

EnteroBac™

A Multifaceted Intestinal Health Approach



All-Natural Feed Additive | Promotes Intestinal Health | High-Cocci Challenge

Your Questions Answered

- No other additional natural feed-additive products should be necessary with EnteroBac.
- EnteroBac may be used from day-1 without the use of additional anticoccidials.
- EnteroBac can be used in segmented rations in conjunction with a coccidiosis vaccination program (i.e. Bio-shuttle).
- The inclusion rate of EnteroBac is 2-3 lb/ton feed.

QTI™

ANIMAL HEALTH & NUTRITION

Background

Coccidiosis in poultry refers to a disease in which a bird's intestinal tract is damaged by protozoan parasites called coccidia. The disease can have a high mortality rate in young birds and death usually occurs within a week of first seeing symptoms. Even if a young bird survives, permanent intestinal tissue damage often occurs reducing the birds subsequent performance. In commercial poultry operations, coccidian are prolific and extremely difficult to eliminate in the house environment. They have a large reproduction potential and just a few oocysts will re-infect a clean house. Most often it spreads into a flock through contact with the infected feces or contaminated drinking water. It normally manifests itself as diarrhea, bloody droppings, ruffled feathers, poor appetite and lethargy and results in a reduced ability to properly absorb dietary nutrients. The difference between a healthy flock and a flock that's suffering with coccidiosis?

- The number of oocysts eaten: coccidia survive best in warm, wet and dirty conditions.
- The strain of coccidia: Some strains cause more intestinal damage than others and affect different sections of the GI tract.
- The flock age and health status: Birds develop immunity to coccidia as they age. Young birds are most susceptible. As birds age and are exposed to low levels of the parasite over time, they develop a natural immunity and will become asymptomatic when they come into contact with coccidia, but older birds with poor immune systems or who are stressed or otherwise unhealthy are also vulnerable.

How to Prevent Coccidiosis:

Since the immune system is centered in the intestine, a strong, healthy intestinal system supporting the immune system is the best defense against coccidiosis.

Since immunity develops rapidly, good management focuses on reducing the number of coccidia to keep infection at a low level until immunity is established. Hygiene, anticoccidial treatments and live cocci vaccines all play major roles. The goal is to facilitate low-level exposure to the coccidia over the first few weeks of life to allow the flock to build a natural resistance.

Enterobac™ is specially formulated and contains a proprietary blend of GRAS ingredients that through numerous research studies was formulated to support intestinal health; improving immune response to optimize bird performance as well as mitigating secondary complications such as necrotic enteritis and coccidiosis. QTI specifically formulated & combined in this product a patented direct fed microbial to promote beneficial intestinal microflora with phytogetic compounds to support intestinal function.

Overall, battery and field tests demonstrated that Enterobac can be used alone or as a complement to live cocci vaccines by providing significant improvements in FCR and significant reduction in number of oocysts shed during critical periods of the birds growth cycle.

- Numerous Broiler Battery Studies- Consistently remediated enteritis.
- Two Floor-pen studies- Improved Weight Gain & FCR (vs. Salinomycin, Coccivac-B & Non-treated control).
- Research demonstrates reduced Oocyst shedding without sacrificing natural immunity.
- Studies indicate remediation of enteric lesion scores:
 - » full program or vaccine augmentation programs.
 - » significantly reduced NE lesion scores compared to Stafac in intensive necrotic enteritis challenge models.
- Studies indicate a reduced level of fecal shedding of Staphylococcus.

EnteroBac Mitigates the Effects of a Significant Coccidiosis Challenge - A Turkey Poult Battery Study

Objective: Assess effects of EnteroBac feed additive, on turkey poult, during a significant enteric challenge in the form of exposure to three important turkey coccidiosis species.

Background:

- EnteroBac is a proprietary feed additive blend of GRAS ingredients specifically designed to augment intestinal health in high-challenge poultry production systems.
- EnteroBac dietary supplementation has shown intestinal and performance benefits in broilers in the face of a significant coccidiosis and *Clostridium perfringens* challenge (Schleifer et al., 2016).
- Coccidiosis in turkeys continues to be an important threat to bird welfare, health and performance.
- Benefits of EnteroBac can be well assessed in a turkey coccidiosis challenge model.

