



Salinomycin and Coccivac®-B: Impact on Immunity, Weight Gain and Feed Conversion Ratio

The U.S. broiler industry has successfully used low and intermediate levels of salinomycin to control coccidiosis for several years. The reduced level ionophore program depends on incomplete control of the coccidial parasite, and development of flock immunity via “leakage” exposure to the wild coccidial population.

However, there are two problems that occur with this salinomycin program that can erode performance: wild coccidial populations become less sensitive to the ionophore with prolonged use, and peak leakage and immunity development occur after 28 days

of age, during the steepest part of the broiler growth curve. Long-term use of reduced-level salinomycin has permitted a slow erosion of performance at many integrators.

A recent study conducted by Dr. Steve Davis at Colorado Quality Research examined the impact of two intermediate-level salinomycin feeding programs on immunity induced by Coccivac®-B and the performance outcome with the two salinomycin programs compared to Coccivac-B alone.

Salinomycin was fed at 50 g/ton from day 17 to 28 or from day 29 to 42 to male broilers vaccinated with Coccivac-B at one day of age. The test groups were designed to examine salinomycin fed in representative grower feed (day 17 to 28) vs. finisher feed (day 29 to 42).

Immunity against coccidiosis was evaluated by challenge at 36 days of age, and the performance, determined by weight gain and feed conversion ratio, was evaluated at 35, 42 and 47 days of age. The salinomycin + Coccivac-B programs were compared to the use of Coccivac-B alone.

Key Points

- Salinomycin administered at 50 g/ton from day 17 to 28 or from day 29 to 42 had little or no negative impact on coccidiosis immunity following vaccination with Coccivac®-B.
- Feed conversion ratios at 35, 42 and 47-days of age were significantly better in Coccivac-B vaccinates fed salinomycin (50 g/ton) from day 17 to 28 than for Coccivac-B alone.
- All Coccivac-B-vaccinated groups, with or without salinomycin added to the feed, demonstrated excellent weight gain after challenge.

Study Design

The study was designed in two parts: an immunity/challenge study and a performance study.

Six hundred male Cobb x Cobb 500 broiler chicks were vaccinated with Coccivac-B at one day of age and housed in 30 randomized floor pens. At 5 days of age, pens were adjusted to 18 birds per pen to account for

Table 1: Treatment group summary

Group	Treatment	Level	No. Birds Per Pen	No. Pens or Cages	Total
1	Unvaccinated, negative control	N/A	N/A	10 (day 35)	40
2	Coccivac-B only	N/A	18	10	180
3	Coccivac-B + salinomycin 17–28 days	50 g/t	18	10	180
4	Coccivac-B + salinomycin 29–42 days	50 g/t	18	10	180

early mortality. An additional 40 unvaccinated control birds were housed in battery cages.

The pens were divided into groups of 10, representing 180 birds for each treatment (Table 1).

At 35 days of age, four birds from each pen, or 40 birds per treatment group, were removed, individually weighed and placed in Petersime cages with non-medicated feed for the challenge study. The remaining birds continued in pens on their assigned feeding program. Weights and feed conversions were measured at days 35, 42 and 47.

were challenged with a 15X oral dose of Coccivac-B, while the remaining 20 birds received 1 ml of distilled water. At 7 days post-challenge, all birds were individually weighed, sacrificed and intestinal lesions scored by gross (Johnson and Reid) and microscopic scoring systems.

Microscopic lesion scores were slightly higher than gross lesion scores, and are summarized in Figure 1.

Weights as a percentage of unchallenged control weight are summarized in Table 2.

Immunity Challenge Study

On day 36, 20 birds per treatment group

Immunity Challenge Study Conclusions

Coccivac-B demonstrated excellent protection against challenge. Birds fed salinomycin

Figure 1

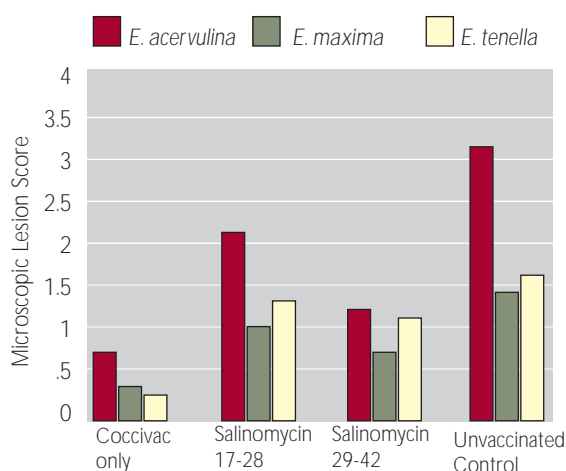


Figure 1: Microscopic lesion scores in birds challenged at 36 days of age

Microscopic Lesion Scoring System

Microscopic scores (average oocyst count of 4-5 microscopic fields)

