

## **T169 Efficacy of different forms of benzoic acid and butyric acid in broilers subject to *Eimeria* challenge**

***F. Yan, J. Chen, V. Kuttappan, and M. Vazquez Anon***

***Novus International Inc. St. Charles, MO***

Organic acids have been proven to be a valuable tool to maintain growth performance and gut health of broilers raised in AGP free production. However, their efficacy is both type and form dependent. A battery trial was conducted to evaluate the effect of benzoic acid and butyric acid on growth performance and gut health of male broilers subject to *Eimeria* challenge as affected by protection technology. The study consisted of 6 dietary treatments – negative control, free benzoic acid, benzoic acid protected by embedding in fat (AVIMATRIX®, Novus International Inc.), tributyrin, encapsulated calcium butyrate, and free sodium butyrate, each with 12 replicate pens of 8 birds. Rye (10%), canola meal (7.5%) and poultry byproduct meal (3%) were incorporated into a corn soybean meal based nutritionally complete diet in crumbles to provide some mild dietary challenge. All birds were orally gavaged with a coccidiosis vaccine (mixed species of *E. acervulina*, *E. tenella*, & *E. maxima*) at 10x the recommended dose on d 14. Growth performance was determined on d 7, 14, and 19. Ceca content bacteria were quantified by qRT-PCR on d 19, and intestinal morphometry was examined on d 20. Data were subject to one-way ANOVA and means were separated by Fisher's protected LSD test. On d 14, all acid treatments except encapsulated calcium butyrate had better FCR; on d 19, only protected benzoic acid, tributyrin, and free sodium butyrate improved FCR ( $P \leq 0.05$ ). During the 14-19 d challenge phase, protected benzoic acid was more effective than free benzoic acid and encapsulated calcium butyrate in improving FCR. Protected benzoic acid and free sodium butyrate tended to reduce cecal *E. coli*, and protected benzoic acid, free benzoic acid, and tributyrin tended to lower cecal *C. perfringens* ( $P \leq 0.10$ ). Only protected benzoic acid improved jejunal crypt depth to villus ratio suggesting better gut maintenance and growth efficiency ( $P \leq 0.05$ ). In summary, protected benzoic acid was effective in improving growth performance, modifying gut microbiota, and improving gut morphometry of young broilers, and its efficacy was similar to tributyrin, but better than free benzoic acid and encapsulated calcium butyrate in improving morphometry and FCR during the *Eimeria* challenge phase.

**Key words:** benzoic acid, butyric acid, *Eimeria*, broiler