



# Technical Bulletin

## Information from Phibro Technical Services

### Evaluation of Feeding Cellerate Yeast Solutions<sup>®</sup> to Broilers on Pathogen Load and Bird Health

#### Executive Summary:

- Feeding Culture Classic Plus (CCPlus) reduced fecal concentrations of *Escherichia coli* and *Clostridium perfringens* as well as lowered prevalence rates of *Salmonella* (Figures 1-3)
- CCPlus decreased Day 0 to 42 mortality rate (Figure 4)

#### Background:

Culture Classic Plus is a unique combination of Phibro Animal Health's original yeast culture made from *Saccharomyces cerevisiae* yeast extracts and yeast cell wall developed to help support animal productivity and health. The **Cellerate Yeast Solutions** portfolio of products have been designed to enhance fiber digestion in the rumen, stabilize ruminal pH, and scavenge free oxygen in the rumen to potentially improve milk production and overall gut health in dairy cattle. The addition of mannans and glucans to CCPlus also allows the product to be a primary driver of pathogen immobilization. Oyofu et al. (1989) reported that the mannan portion of the yeast cell wall can bind type-1 fimbriae on certain bacterial species rendering them unavailable to attach to the gastrointestinal tract and cause disease. Bacterial infections are initiated only after microorganisms have first adhered to the host intestinal cell surface. Binding of bacteria prior to adhesion may decrease the pathogen load experienced by the animal and subsequently improve animal performance.

#### Trial Objective:

To determine the effect of feeding CCPlus to broilers on pathogen (*Clostridium perfringens*, *Escherichia coli*, *Salmonella*) load and bird mortality.

#### Materials and Methods:

- Two separate, but similarly designed poultry studies were conducted using CCPlus.
- 1,248 broilers were equally divided into two treatment groups with 12 pens per treatment group.
- Treatments consisted of:
  - 1) Negative control
  - 2) Culture Classic Plus (3 lb/ton starter diet; 2 lb/ton grower/finisher)
- Length of trial: 42 days
- Birds were weighed on day 0, 14, 21, 35, and 42
- Birds were housed on litter obtained from commercial broiler houses that experienced outbreaks of *Clostridium*, *Salmonella*, and *coccidia*. The litter was spiked with additional *Salmonella*, *Clostridia*, and *Eimeria* species.
- Intestinal bacterial concentrations were determined utilizing four broilers/pen on Day 21 and ten broilers/pen on Day 42. *C. perfringens* and *E. coli* concentrations were measured from fecal samples collected directly from the intestines to prevent litter/bedding contamination and converted to log scores per gram of wet feces for interpretation.
- *Salmonella* prevalence rate was evaluated using the USDA methodology by comparing positive vs negative swabs, and calculating the percentage of positive birds via feces collected directly from the intestine.

## Results & Discussion:

Culture Classic Plus had a reduction in log concentration for *C. perfringens* on Day 21 of 15.0% and 11.8% for each trial, respectively (Figure 1). On Day 42 the CCPlus treatment group had a 15.7% and 7.7% reduction in log concentration in *C. perfringens* for each trial, respectively.

Figure 2 depicts the effect Culture Classic Plus has on *E. coli*. On Day 21 there was a 5.2% and 5.0% reduction in log concentration for each trial, respectively. In Trial 2, this reduction was only numerical, but was similar in the reduction observed in Trial 1. On Day 42 the CCPlus treatment group had a 12.2% and 4.8% reduction in log concentration for *E. coli* in each trial, respectively.

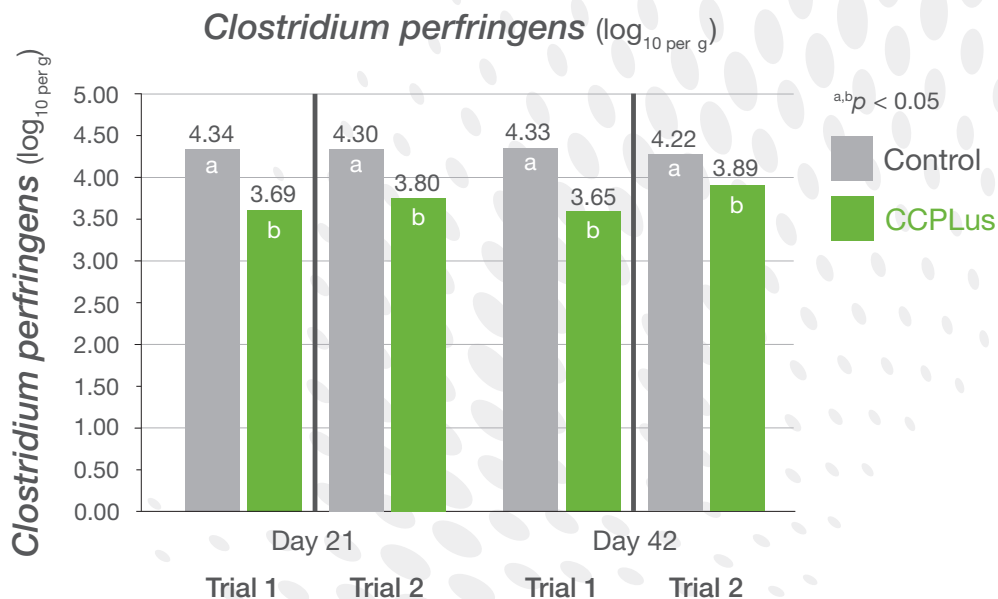
When examining *Salmonella* prevalence rate, the CCPlus treatment group on Day 21, had a 35.4%

