



Technical Bulletin

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The Influence of Magni-Phi® on Coccidial Lesion Scores and Growth Performance of Broilers Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine

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Research trials were conducted to evaluate the effects of Magni-Phi (MP) when combined with anticoccidial programs typically used in No Antibiotics Ever (NAE) production. Coccidial lesion scores, growth performance and mortality were used to measure the effects of feeding Magni-Phi when combined with these different programs.

Methods

Two floor pen trials of identical design were conducted. In addition to a non-medicated control, four anticoccidial programs were tested: nicarbazin (NIC:NIC, 125 ppm in starter feed, 100 ppm in grower feed); nicarbazin:decoquinate (NIC:DEC, 125 ppm NIC in starter, 30 ppm DEC in grower); zoalene (ZOL, 125 ppm in starter and grower feeds) and a live coccidiosis vaccine (VAC, Coccivac® B52). The doses shown above are equivalent to: NIC - 113 and 90 g/US ton; DEC - 27 g/US ton; ZOL - 113 g/US ton. In addition, each of these four programs was evaluated in the presence of Magni-Phi (250 ppm or 0.5 lb/US ton), administered in feed from placement until trial termination.

Anticoccidials were fed from placement until day 28 of the trials. In both tests, completely randomized block designs were employed utilizing 10 blocks in each trial. Fifty-five Ross 708 broilers were assigned to each pen at day-of-hatch and grown until day 42.

All birds in these trials were reared on used, built-up litter. Each pen was also supplemented with 5 kg of litter that was collected from commercial broiler farms in the Delmarva region of the United States. The farms were known to have had consistent production difficulties with coccidiosis; further analysis of this litter indicated that the spores of *Clostridium perfringens* were present. In addition, the sporulated oocysts of *E. acervulina* and *E. maxima* (1×10^5 and 3.5×10^4 per bird, respectively) were added to the litter in each pen. Bafundo et al.¹ contains additional details.

Body weight gain and feed conversion values were determined at 42 days. Final performance is presented in terms of the anticoccidial method applied in starter and grower (each chemical program or vaccine) and whether quillaja-yucca (MP) was administered as part of the feeding program. Bird mortality was evaluated daily but is expressed as percent total mortality from all cases recorded throughout the entire test period (days 0 to 42). Coccidial lesion scores were evaluated in four birds per pen on day 21 using the procedures described by Johnson and Reid². *E. tenella* lesion scores were not severe and showed no differences among treatments. These lesion scores are not included.

Data from the two trials were combined prior to statistical analysis and each data point represents the mean of 20 replications per treatment. Means were separated by Tukey's HSD, where $P < 0.05$ was considered significant.

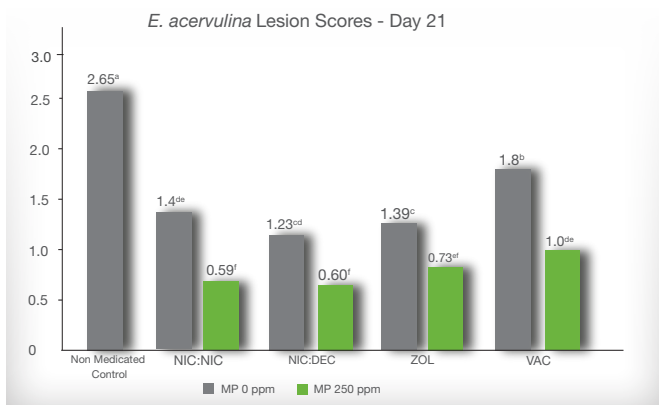
Results

Compared to controls, all chemical anticoccidials and the VAC reduced *E. acervulina* and *E. maxima* lesion scores at day 21 (Figures 1 and 2). At these same intervals, the lesion scores of the VAC program were significantly greater than those of the chemical anticoccidials. *E. acervulina* lesions for the NIC:NIC program were significantly lower than those for ZOL. Other significant differences among the three chemical programs in duodenal or ileal lesions were not observed ($P > 0.05$).

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When MP was added, *E. acervulina* and *E. maxima* lesion scores were reduced by 50%.

Figure 1. *Eimeria acervulina* Lesion Scores (Day 21) for Birds Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine in the Absence and Presence of Magni-Phi^{1,2}



¹Data are the means of two trials in which each treatment was replicated 10 times per trial.

