



## Coccivac®-B: Field Coccidial Population Changes Following Vaccination

### Part 1: Laboratory Sensitivity Studies

**D**r. David Chapman (University of Arkansas)<sup>1</sup> and Dr. Harry Danforth (USDA-ARS Beltsville, MD)<sup>2</sup> have demonstrated that vaccination with Coccivac-B vaccine can modify the field population of coccidial oocysts with respect to anticoccidial sensitivity.

Recent studies by Dr. Danforth indicate that the field population may also change

with respect to composition, including strains of *Eimeria* present in the litter and the aggressiveness (ability to cause intestinal damage) of those strains.

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#### Isolation of *E. tenella* before and after vaccination with Coccivac-B Vaccine

Dr. Harry Danforth (USDA ARS, Beltsville, MD) isolated an aggressive *E. tenella* and a moderately pathogenic *E. maxima* from litter samples collected from a farm at a large broiler integrator. After samples were collected, a new flock was vaccinated with Coccivac-B vaccine and placed in the same house. New litter samples were collected at the end of the growout from the same house.

The mixed oocyst population from each sample was isolated and used to challenge 10-day-old SPF test birds fed non-medicated or salinomycin-medicated feed. At 6 days post challenge, the birds were weighed, and intestinal lesions were recorded. Results are summarized in Table 1.

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### Key Points

- The aggressive *E. tenella* found on a farm before vaccination with Coccivac-B vaccine was absent from litter samples collected after vaccination.
- The pathogenicity of the *E. maxima* population appeared to decline, and the sensitivity to salinomycin appeared to improve following vaccination, based upon middle intestine lesion scores.
- The upper intestinal lesion scores also indicate improved salinomycin sensitivity post-vaccination.
- Coccivac-B vaccine via spray cabinet can be used as a tool to change the composition of the field coccidial population.

**Table 1**  
**Weight Gain and Intestinal Lesion Scores Following Challenge with Oocysts Isolated from a Farm Before and after Vaccination with Coccivac-B Vaccine**

Litter sample	Treatment	Avg. Weight Gain (gm)	Upper intestine lesion score	Middle intestine lesion score	Cecal lesion score
Before Coccivac-B	Non Medicated	118.52 <sup>D</sup>	1.759 <sup>A</sup>	1.310 <sup>A</sup>	3.138 <sup>A</sup>
Before Coccivac-B	Salinomycin	1665.43 <sup>C</sup>	0.867 <sup>B</sup>	1.467 <sup>A</sup>	3.000 <sup>A</sup>
<b>After Coccivac-B</b>	Non Medicated	155.47 <sup>c</sup>	1.730 <sup>a</sup>	0.770 <sup>b</sup>	0.000 <sup>1</sup>
<b>After Coccivac-B</b>	Salinomycin	229.66 <sup>a</sup>	0.380 <sup>bc</sup>	0.007 <sup>c</sup>	0.000 <sup>1</sup>

<sup>A</sup> Superscripts in capital letters indicate statistically significant difference at the .05 level in test #1

<sup>a</sup> Superscripts in lower case letters indicate statistically significant difference at the .05 level in test #2.

<sup>1</sup> No *E. tenella* was able to be isolated from the post-vaccination litter samples, therefore there was no *E. tenella* challenge.

## Discussion

The *E. tenella* before Coccivac-B vaccine vaccination was quite aggressive, creating lesion scores of 3.0 or greater, even in salinomycin-medicated birds. It should be noted that under field conditions, this complex must routinely use 3-nitro to augment the ability of ionophore coccidiostats to control *E. tenella*.

Following vaccination with Coccivac-B vaccine, the aggressive *E. tenella* population had virtually disappeared.

Similarly, improvements in the salinomycin-medicated lesion scores after Coccivac-B vaccine vaccination were noted in the middle and upper intestine, indicating an impact of vaccination on the populations of *E. maxima* and *E. acervulina*, respectively. Each of these species demonstrated improved sensitivity to salinomycin post-vaccination.

These studies demonstrate that vaccination with Coccivac-B vaccine can be used as a tool to displace aggressive field *Eimeria* populations and to improve the sensitivity of the field oocyst population to ionophore anticoccidials.

<sup>1</sup> Chapman, H.D. 1994. Sensitivity of Field Isolates of *Eimeria* Monensin Following the Use of a Coccidiosis Vaccine in Broiler Chickens. Poultry Science 73:476-478.

<sup>2</sup> Danforth, H.D., Shirley, M. 2000. Use of Polymerase Chain Reaction-Based Techniques to Identify Avian Coccidia. AAAP Symposium on Molecular Identification and Epidemiology of Avian Pathogens, 137th AVMA Convention, Salt Lake City, UT, pp 21-22.

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