

Effects of Magni-Phi® in Floor Pen- and Commercially-Reared Turkeys

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Introduction

Saponins are natural products of plant origin that are known to exhibit activity against a number of important protozoan parasites of domestic animals and of man. Previous work (1, 2, 3) has shown that saponins display activity against *Plasmodium*, *Giardia*, *Leishmania* and a variety of ciliated protozoal species.

Magni-Phi® nutritional specialty product from Phibro Animal Health Corporation contains saponins mainly sourced from the quillaja tree. Recently, Bafundo et al. (4) demonstrated that the saponins contained in **Magni-Phi** also inhibit the development of *Eimeria spp.* in the chicken. This research demonstrated that at an inclusion of 250 ppm in feed, **Magni-Phi** reduced oocyst production of the three major species of chicken coccidia by 40 to 50 percent. Concurrent with these changes in coccidial development were improvements in bird performance.

In addition to studies previously conducted, Bafundo et al. (4) also reported additive anticoccidial responses in broilers when **Magni-Phi** was fed with salinomycin. Thus, combinations of **Magni-Phi** and salinomycin reduced oocyst production and improved bird performance compared to either treatment alone. The purpose of the current work was to demonstrate the anticoccidial effects of **Magni-Phi** in the turkey and to establish whether additive responses would be produced when administered in combination with ionophore medication. Both floor pen and commercial trials were used to determine these effects.

Materials and Methods

Floor Pen Trials

Two floor pen studies were carried out with Hybrid cross turkey hens in order to evaluate the effects of **Magni-Phi** when fed with the ionophores monensin (68 ppm) or lasalocid (75 ppm). In each test, four treatments, arranged in a 2 x 2 factorial design, were used; each was replicated 8 times in a randomized complete block. In both studies, coccidial challenge was provided by contaminated litter from Day 0. Litter was known to contain oocysts of *Eimeria meleagritidis*, *E. adenoeides* and *E. gallopavonis*. Variables measured were performance at day 42 and oocyst production on 14, 21 and 28 d.

All data were analyzed by ANOVA procedures. Treatment differences were determined at $P < 0.05$.

Commercial Trials

In addition to these pen studies, three commercial trials were carried out over a two-year period, each utilizing Nicholas tom turkeys that were reared to 141 days of age. In order to evaluate the effects of **Magni-Phi** when fed with ionophores, monensin (68 ppm) or lasalocid (75 ppm) were fed alone or in combination with **Magni-Phi**. Each ionophore was administered to 12 weeks of age, while **Magni-Phi** was fed for the duration of each test. All other nutritional parameters and any supplements used were consistent throughout the entire trial period such that **Magni-Phi** was the only difference between the two treatments. All birds received **Magni-Phi** (500 ppm) from placement to week 10 and 250 ppm from week 11 to trial termination. In each test, 35,000 birds per treatment were used; pooled trial results were based on over 105,000 toms per treatment. Consistent with commercial rearing conditions, the standard anticoccidial rotation was scheduled in the middle of the first trial. As a result, monensin was administered for the first 10 weeks and lasalocid for the remainder of the growth period. Lasalocid (75 ppm) and monensin (68 ppm) were used in trials 2 and 3, respectively.

Results

Results of Floor Pen Trial 1 are shown in Table 1. At day 21, both **Magni-Phi** and monensin significantly reduced oocysts per gram (OPG) compared to the non-medicated control but monensin provided a greater reduction in OPG than **Magni-Phi** alone during the same period. While not significantly different from monensin alone, the two products together further reduced oocysts produced at 21 days. At 42 days, **Magni-Phi** alone significantly improved body weight and feed conversion compared to the non-medicated treatment. While no statistical differences in feed conversion were observed among the treatments receiving **Magni-Phi**, monensin or both products, body weight gain was greatest for birds concurrently fed **Magni-Phi** and monensin ($P < 0.05$). The combination of **Magni-Phi** and monensin produced additive effects in body weight gain.

Table 2 presents the results of pen trial 2 and illustrates that at 14 d both **Magni-Phi** and lasalocid significantly reduced OPG compared to controls. Similar trends were seen at day 21, although significant reductions were not observed. Fewest oocysts produced occurred when both lasalocid and **Magni-Phi** were fed together; additivity of these effects was also evident in these data. Adjusted feed conversion was significantly improved by both **Magni-Phi** and lasalocid individually, with the combination of the two products together providing further significant reductions in this variable.

