

Micronutrition & Health Solutions Article

Synergistic benefits of postbiotics and essential oils on broiler performance across growth stages

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Feed additives are shown to be an effective part of mitigating various challenges in poultry production and supporting animal health as well as performance. There are several types of feed additives such as phytochemicals, probiotics, prebiotics, postbiotics, etc. that are used in the industry. Each of these feed additives has a specific mode/s of action and can be an effective part of the holistic strategy to support sustainable animal production. However, when used alone, the benefits could vary across different conditions. The more we know about the mode/s of action of these feed additives, the more we realize that just using one type of feed additive might not give us consistent benefits. Understanding the mechanism of action of various feed additives and combining the ones with synergistic benefits can give better value and consistency across different production systems.

Science-based feed additive combination for consistent benefits

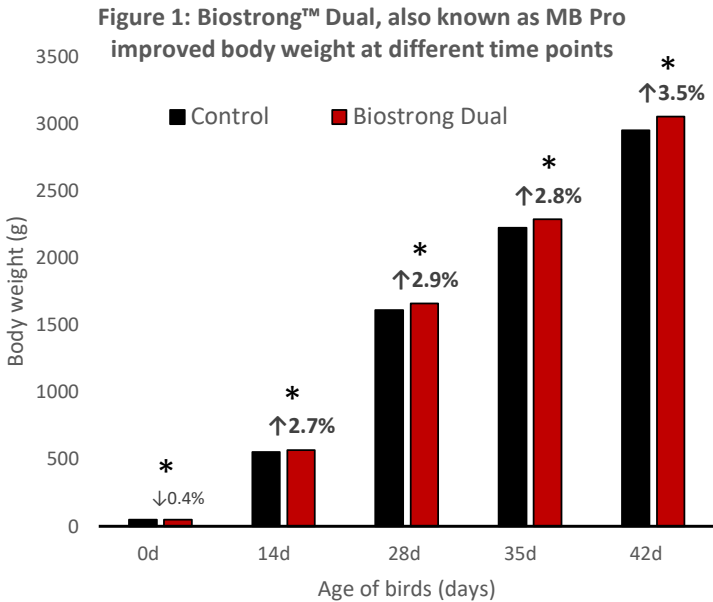
A successful combination of two different platforms of feed additives available for broilers is Biostrong™ Dual, also known as MB Pro. It provides synergistic benefits of a postbiotic, *Saccharomyces cerevisiae* fermentation product (SCFP), and a proprietary blend of essential oil compounds (EOC). Postbiotics are produced from a controlled fermentation process and they typically contain inanimate cells/cell fragments and metabolites that are beneficial to the host. The main modes of action of SCFP are modulating the immune response and supporting the beneficial microbes in the gut. The advantage of using postbiotics over other categories of feed additives is it's a stable mix of ready-to-be-utilized metabolites which can provide consistency in ingredient functionality and animal response. On the other hand, the EOCs are substances that are either of phytochemical origin or produced through synthetic processes. The main modes of action of EOC are they can improve digestive enzymatic activity and help manage undesirable bacteria in the gut. So, combining SCFP and EOC in one product can

have synergistic effects leading to better protection throughout the gastrointestinal tract of the animal.

Biostrong™ Dual is not just any combination of two feed additive platforms. A lot of science-based innovative research efforts, both *in vitro* and *in vivo*, went into the development of the right combination with desirable benefits. After developing the product, the benefits were systematically evaluated under a wide range of conditions, such as controlled research conditions, semi-commercial trials (research pens set up inside commercial chicken houses), and under real commercial conditions. In addition to that, the mode of action of the product was further explored using advanced analytical tools.

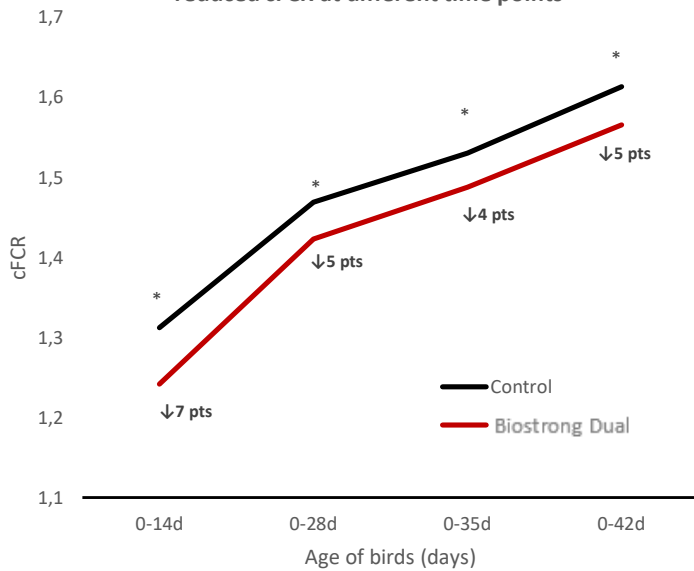
Biostrong™ Dual confers performance benefits to broilers across growth stages