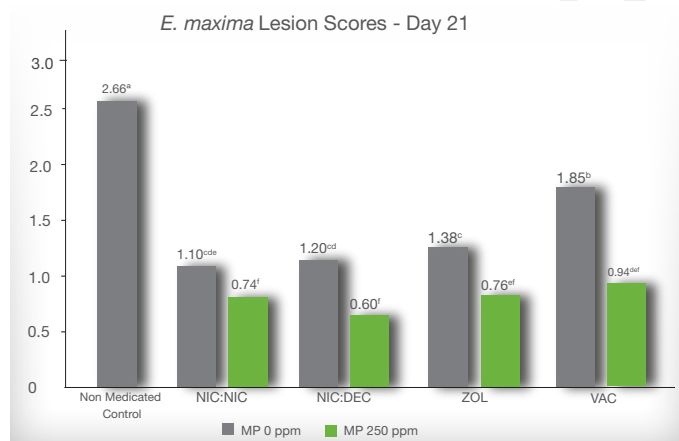
²Anticoccidial treatments were administered in starter and grower feeds only. Programs differing in product or dosage from starter to grower are separated by a colon. Abbreviations:

NIC = nicarbazin; DEC = decoquinate; ZOL = zoalene; VAC = live coccidiosis vaccine.

^{a-f}Means were separated by Tukey's HSD where significance was determined at

$P < 0.05$. Means not sharing a common letter are statistically different.

Figure 2. *Eimeria maxima* Lesion Scores (Day 21) for Birds Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine in the Absence and Presence of Magni-Phi^{1,2}



¹Data are the means of two trials in which each treatment was replicated 10 times per trial.

²Anticoccidial treatments were administered in starter and grower feeds only. Programs differing in product or dosage from starter to grower are separated by a colon. Abbreviations:

NIC = nicarbazin; DEC = decoquinate; ZOL = zoalene; VAC = live coccidiosis vaccine.

^{a-f}Means were separated by Tukey's HSD where significance was determined at $P < 0.05$. Means not sharing a common letter are statistically different.

Since medicated feeds were administered up to day 28 in these tests, differences in final performance (Figures 3 and 4) are largely dependent upon the anticoccidial effects produced by the starter:grower programs and whether MP was included in the feeding program. Thus, of the starter and grower anticoccidial programs fed in the absence of MP, only the NIC:NIC program showed significant improvements versus controls in weight gain. Final feed conversion rate (FCR) values were improved by all chemical programs applied in starter and grower, but birds vaccinated for coccidiosis showed no differences from non-medicated controls. All MP-fed treatments displayed significantly improved final weight gain and FCR compared to controls, but comparisons between each program based on MP feeding showed numerical improvements in final weight and FCR values ($P > 0.05$). Mortality (Figure 5) was significantly reduced by all medicated treatments but not by vaccination; MP fed birds showed reduced mortality of all treatments, with significantly lower mortality occurring when MP was combined with VAC ($P < 0.05$).

Figure 3. Forty-two Day Weight Gain for Birds Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine in the Absence and Presence of Magni-Phi^{1,2}



¹Data are the means of two trials in which each treatment was replicated 10 times per trial.

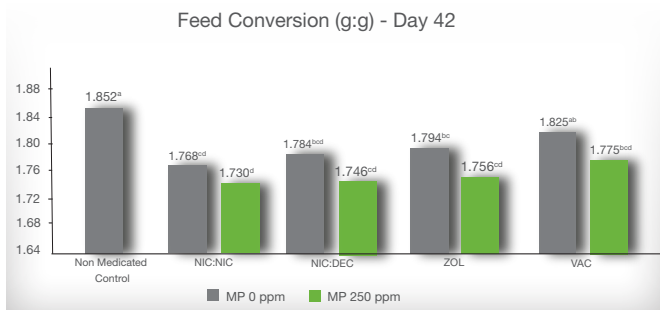
²Anticoccidial treatments were administered in starter and grower feeds only. Programs differing in product or dosage from starter to grower are separated by a colon. Abbreviations:

NIC = nicarbazin; DEC = decoquinate; ZOL = zoalene; VAC = live coccidiosis vaccine.

^{a-e}Means were separated by Tukey's HSD where significance was determined at $P < 0.05$. Means not sharing a common letter are statistically different.

