

Technical Bulletin

Information from Phibro Technical Services

The Synergistic Effects of Using a Four Strain Direct-Fed Microbial and Antibiotic Growth Promoters Together in Commercial Broiler Diets

Using direct-fed microbials (DFM) to balance the gut microbiome in broilers has been utilized successfully for many years by producers to help reduce the negative effects of pathogens on growth performance and bird health (Angel *et al.* 2005; McReynolds *et al.* 2009; Lee *et al.* 2010; Dersjant-Li *et al.* 2013; Salim *et al.* 2013; Waititu *et al.* 2014). However, their combination with existing antibiotic growth promoters (AGPs) has raised questions regarding any antagonistic effects that may occur when using such products together. This has arisen from concerns whether antibiotics may affect the viability of live microbes within a given DFM product, which could eliminate any positive benefit it may offer.

MicroLife® Prime DFM is composed of four different species of *Bacillus*, including *Bacillus subtilis*, *Bacillus licheniformis*, *Bacillus amyloliquefaciens*, and *Bacillus coagulans*. Previous research has shown that MicroLife Prime improves broiler growth performance and it is associated with reduced pathogen overgrowth in the gut of broiler chickens. New trials, testing MicroLife Prime efficacy in the presence of in-feed AGPs, have recently been conducted to identify any possible synergies between products.

Trial Design

The trial used Ross 708 mixed sex broilers (50% males and 50% females) and compared 11 treatment groups with 12 replicate pens/treatment, with 52 birds per pen, giving 624 birds per diet treatment. Clean versus used litter were compared to establish a commercial challenge model. The birds were fed from 1-42 days of age, and bacterial isolation was conducted at the end of the trial period. The trial diets compared the clean and commercial conditions, and the latter, with BMD® and Stafac® antibiotics singly or in combination with MicroLife Prime at two inclusion levels.

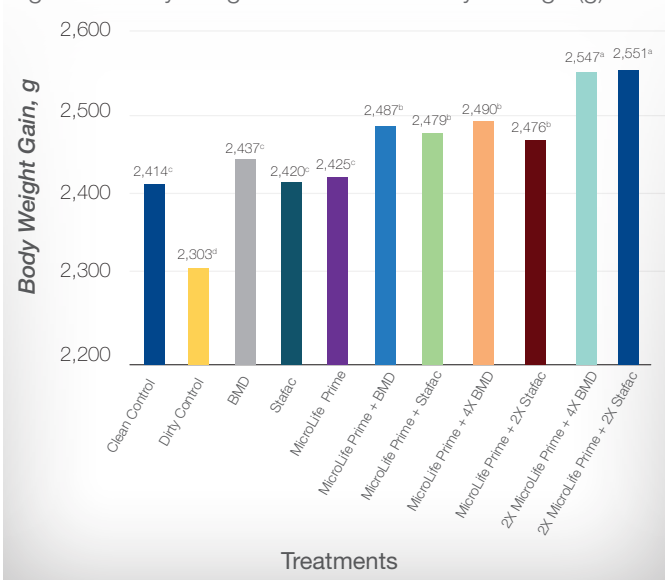
Tx	Dirty/Clean Litter + Additive	MicroLife Prime (g/ton)	BMD (g/ton)	Stafac (g/ton)
1	Clean Litter, No additive	-	-	-
2	Dirty Litter, No additive	-	-	-
3	Dirty Litter, BMD	-	50	-
4	Dirty Litter, Stafac	-	-	20
5	Dirty Litter, MicroLife Prime	113	-	-
6	Dirty Litter, BMD + MicroLife Prime	113	50	-
7	Dirty Litter, Stafac + MicroLife Prime	113	-	20
8	Dirty Litter, 4X BMD + MicroLife Prime	113	200	-
9	Dirty Litter, 2X Stafac + MicroLife Prime	226	-	40
10	Dirty Litter, 4X BMD + 2X MicroLife Prime	226	200	-
11	Dirty Litter, 2X Stafac + 2X MicroLife Prime	226	-	40

Results

The birds housed on used litter had much higher (> 6%) mortality compared to the clean litter and other treatment groups, which were similar with mortality consistently below 2.5% ($P < 0.05$). As expected, when the birds were housed on used litter as the challenge, body weight gain was significantly reduced. When used alone, all three products increased body weight gain from 1-42 d to the same level of significance (Figure 1). However, when combined with MicroLife Prime, both AGP products resulted in higher body weight gain to the same level and significance. When MicroLife Prime levels were doubled, this further increased to weight levels of over 2.5 kg per bird.

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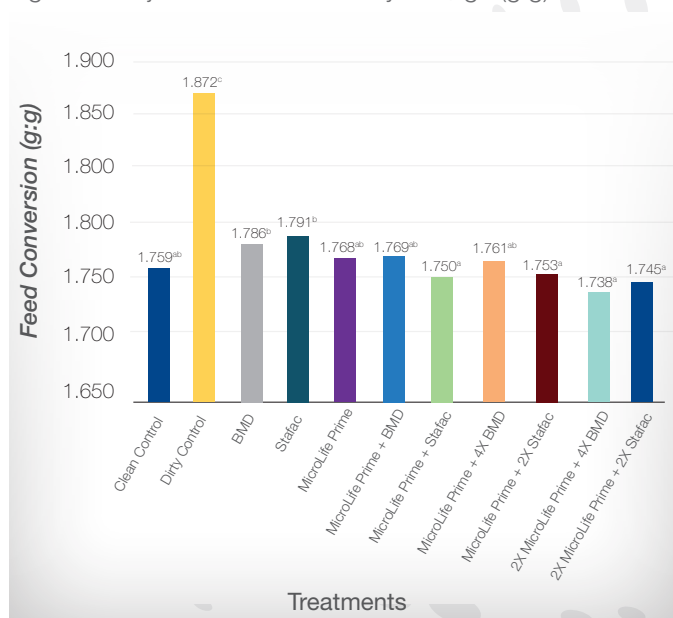
Figure 1: Body Weight Gain for 1-42 Days of Age (g)



^{a-d}Means differ significantly (P < 0.05)
Source: Phibro Data, 2022

Feed conversion ratio (FCR) data reflected this same finding. All treatments which included MicroLife Prime in combination with an AGP showed significantly similar responses in lowering the mortality adjusted FCR (Figure 2).

Figure 2: Adjust FCR for 1-42 Days of Age (g:g)



^{a-d}Means differ significantly (P < 0.05)
Source: Phibro Data, 2022

When the performance data was used to calculate the European Production Efficiency Factor (EPEF) for each treatment, the highest values were seen for the double inclusion rate of MicroLife Prime plus Stafac or BMD (338.6 and 340.9, respectively) treatment groups compared to 266.9 for the challenge control (P < 0.0001).

Conclusion

Using MicroLife Prime in combination with antibiotic growth promoters results in synergistic benefits in terms of growth performance and efficiency of feed conversion. For commercial production, using both MicroLife Prime and an antibiotic is recommended for achieving these beneficial synergistic results in broilers.

References

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