More than 15 independent trials were conducted under three different conditions, controlled research, semi-commercial, and commercial conditions to evaluate the performance benefits of the product. On average across the independent trials, birds fed with Biostrong™ Dual at 0.4kg/MT showed significant improvement in performance with respect to body weight (3.5% improvement), adjusted cumulative feed conversion ratio, cFCR (5 points reduction) and breast meat yield (1.53% increase). Interestingly, dietary inclusion of Biostrong™ Dual improved body weight (Figure 1) and cFCR (Figure 2) throughout the grow-out period with consistent benefits at different ages of the birds.



* indicate significant difference (P<0.05) between the treatments within each age

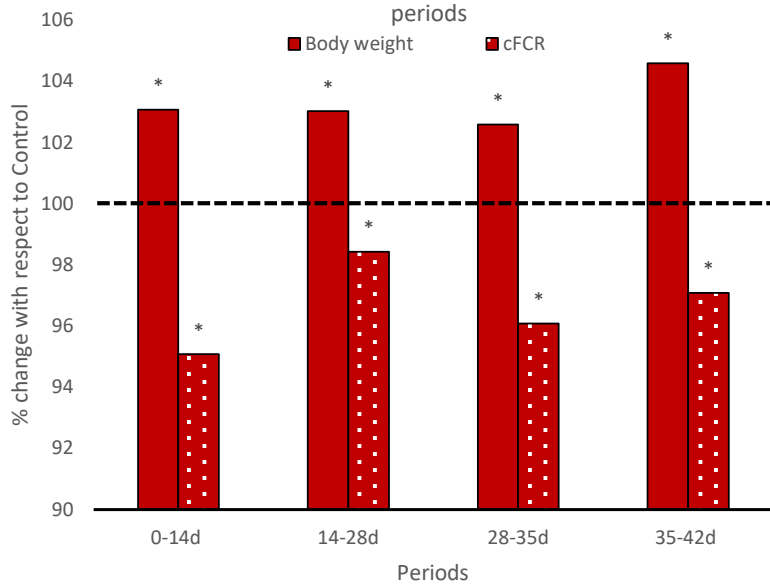
Figure 2: Biostrong Dual , also known as MB Pro reduced cFCR at different time points



* in the graphs indicate significant difference (P<0.05)

In addition to that, the performance within each period was also significantly improved in Biostrong™ Dual-fed birds (Figure 3). Overall, this data clearly shows the benefits of Biostrong™ Dual in supporting the broiler performance during all stages of growth, resulting in birds with higher market weight.

Figure 3: Change in body weight and cFCR for Biostrong™ Dual, also known as MB Pro, during different periods



* in the graph indicates a significant difference (P<0.05) compared to CON
The black dotted line indicates control birds set to 100% for comparison

How is Biostrong™ Dual supporting animal performance?

The microbiome plays a key role in supporting animal performance. In a comparison between the microbiome from birds sampled from well-performing farms and bad farms using an advanced gut microbiome surveillance tool (Galleon™), the data showed that the major difference is coming from microbiome maturation pattern. In good performing birds, the gut microbiome follows a typical pattern with a higher abundance of lactic acid producers in early life, which is replaced by butyrate producers in the later stage. The higher abundance of lactic acid producers (such as *Lactobacillus*) results in increased production of lactic acid which is used by butyrate producers as a substrate to grow in abundance. Once the butyrate producers grow in abundance, the concentration of butyric acid (which is beneficial for improved gut integrity) increases in the gut, making the gut microbiome more resilient to challenges and supports health as well as performance. In addition, the levels of Proteobacteria (such as *E. coli*) were always lower in good performing birds. In short, the key is that the faster we can get to the more resilient gut microbiome, the better it is for improved broiler performance.