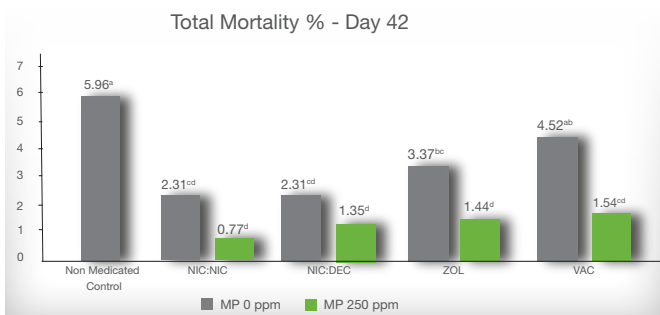
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Figure 4. Forty-two Day Feed Conversion for Birds Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine in the Absence and Presence of Magni-Phi^{1,2}



¹Data are the means of two trials in which each treatment was replicated 10 times per trial.
²Anticoccidial treatments were administered in starter and grower feeds only. Programs differing in product or dosage from starter to grower are separated by a colon. Abbreviations: NIC = nicarbazin; DEC = decoquinate; ZOL = zoalene; VAC = live coccidiosis vaccine. ^{a-d}Means were separated by Tukey's HSD where significance was determined at $P < 0.05$. Means not sharing a common letter are statistically different.

Figure 5. Total Mortality (Day 42) for Birds Administered Chemical Anticoccidials or a Live Coccidiosis Vaccine in the Absence and Presence of Magni-Phi^{1,2}



¹Data are the means of two trials in which each treatment was replicated 10 times per trial.
²Anticoccidial treatments were administered in starter and grower feeds only. Programs differing in product or dosage from starter to grower are separated by a colon. Abbreviations: NIC = nicarbazin; DEC = decoquinate; ZOL = zoalene; VAC = live coccidiosis vaccine. ^{a-d}Means were separated by Tukey's HSD where significance was determined at $P < 0.05$. Means not sharing a common letter are statistically different.

Table 1. Comparative Final Performance and Total Mortality of Control and Anticoccidial Treatments when Arranged and Analyzed by Magni-Phi Administration

| Treatments | Weight Gain (g) | Feed Conversion (g:g) | Percent Mortality |
|---|-------------------|-----------------------|--------------------|
| Non-Medicated Control | 2398 ^c | 1.854 ^a | 5.96 ^a |
| Non-Magni-Phi Treatments | 2503 ^b | 1.793 ^b | 3.13 ^b |
| Magni-Phi Treatments | 2594 ^a | 1.751 ^c | 1.28 ^c |
| Mean Difference Magni-Phi vs. Non-Magni-Phi | 91 [*] | -0.042 [*] | -1.85 [*] |

¹Data represent the means of two trials averaged across the anticoccidial programs administered and arranged according to Magni-Phi feeding: controls, all treatments without Magni-Phi, and all treatments containing Magni-Phi. Data presented are the means of 20, 80 and 80 replications, respectively.
^{a-c}Means were separated using Tukey's HSD where significance was established at $P < 0.05$. Within columns, means not sharing a common letter are statistically different. ^{*}Mean differences between combined Magni-Phi and non-Magni-Phi treatments were significant ($P = 0.01$).

Conclusions

Use of chemically synthesized anticoccidials reduced coccidial lesions scores and improved growth performance compared to controls. However, a live coccidiosis vaccine was not as effective in reducing lesions or improving growth performance as these chemicals. Feeding Magni-Phi improved intestinal health, which in turn led to significantly reduced coccidial lesion scores and provided improvements in body weight, feed conversion and mortality for each program tested. These responses show an additive effect when Magni-Phi is used in combination with chemical anticoccidials. We have also seen similar responses when the product is used with ionophores. Magni-Phi can be used in antibiotic-free (NAE) and conventional production systems.

References

- ¹Bafundo, K. W., I. Duerr, J. McNaughton, and L. Gomez. 2022. The influence of a quillaja and yucca combination on growth performance and lesion scores of broilers administered chemical anticoccidials or a live coccidiosis vaccine. *Int. J. Poult. Sci.* 21: 50-56. DOI:10.3923/ijps2022.50.56.
- ²Johnson, J. and W. M. Reid. 1970. Anticoccidial drugs: Lesion scoring techniques in battery and floor pen experiments with chickens. *Exp. Parasitol.* 28: 30-36.