and 18.8% percentage unit decrease for each trial, respectively, in *Salmonella* prevalence when compared to the control group (Figure 3). On Day 42 the CCPlus treatment group had a 32.5% and 9.2% decrease in *Salmonella* prevalence for each trial, respectively. Trial 2 results were not statistically different when compared to the control group when using a P-value of 0.05. However, there is a similar trend at Day 21 and 42 when compared to Trial 1 results.

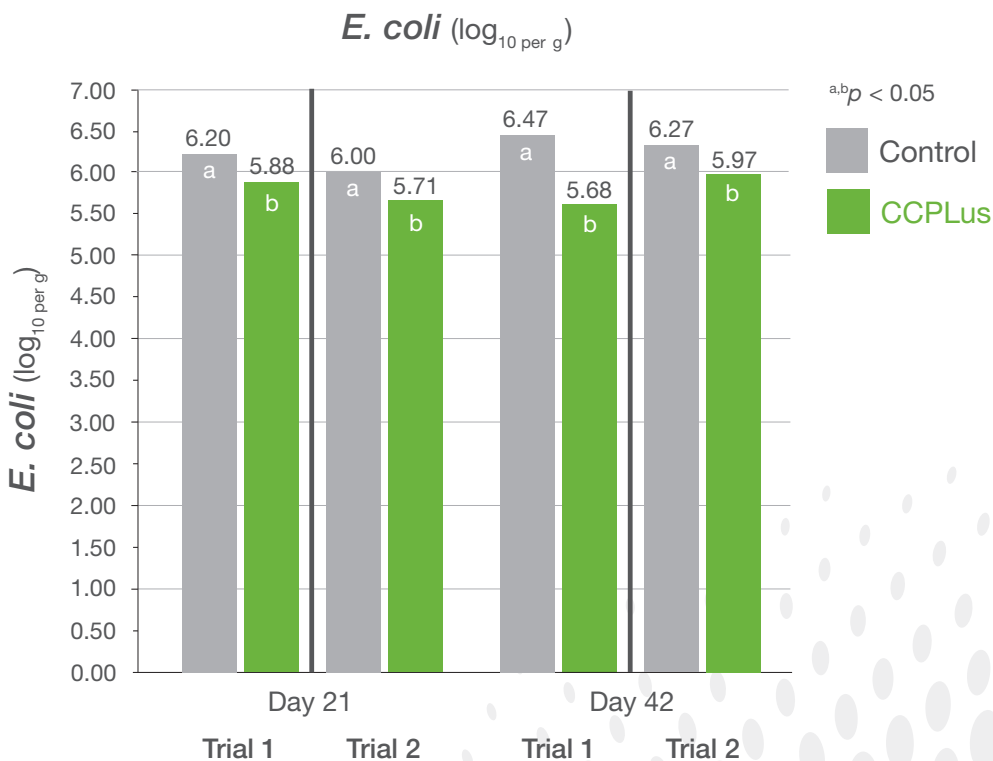
The Day 0 to 42 mortality was decreased by 8.0 and 9.0 percentage units (Figure 4), respectively, when CCPlus was fed. The challenge elicited mortality rates greater than the expected 10% in both control groups for Trial 1 and 2.

In summary, in this study CCPlus reduced fecal concentrations of *C. perfringens* and *E. coli* and lowered infection rates of *Salmonella*, and decreased Day 0 to 42 mortality rate.