Location: Southern Poultry Research, Athens, GA - June 27 - July 6, 2016

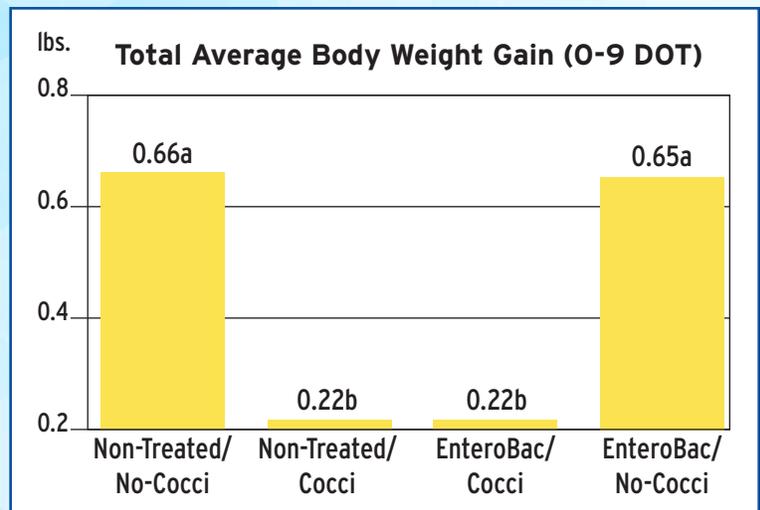
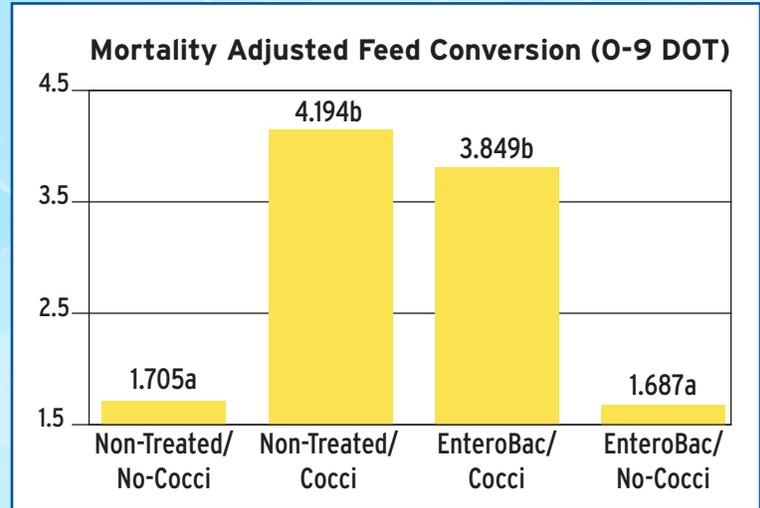
Study Design: Battery study - female turkey poults. 8 replications per treatment. 8 birds per battery.

Treatments:

Treatment	EnteroBac Usage	Coccidiosis Challenge*
Non-Treated/Non-Infected	None	None
Non-Treated/Infected	None	Oral Gavage DOT 2
Treated/Non-Infected	2 lb/ton (DOT 0-9)	None
Treated/Infected	2 lb/ton (DOT 0-9)	Oral Gavage DOT 2

*Coccidiosis Challenge: *Eimeria meleagrimitis*, *E. gallopavonis* and *E. adenodes* (Field isolates, 50,000 oocysts/species)

Performance Results:

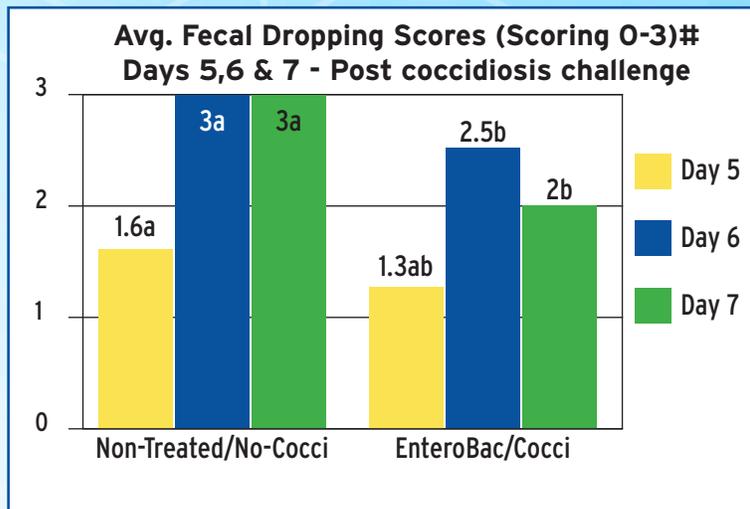


Note: No significant differences in mortality levels occurred between treatment groups.