Results of the commercial trials are presented in Table 3 and illustrate that **Magni-Phi** improved both final body weight and adjusted feed conversion in each situation where it was fed. Pooled trial results indicated that birds fed **Magni-Phi** gained more than 0.6 lbs. of weight per bird and had substantially improved feed conversions (7 points improvement) compared to birds fed the standard feeding program without **Magni-Phi**.

Discussion

As in previous work with broiler chickens, the floor pen data presented herein illustrates that **Magni-Phi** exerts additive anticoccidial effects in turkeys. Consistent with previous results (4), OPG were significantly reduced by using **Magni-Phi** alone and were diminished further when combined with an ionophore. Concurrent with these effects were significant improvements in body weights and/or feed conversions. The effects of simultaneous feeding of **Magni-Phi** and the ionophores were additive.

In further support of these effects, three large commercial trials involving more than 105,000 tom turkeys per treatment produced responses similar to those described above. Because **Magni-Phi** improved final body weights and feed conversion in each of the trials, these results indicate that **Magni-Phi** can be applied successfully in turkey production for improved performance.

Table 1. Day 21 total oocysts per gram of feces (OPG) and 42-day performance for tom turkeys fed monensin and **Magni-Phi**, both alone and in combination.

	Day 21 OPG x 10 ^{3*}	aFCR (d 42) g:g	BWG (d 42) kg
Non-Medicated	12.4 ^a	1.793 ^a	1.547 ^c
Magni-Phi 250 ppm	7.3 ^b	1.731 ^b	1.616 ^b
Monensin 68 ppm	3.4 ^c	1.707 ^b	1.614 ^{bc}
Magni-Phi + Monensin	2.1 ^c	1.689 ^b	1.691 ^a

*For simplicity, OPG are reported using scientific notation, where each value must be multiplied by 1,000 to attain actual OPG figures recorded.

^{a,b,c} Results with different superscripts significantly differ ($P < 0.05$).

Table 2. Day 14 and 21 oocysts per gram of feces (OPG) and 42-day adjusted feed conversion for tom turkeys fed lasalocid and *Magni-Phi*, both alone and in combination.

	OPG x 10 ³ at 14 d*	OPG x 10 ³ at 21 d*	aFCR (d 42) g:g
Non-Medicated	40.9 ^a	17.4 ^a	1.793 ^a
<i>Magni-Phi</i> 250 ppm	24.9 ^b	12.7 ^{ab}	1.731 ^b
Lasalocid 75 ppm	13.8 ^{bc}	8.9 ^{ab}	1.707 ^c
<i>Magni-Phi</i> + Lasalocid	9.7 ^c	6.6 ^b	1.689 ^d

*For simplicity, OPG are reported using scientific notation, where each value must be multiplied by 1,000 to attain actual OPG figures recorded.

^{a,b,c,d} Results with different superscripts significantly differ ($P < 0.05$).

Table 3. Adjusted feed conversion and final body weights of commercially reared tom turkeys fed for 141 days in three field trials. Standard commercial diets* with and without *Magni-Phi* were tested.

Trial Number	Adjusted Feed Conversion g:g		Body Weight Gain (lbs.)	
	Standard Program	Standard + <i>Magni-Phi</i>	Standard Program	Standard + <i>Magni-Phi</i>
1	2.364	2.324	44.69	44.80
2	2.285	2.196	46.93	48.20
3	2.330	2.240	44.69	45.28
Mean	2.326	2.253	45.44	46.09

*Each field trial was conducted in the presence of an anticoccidial ionophore that was provided from placement to 12 weeks of age. See Materials and Methods for products and dosages utilized. Approximately 105,000 birds per treatment.

References

- (1) Mandal, D., N. Panda, S. Kumar, S. Banjeree, N. Mandal, and N. Sahu. A triterpenoid saponin possessing antileishmanial activity from the leaves of *Careya arborea*. *Phytochemistry* 67:183-190. 2006.
- (2) McAllister, T., C. Annett, C. Cockwill, M. Olson, Y. Wang and P. Cheeke. Studies on the use of *Yucca schidigera* to control giardiasis. *Vet. Parasitol.* 97:85-99. 2001.
- (3) Sparg, S., M. Light and J. van Staden. Biological activities and distribution of plant saponins. *J. Ethnopharmacology* 94:219-243. 2004.
- (4) Bafundo, K.W., G.F. Mathis and B. Lumpkins. The effects of Nutrafito Plus and virginiamycin on the performance and anticoccidial responses of broilers vaccinated for coccidiosis. *Poultry Sci.* 93:(E-Suppl. 1) p. 41. 2014.

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