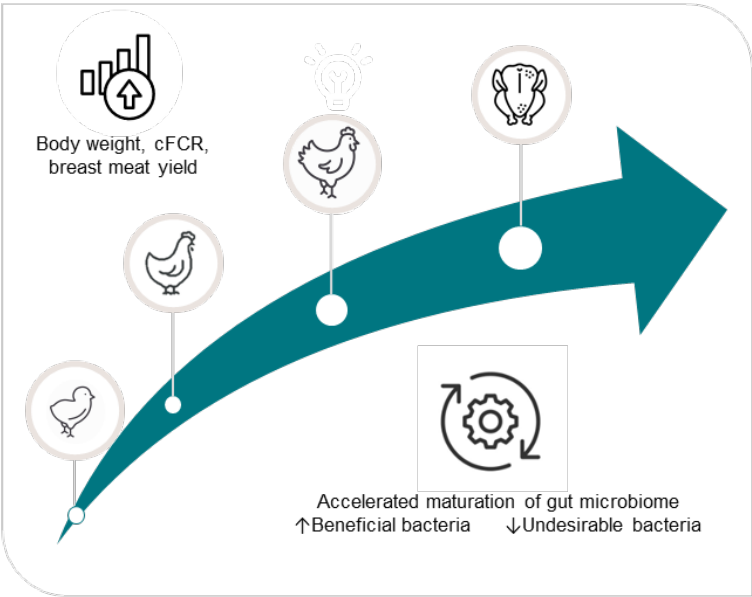
As Galleon™ uses samples collected in a non-invasive (cloacal swabs) way, multiple samples can be collected for different time points from the same bird to track the microbiome maturation pattern. In one of the recent studies, samples were collected from the same set of birds at different time points to follow the microbiome profile. Interestingly, the results showed that at 7d of age, broiler fed Biostrong™ Dual had significantly higher *Lactobacillus* and lower *E. coli* levels compared to the basal diet-fed control birds. In addition to that, the abundance of Lachnospiraceae (butyric acid-producing microbe) was significantly higher in Biostrong™ Dual, birds at 21d of age. Similarly, a meta-analysis across four different previous studies showed Biostrong™ Dual birds had higher Lachnospiraceae along with lower undesirable bacteria such as *Clostridium perfringens* at 21 and 35d of age. The microbiome profile from Biostrong™ Dual birds in that meta-analysis at 21d of age was already closer to that of control birds at 35d indicating the microbiome maturation is faster in those birds. Overall, the pattern in microbiome development seen in Biostrong™ Dual birds follows the typical microbiome maturation pattern seen in good-performing birds at a faster rate compared to control birds. This accelerated maturation of gut microbiome seen with the feeding of Biostrong™ Dual, mainly by supporting the beneficial bacteria (such as *Lactobacillus* and Lachnospiraceae) and managing the undesirable bacteria (such as *E. coli*), could be contributing to performance benefits we observed in birds early on.

Summary

Science-based innovative approaches in finding synergistic combinations of feed additives could help develop products with better efficiency and consistent functionality in broilers. A unique combination of SCFP and EOC, Biostrong™ Dual has shown to be successful in consistently improving broiler performance, cFCR, and breast meat yield in market-age birds. In addition to that, the dietary inclusion of the product helps in supporting broiler performance through the different phases of production such as starter, grower, finisher, and at the

processing plant with improved meat yield (Figure 4). Biostrong™ Dual, a science-based innovative approach in finding synergistic combinations of feed additives, could help develop products with better efficiency and consistent functionality in broilers. A unique combination of SCFP and EOC, Biostrong™ Dual has shown to be successful in consistently improving broiler performance, cFCR, and breast meat yield in market-age birds. In addition to that, the dietary inclusion of the product helps in supporting broiler performance through the different phases of production such as starter, grower, finisher, and at the processing plant with improved meat yield (Figure 4). Biostrong™ Dual has a profound effect on the gut microbiome in broiler birds mainly by accelerating the maturation of the gut microbiome to a resilient population, supporting the growth of beneficial bacteria, and managing undesirable bacteria. Including Biostrong™ Dual in broiler diets can help support improving health as well as performance, and at the same time optimize the feed cost for poultry producers.

Figure 4: Summary of benefits from Biostrong™ Dual in broiler birds



References may be provided upon request.

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