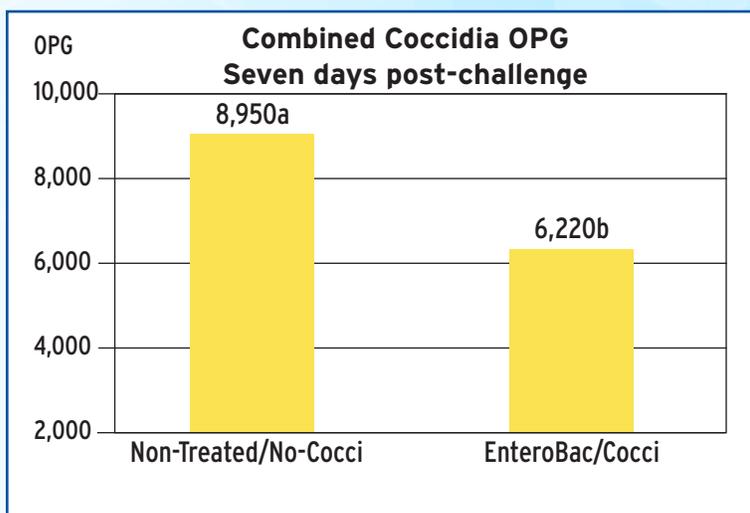
DOT 0	DOT 2	DOT 6	DOT 7	DOT 8	DOT 9
Birds randomized & weighed Feed treatment initiated Poults = 12 days of age	Coccidiosis Challenge	Dropping pans cleaned	Dropping score OPG fecal collect	Dropping score OPG fecal collect Fecal microflora assessment	Dropping score OPG fecal collect Fecal microflora assessment Feed & body weight Poults = 21 days of age

OPG = Total oocyst per gram of feces - fecal float enumeration
DOT = Day of treatment

Assessment Results:



#Visual fecal pan scores: 0 = Droppings completely normal
 1 = Droppings slightly moist, scattering of blood/mucus
 2 = Droppings semi-liquid with scattered blood/mucus
 3 = Droppings liquid with profuse blood/mucus



OPG analysis was conducted on accumulated fecal samples from treatment on DOT 7, 8 & 9

Results:

Treatment	Feed Conversion (Mort. Adj.)	Total Avg. Body Wt. (lb.)	Avg. <i>Clostridium perfringen</i> enumerations**	DOT 8 Dropping score	DOT 9 Dropping score	Fecal OPG enumeration
Non-Treated/No-Cocci	1.705 a	0.66 a	5.35	0 a	0 a	0 a
Non-Treated/Cocci	4.194 b	0.22 b	3.18	3.0 b	3.0 b	8953 b
EnteroBac/No-Cocci	1.687 a	0.65 a	3.78	0 a	0 a	0 a
EnteroBac/Cocci	3.849 b	0.22 b	2.31	2.5 c	2.0 c	6424 c

**log₁₀ CFU/g feces

a,b,c Means within a column with the same letter are not significantly different P<0.05

Discussion:

- EnteroBac provided significant improvements in fecal dropping scores on DOT 8 & 9 as well as a reduction in fecal coccidia OPG numbers compared to the non-treated and infected control group.
- EnteroBac in the diet resulted in a numerical improvement in feed conversion rates by over 34 points compared to the non-treated group challenged with coccidiosis.
- A numerical improvement in feed conversion rates was observed in the EnteroBac treated poult compared to the non-treated, non-challenged control group.
- This coccidiosis challenge can be considered severe basis feed conversion deterioration, the dramatic weight suppression and the highest dropping scores on DOT 8 & 9 for the non-treated control group.
- The decline in the fecal dropping scores for the EnteroBac-treated group on DOT 8, then DOT 9 indicates intestinal health was improving. It is expected the improvement would have continued had the trial progressed after DOT 9.
- It is recommended that EnteroBac be fed to turkey poult at an inclusion rate of 2 lb./ton, from 1 day-of-age until a minimum of 8 weeks of age when no anticoccidial is being employed or a coccidiosis vaccination program is utilized.

