Research Notes

ARM & HAMMER

CERTILLUS reduced avian pathogenic *E. coli* (APEC) levels in an industry-wide survey of US broilers.

CERTILLUS™ Targeted Microbial Solutions use proprietary strains of *Bacillus* selected to combat specific pathogenic challenges.

STUDY OVERVIEW

- This study[1] was designed to investigate the effect of CERTILLUS on avian pathogenic *E. coli* (APEC) levels in commercial U.S. broiler production systems.
- A total of 2,066 broilers from 17 U.S. companies, ranging in age from day of hatch to 8 weeks, were sampled.
- The gastrointestinal tracts (GITs) of broilers, representative of a particular company or region, were collected on site, shipped to the ARM & HAMMER™ SPD Wisconsin lab for analysis, and sampled for *E. coli* levels by plate counts.
- Isolates collected from each bird were subjected to an APEC mPCR to determine pathogenicity of each isolate.[2,3]
- APEC levels were statistically analyzed by two-tailed t-test (GraphPad Prism) of log transformed CFU/g values to determine differences between average APEC levels of birds fed CERTILLUS and the control. Significance was accepted at $P<0.05$.

RESULTS

- Analysis of all samples showed a significant reduction ($P<0.05$) in APEC levels (CFU/g) among broilers fed CERTILLUS (Fig. 1).
- A categorical frequency analysis by log CFU/g categories showed that fewer birds demonstrated high APEC levels (>1000 CFU/g) among broilers fed CERTILLUS, compared to prevalence of high APEC levels in birds not fed CERTILLUS (Fig. 2).

FIGURE 1: Average APEC Levels of All Broiler GITs

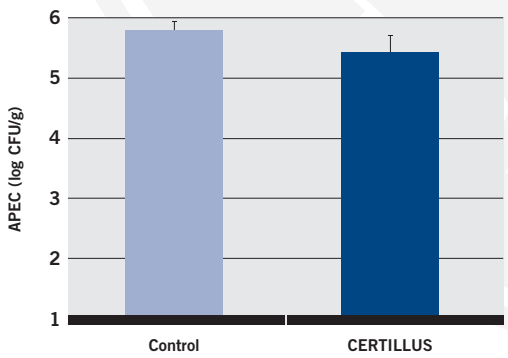
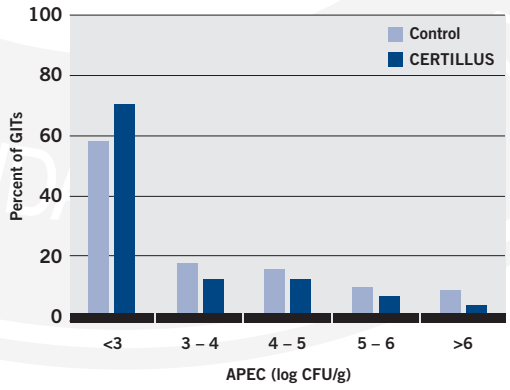


FIGURE 2: Categorical Frequency of APEC Levels by Quantitative Log CFU/g

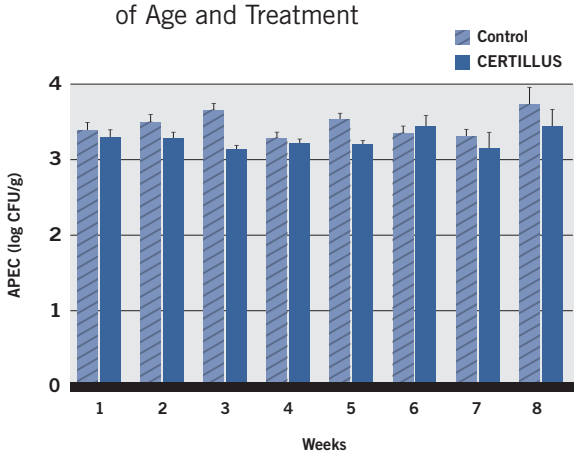


- Broilers fed CERTILLUS™ had statistically significant lower levels of APEC at 3 and 5 weeks of age ($P<0.05$) and numerically lower levels at 1, 2, 4, 7 and 8 weeks of age.
- At 6 weeks, birds fed CERTILLUS had numerically higher APEC levels compared to control birds (Fig. 3).

CONCLUSION

- Inclusion of CERTILLUS in commercial broiler diets throughout the production cycle may reduce APEC populations in broiler gastrointestinal tracts.

FIGURE 3: Broiler APEC Levels (CFU/g) by Week of Age and Treatment



1 Hutchison E, Anderson S, Vang E, Wujek R, Rehberger T. Industry-wide survey of avian pathogenic *E. coli* levels in US broilers. Abstract #382P, presented at Poultry Science Association 2017 Annual Meeting, Orlando, FI.

2 Johnson TJ, Wannemuehler Y, Doetkott C, Johnson SJ, Rosenberger SC, Nolan LK. Identification of Minimal Predictors of Avian Pathogenic *Escherichia coli* Virulence for Use as a Rapid Diagnostic Tool. *Journal of Clinical Microbiology* 2008;46(12):3987-3996.

3 Johnson TJ, Wannemuehler Y, Johnson SJ, Stell AL, Doetkott C, Johnson JR, Kim KS, Spanjaard L, Nolan LK. Comparison of Extraintestinal Pathogenic *Escherichia coli* Strains from Human and Avian Sources Reveals a Mixed Subset Representing Potential Zoonotic Pathogens. *Applied and Environmental Microbiology* 2008;74(22):7043-7050.