The effect of *Bacillus* sp. in broilers to control *Clostridium perfringens* induced necrotic enteritis

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Introduction

The poultry industry is being challenged to limit or remove antibiotics completely from production methods in response to increasing consumer ABF pressure. The objective was to determine the effectiveness of using the Microlife® L *Bacillus licheniformis* and Microlife® S *Bacillus subtilis* probiotics in feed to reduce negative effects of a toxigenic *C. perfringens* on broiler chickens in a necrotic enteritis (NE) challenge model (Hofacre 1998) compared to bacitracin methylene disalicylate (BMD®) 50g/ton.

Materials & Methods

1,200 day-of-hatch male Ross x Ross chicks were randomly allocated to 4 treatment groups, with 6 replications (n=300). All received vegetarian, non-medicated, non-enzyme commercial-type broiler starter DOT 0-21 (crumbles), grower 21-29, finisher 29-43. Pelleting of rations was 80°C. Treatment groups included*:

1. No Additive
2. Microlife® S *Bacillus subtilis*
3. Microlife® L *Bacillus licheniformis*
4. BMD® 50g/U.S. ton feed

*All *Bacillus* final cfu/g application rate (3E5) ton of feed

All birds received a coccidia challenge from a DOT 0 spray application of commercial coccidia vaccine, Advent®. *C. perfringens* was evenly mixed into the feed on DOT 19, 20, 21 at ~1x108 cfu/ml/bird.

Results

The results showed that Microlife L *B. licheniformis*, improved adjusted feed conversion significantly by 6.6 points (3.7%) compared to No Additive and equal to BMD. NE Lesion Scores for Microlife L were equal to BMD 50g/ton at 0.37 in this pen trial. NE lesion improvement was also evident in a 28 Day Battery Trial entitled Comparative efficacy of DFM's for the control of necrotic enteritis caused by *C. perfringens* in broiler chickens, G. Mathis et al, 2014. Microlife L NE Lesion Scores were significantly lower than BMD, Competitor probiotic, and No Additive in that trial.

Conclusion

In conclusion, both Microlife *Bacillus* probiotics performed well in preventing subclinical NE. By Day 22 Microlife *Bacillus* probiotics were quickly colonizing and preventing negative effects of the bacteria in the re-used litter even before the challenge began. This trend of improved feed efficiency was evident at Day 29 and then became statistically significant by study termination Day 43. Although the differences in feed conversion, body weight and NE Lesion Scores were not significantly improved over BMD, all probiotics did as well or even numerically better than the antibiotic.

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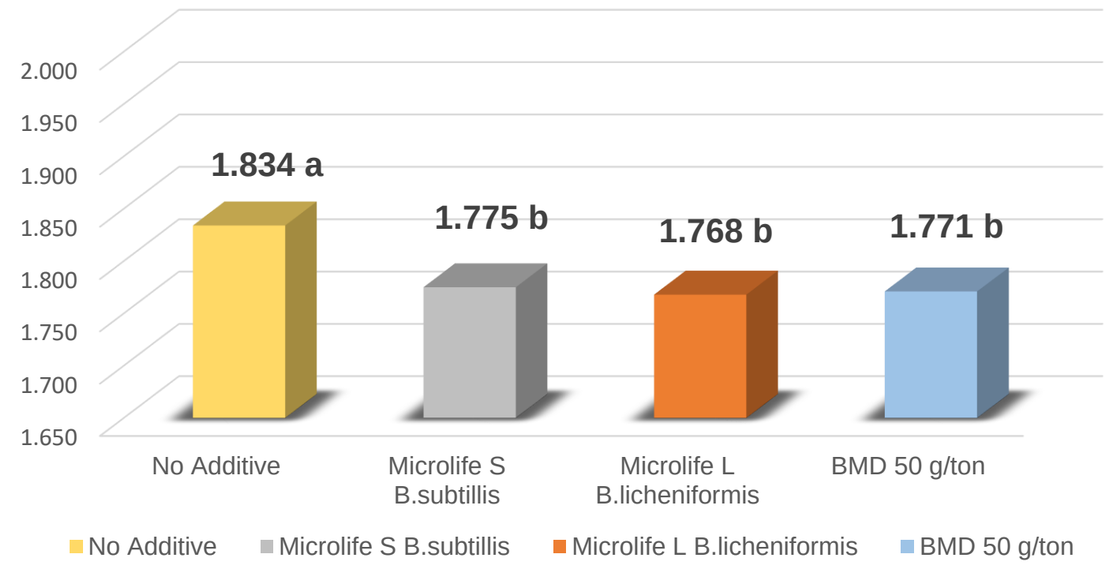
Adjusted Feed Conversion 43 Day Pen Trial

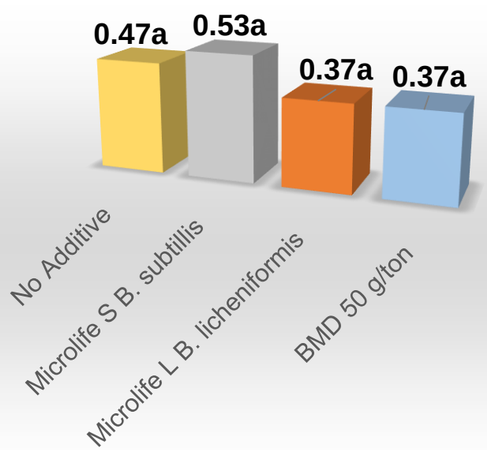
(Figure I)



a,b,c indicate significant ($p < 0.05$) difference between treatments

NE Lesion Score 43 Day Pen Trial

(Figure II)

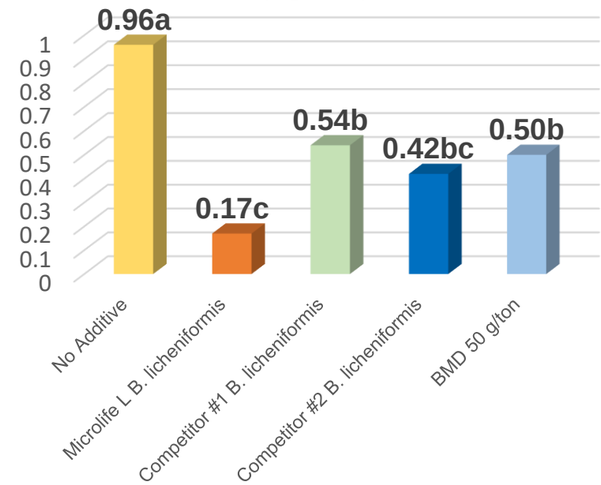


Microlife L NE Lesion Scores equal to BMD® 50g/ton

a,b,c indicate significant ($p < 0.05$) difference between treatments

NE Lesion Score 28 day Battery Trial

(Figure III)



Microlife L Lesion Scores were significantly lower than BMD, Competitor #1 and No Additive

a,b,c indicate significant ($p < 0.05$) difference between treatments