective option. In addition, some feed-additive interventions can help mitigate enteric disease and, to some extent, control *Salmonella* proliferation.

[1] Russell S. Processing Tip...A possible reason why more plants are failing the *Salmonella* performance standard. The University of Georgia, Cooperative Extension Service. January 2005.

[2] Hargis B. Overview of Necrotic Enteritis in Poultry. Merck Veterinary Manual.

[3] Ibid.

[4] Data on file, Study Report Nos. 06-16-7AMVG, 02-17-7AMVG, 03-17-AMVG, Zoetis LLC.

For more information, contact Manuel DaCosta (manuel.dacosta@zoetis.com) or your Zoetis representative.

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.

To contact *Poultry Health Today*:
editor@poultryhealthtoday.com
POULTRYHEALTHTODAY.COM

To contact Zoetis:
855.702.1036
ZOETISUS.COM/POULTRY

BMD-00009