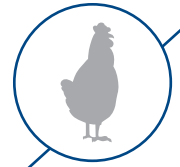


# Research Notes P-91

Arm & Hammer Animal Nutrition



## CELMANAX supplementation reduced degree of infection in commercial layer pullets artificially infected with *Salmonella enteritidis*.

### OBJECTIVE

Determine if feeding CELMANAX™ to commercial layer pullets either from 1 day to 17 weeks or from 10 weeks to 17 weeks would affect *Salmonella enteritidis* colonization of both the digestive tract (cecum) and ovaries.

### MATERIALS AND METHODS

Two hundred and fifty (250) one-day old Hyline W-36 pullets were purchased from Hyline, Mansfield, Georgia. Each bird was in an individual cage, with forty-eight (48) pullets per treatment group. The following treatments were tested:

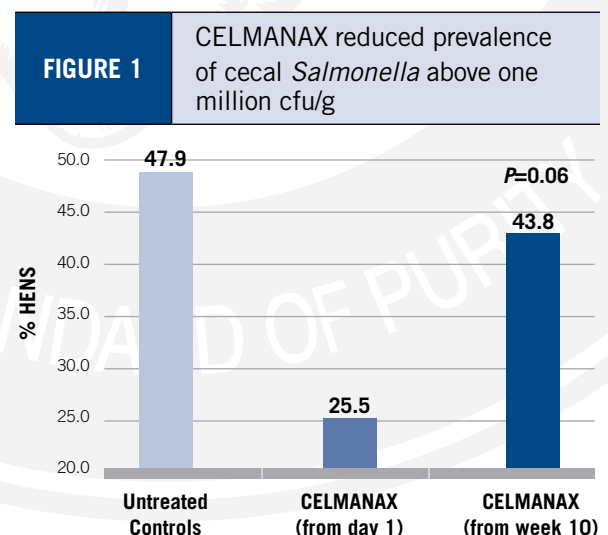
- T1: No additive, challenge
- T2: CELMANAX SCP, 100g/MT supplemented from day 1 to study termination, challenge
- T3: CELMANAX SCP, 100g/MT supplemented from week 10 to study termination, challenge
- T4: No additive, no challenge

All birds were fed a non-medicated commercial layer diet in mash form. At 16 weeks-of-age each bird was orally challenged with a nalidixic acid resistant strain of *Salmonella enteritidis* ( $1.8 \times 10^9$  cfu/ml). One week (seven days) post-challenge all birds were necropsied and ceca and ovary samples taken. *Salmonella* was isolated using selective media culturing, and identified and serogrouped using poly-O *Salmonella* specific antiserum. *Salmonella* were enumerated using the most probable number (MPN) method. Data were analyzed statistically, and  $P < 0.05$  was considered significant.

### RESULTS

#### Ceca *Salmonella* Prevalence and MPN.

*Salmonella* was identified in all of the ceca samples from all three of the challenged treatment groups. The prevalence of ceca samples with *Salmonella* loads that exceeded one million cfu/g (the upper quantitative limits of the MPN assay) are summarized in Figure 1. CELMANAX supplementation from day one of age trended to reduce the number of hens with high (over one million cfu/g) cecal *Salmonella enteritidis* compared to untreated or CELMANAX supplementation from 10 weeks of age ( $P=0.06$ ).



Quantitative results for the ceca *Salmonella* MPNs are summarized in Figure 2, and the distribution of MPNs is illustrated in Figure 3. Observations which exceeded the MPN threshold were censored in the quantitative *Salmonella* analysis. Both CELMANAX™ supplementation treatments reduced *Salmonella enteritidis* by over one log compared to untreated control ( $P=0.056$ ).

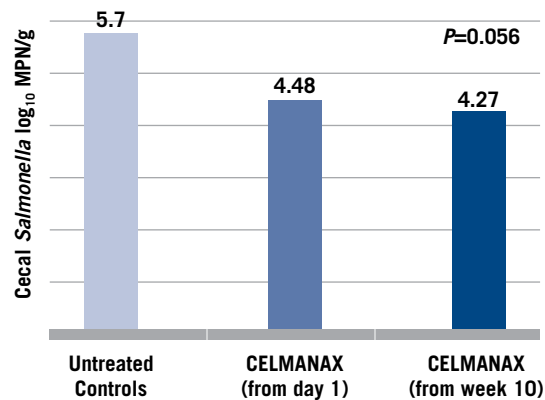
**Ovary *Salmonella* Prevalence.** There was no significant difference between challenged treatment groups with respect to ovary *Salmonella* prevalence ( $P=0.32$ ). All except two of the layers had *Salmonella* MPNs that were below the quantitative detection limit of the MPN assay. Decreased *Salmonella* counts in the ovaries is not surprising because ovaries naturally tend to clear *Salmonella* infection rapidly.

## CONCLUSIONS

- CELMANAX supplementation from day 1 of age trended to reduce the number of hens with high (over one million cfu/g) cecal *Salmonella enteritidis* in challenged layers compared to untreated or CELMANAX supplementation from 10 weeks of age ( $P=0.06$ ).
- Both CELMANAX supplementation treatments reduced *Salmonella enteritidis* by over one log in challenge trials compared to untreated control ( $P=0.056$ ).
- A higher proportion of hens receiving CELMANAX from day 1 were noted to have lower *S. enteritidis* counts in the ceca compared to hens fed control or CELMANAX from week 10.
- No difference between treatments on ovarian *Salmonella* colonization was noted.

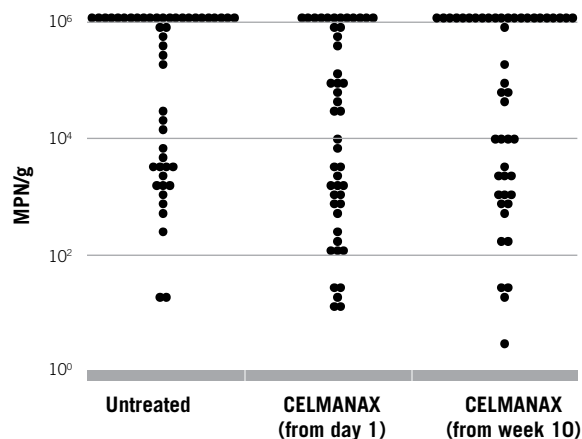
**FIGURE 2**

CELMANAX reduced *Salmonella*  $\log_{10}$  MPN per gram in ceca samples by 1.2 log



**FIGURE 3**

More pullets receiving CELMANAX had lower *Salmonella* MPN per gram in ceca samples



Samples that exceeded the upper limits of the MPN assay were arbitrarily assigned an MPN value of approximately  $1 \times 10^6$  MPN/g for graphical illustration.



**Animal Nutrition**



Based on study conducted by Dr. Hofacre at Southern Poultry Research Inc., Athens, GA

© 2017 Church & Dwight Co., Inc. ARM & HAMMER™, the ARM & HAMMER logo and CELMANAX™ are trademarks of Church & Dwight Co., Inc. CE2779-0417