Figure 1. Effect of CCPlus on intestinal *C. perfringens* levels in broilers



**Figure 2. Effect of CCPlus on intestinal *E. coli* levels in broilers**



**Figure 3. Effect of CCPlus on intestinal *Salmonella* prevalence in broilers**

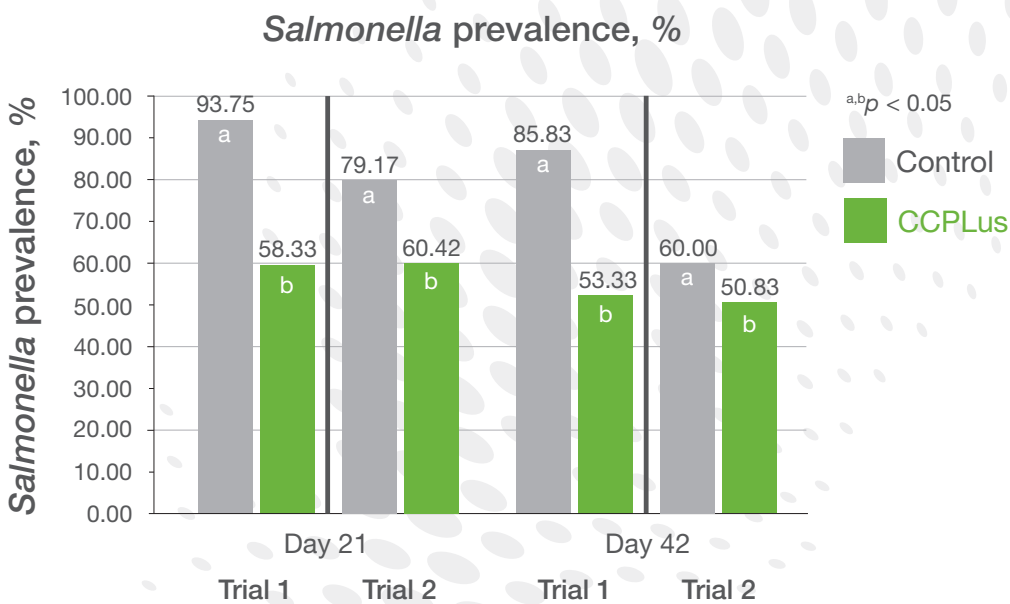
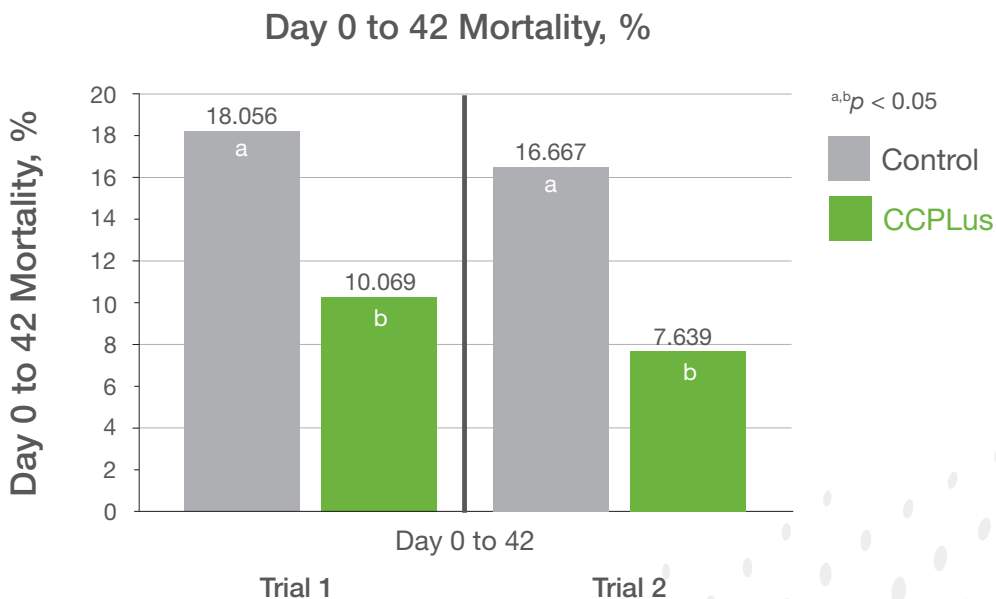


Figure 4. Effect of CCPlus on Day 0 to 42 mortality rate in broilers



Reference:

Oyoyo A.O., DeLoach J.R., Corrier D.E., Norman J.O., Ziprin R.L., and Mollenhauer H.H. 1989. Effect of carbohydrates on Salmonella typhimurium colonisation in broiler chickens. Avian Diseases. 33:531–534.

This information has been prepared for industry technical professionals.