<i>E. maxima</i>	<i>E. acervulina</i> and <i>E. tenella</i>
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1 = 1–10	1 = 1–20
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2 = 11–20	2 = 21–40
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3 = 21–40	3 = 41–80
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4 = TNTC	4 = TNTC
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Treatment Group	Non-Vaccinated Non-Medicated	Coccivac-B Only	Salinomycin* Day 17-28 + Coccivac-B	Salinomycin* Day 29-42 + Coccivac-B
Not challenged	0.644	0.634	0.582	0.634
Challenged	0.360	0.603	0.566	0.689
% of not challenged weight	55%	95%	97%	108%

¹ Mean weight gain per bird (kg).

* 50 g/ton.

Table 2: Weights of challenged vs. not challenged treatment groups from day 35 to day 43¹

from day 17 to 28 developed slightly greater lesions in response to challenge. Likewise, the birds fed salinomycin from day 29 to 42 had slightly greater lesion scores in response to challenge. All Coccivac-B vaccinates, however, demonstrated lower lesion scores post-challenge than did the unvaccinated controls.

More importantly, these low-level lesion scores did not appear to affect weight gain following challenge. All Coccivac-B vaccinated groups, with or without salinomycin added to the feed, demonstrated excellent weight gain after challenge. Based upon this performance parameter, all of the Coccivac-B vaccinated groups developed protective immunity to the coccidial challenge.

Performance Evaluation

Weight and feed conversion ratios were examined at days 35, 42 and 47. The parameters were compared for Coccivac-B only,

Coccivac-B + salinomycin 50 g/ton from day 17 to 28 and Coccivac-B + salinomycin 50 g/ton from day 29 to 42. A summary of the findings are listed in Table 3 and Figures 2 and 3.

Conclusion and Discussion

Under the conditions of this trial, intermediate-level salinomycin administered in the grower feed from 17 to 28 days resulted in improved feed conversion performance while still allowing substantial development of immunity in Coccivac-B vaccinates.

When reduced salinomycin sensitivity erodes performance, Coccivac-B may be used to seed the premises with sensitive strains. Reduced-level salinomycin in the grower feed, used in conjunction with day-of-age Coccivac-B, may enhance feed conversion ratios, making this a practical program for light-weight birds that have little time for post-vaccination compensatory gain.

Treatment	Day 35		Day 42		Day 47	
	Weight (kg)	FCR	Weight (kg)	FCR	Weight (kg)	FCR
Coccivac-B Only	1.73 ^a	1.58 ^a	2.36 ^a	1.65 ^a	2.80 ^a	1.71 ^a
Salinomycin Day 17–28 + Coccivac-B	1.83 ^b	1.53 ^b	2.45 ^a	1.62 ^b	2.86 ^a	1.68 ^b
Salinomycin Day 29–42 + Coccivac-B	1.79 ^{a,b}	1.56 ^a	2.44 ^a	1.63 ^{a,b}	2.90 ^a	1.69 ^{a,b}

Different superscripts indicate significantly different results.

Table 3: Coccivac-B only vs. Coccivac-B + salinomycin performance parameters

Figure 2: Coccivac-B only vs. Coccivac-B + salinomycin 50 g/t weight comparison

Figure 2

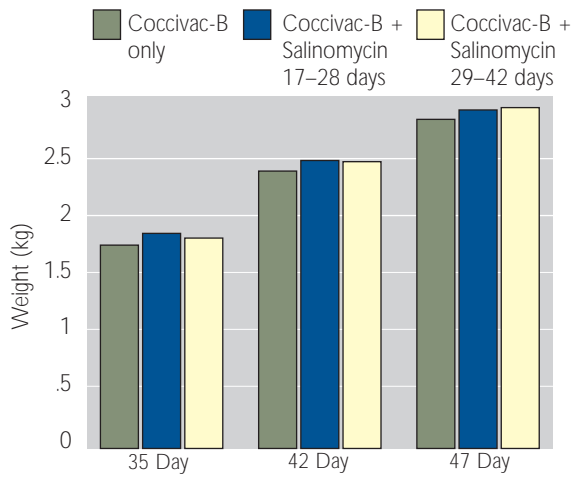


Figure 3: Coccivac-B only vs. Coccivac-B + salinomycin 50 g/t feed conversion ratio comparison

Figure 3

