Research Notes

Arm & Hammer Animal and Food Production

CELMANAX reduces *Campylobacter jejuni* load and prevalence in poultry.

CELMANAX™ is a multicomponent, natural feed supplement containing Refined Functional Carbohydrates™ (RFC™) that has Generally Recognized as Safe (GRAS) status as a feed ingredient.

STUDY OVERVIEW

The objective was to determine the effect of CELMANAX on *Campylobacter jejuni* adhesion to chicken epithelial cells and colonization of broiler and turkey ceca and litter.

Inhibition Study

- An adhesion inhibition assay was performed where CELMANAX and *C. jejuni* were added concurrently for co-incubation with the chicken LMH epithelial cell line and adherent bacterial cells were counted.[1]

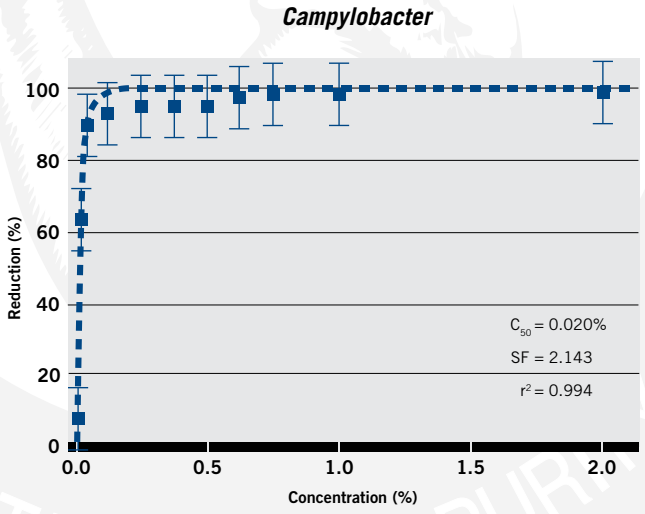
Turkey Study

- For the turkey study,[2] commercial turkey poults, 17 birds/pen with 4 replicate pens/treatment were on trial from day one of age through 16 weeks.
  - Control
  - CELMANAX SCP (0.2 lbs./ton or 100 g/MT)
- Turkeys were transported at weeks 6, 12 and 16 and were exposed to an environmental challenge of *E. coli* to emulate field conditions. Prevalence of *Campylobacter jejuni* in the ceca was measured at 16 weeks of age.

Broiler Studies

- For the two broiler studies,[3,4] Cobb male broiler chicks, 43 (study 1) or 38 (study 2) chicks/pen were randomly assigned to one of two treatment groups fed from day 1-42, to give 10 replicate pens/treatment.
  - Control
  - CELMANAX SCP (0.2 lbs./ton or 100 g/MT)
- *Campylobacter jejuni* prevalence and enumeration in the broiler ceca and prevalence in the litter were measured at day 42.

FIGURE 1: Dose effect of CELMANAX on inhibition.



Data were analyzed statistically, with significance noted at $P<0.05$.

RESULTS

- A direct dose dependent effect of CELMANAX on reduction of adhesion of *Campylobacter* to LMH cells was observed (Fig. 1).

- *Campylobacter jejuni* prevalence in the ceca: A tendency for reduction of *Campylobacter jejuni* prevalence was noted in both the turkey study and the broiler study 1. Turkeys receiving CELMANAX™ had 8% prevalence while control fed turkeys had 33% prevalence of *Campylobacter jejuni* in the ceca (*P*=0.06). Broilers receiving CELMANAX had 83% prevalence compared to 100% in control broilers (*P*=0.08) (Fig. 2).
- *Campylobacter jejuni* enumeration in the ceca: Enumeration was not performed in the turkey study. In the first broiler study, CELMANAX decreased counts of *Campylobacter jejuni* at day 42 (*P*<0.05) by 0.96 $\log_{10}$ cfu g^{-1} in comparison to the control group. In the second broiler study, CELMANAX decreased counts of *Campylobacter jejuni* at day 42 (*P*=0.06) up to 0.85 $\log_{10}$ cfu g^{-1} in comparison to the control group. (Fig. 3).
- *Campylobacter* prevalence in the litter: *Campylobacter* prevalence in the litter in the turkey study was not tested. No significant differences with CELMANAX supplementation were noted for *Campylobacter* in the litter in either broiler study. However, in the first broiler study, recovery of *Campylobacter* from the litter was up to 50% lower when broilers were administered CELMANAX compared to the control treatments (*P*>0.05) (Fig. 4).

CONCLUSION

- CELMANAX supplementation in poultry diets may help reduce prevalence and load of *Campylobacter jejuni* in the ceca of broilers and turkeys.

FIGURE 2: Prevalence of *Campylobacter jejuni* in the ceca at the time of processing.

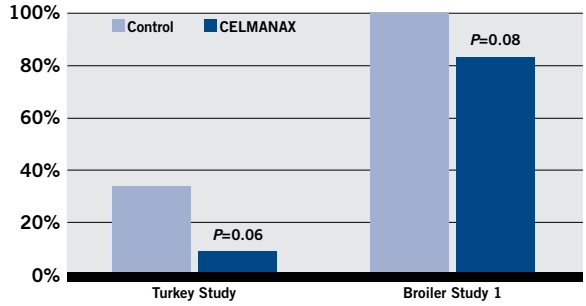


FIGURE 3: Enumeration of *Campylobacter jejuni* in the ceca at day 42.

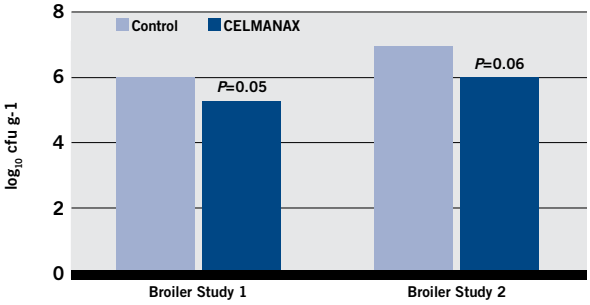
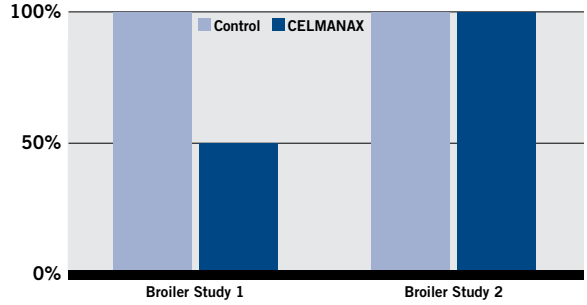


FIGURE 4: Prevalence of *Campylobacter* in the litter on day 42.



To learn more about CELMANAX contact your nutritionist, veterinarian or ARM & HAMMER™ representative or visit AHfoodchain.com.

1 Froebel et. al. 2020 IPSF, Atlanta Abstract #216.
2 Huff et al. *Poultry Science* 2013;92:655–662.
3 Froebel et al. 2018 Poultry Science Association meeting abstract 429P.
4 Froebel et al. 2019 Poultry Science Association meeting abstract 656P.