

Controlling Turkey Coccidiosis

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Coccidiosis is an economically significant disease of poultry, costing the industry millions of dollars annually through lost productivity and mortality. In turkeys it should be considered more serious than commonly recognized.

In a rapidly growing bird, such as the turkey, any factor interfering with the absorption of nutrients will cause economic losses. It is extremely difficult to estimate the total impact of *Eimeria* – infections, because they are not always easy to detect due to their complex interactions with other organisms and management factors.

Coccidiosis in turkeys is characterized by enteritis, watery or mucoid diarrhea, ruffled feathers and anorexia.

Coccidia a parasite of the digestive tract of turkeys can interact with bacteria, viruses, and mycotoxins to increase the severity of the effects observed. Thus coccidiosis must be considered as a multifactorial disease in which complex interactions of various factors will determine the outcome of the infection and the clinical damage.

Coccidiosis, a disease only in young turkeys?

Coccidiosis in turkeys has often been associated only with young birds. From field trials it has become apparent that, contrary to popular belief, coccidiosis is not only associated with young turkey poults between 3 and 10 weeks old. In many trials variable patterns of oocyst excretion were measured during the entire growing period, even up to 20 weeks. It is true that the main peak of oocyst excretion normally occurs between 35 and 50 days, but increased oocyst shedding was also recorded between days 80 and 90.

There are seven *Eimeria* species of coccidia that infect turkeys but only four species (*E. adenoides*, *E. gallapavonis*, *E. meleagritidis* and *E. dispersa*) are considered pathogenic. *Coccidia* can be spread from farm-to-farm or house-to-house by oocyst-contaminated feed, litter or water and can be carried on workers' footwear, mechanical equipment and animals. The primary source of infection is the birds actively shedding oocysts in the

feces. Birds become infected by pecking in the litter or consuming coccidia contaminated feed or water.

A number of factors such as season, weather conditions, and management practices can affect the spread of coccidiosis. Outbreaks usually occur during wet months in the spring and fall, but can occur at any time of the year.

Control Methods

Since it is nearly impossible to eradicate coccidia by practical means, the only way to deal with coccidiosis is by control methods. Presently there are several effective methods used in the poultry industry – feeding coccidiostats (anticoccidials) and vaccination.

Coccidiostats

The feeding of coccidiostats has been used extensively over the years. Coccidiostats were an important tool in allowing successful growing of large numbers of birds in confinement. Without their discovery and use, the poultry industry couldn't have developed to the status it is today. Coccidiostats are classified as either ionophores or chemicals in origin. The ionophores, in reality, are antibiotics, which possess anticoccidial activity. Presently monensin and lasalocid are the only ionophore coccidiostats approved for use in turkeys. Chemical coccidiostats are synthetically manufactured and further classified by chemical composition. The other chemical coccidiostats presently approved for use in turkeys are halofuginone, zoalene, amprolium and diclazuril.

Unfortunately, no ideal or perfect coccidiostat has yet been developed. Every existing coccidiostat has certain weaknesses whether it is decreased sensitivity to certain coccidial species, or high toxicity level. However, the major weakness of all coccidiostats lies in the ability of the parasites to develop resistance against the effect of the drug when the same product is used continually over time. As a rule, coccidia tend to develop resistance against chemicals faster than to ionophores. To reduce the development of resistance, the poultry industry has adopted the practice of switching or rotating coccidiostats during the same growout or after several cycles. When changing coccidiostats it is recommended to switch from an ionophore to a chemical coccidiostat or vice versa.

Vaccination

Like other vaccines, the objective of a coccidial vaccine is to stimulate immunity against all the pathogenic species that infect turkeys. Once a bird ingests a coccidial oocyst that has sporulated it takes approximately 5 to 7 days for the parasite to complete its life cycle. Each subsequent cycle enhances the immunity to the particular species cycling in the bird. Generally, after 3 to 4 cycles the bird has developed solid immunity. Since immunity to coccidia is species specific, it is imperative the coccidial vaccine contain all the four species pathogenic to turkeys in order to stimulate broad protection.

Coccidial vaccines contain live sporulated oocysts. Each dose contains a predetermined number of oocysts of the different species contained in the vaccine. Vaccines are

administered at an early age (1-3 days) in order to initiate early cycling and the development of immunity. As with any vaccine, it is important the vaccine be administered according to the manufacturers' recommendations.

Coccidial vaccines have several advantages over coccidiostats. There is no concern about a withdrawal period prior to slaughter. Feed mills have more flexibility in what medications can be added to the feed. The use of vaccines re-introduce sensitive coccidial strains into barns which reduce the tolerance against anticoccidial drugs. Lastly, vaccines are not faced with the development of resistance by field strains.

Coccivac®-T is a live coccidiosis vaccine approved for use in turkeys. It contains four species – *E. meleagridis*, *E. adenoides*, *E. gallopavonis*, and *E. dispersa*. Since the species in this vaccine were isolated prior to the use of present day coccidiostat, they are highly sensitive to all coccidiostats. Initially Coccivac-T was administered in the drinking water or sprayed on the feed. Because of the peck order behavior of birds, the more aggressive birds sometimes would receive a heavy dose of oocysts which could lead to clinical coccidiosis; whereas, the more timid birds may not receive an adequate dose. This would result in uneven vaccination of the flock. Since it required manual application of the vaccine, human error sometimes caused problems. To deal with these situations, it was recommended to treat the flocks with a low level of amprolium for 48 hours, 10 days following vaccination.

New Approach

Recently Coccivac-T was approved to be administered by spray cabinet (Spraycox™) at the hatchery. This new application eliminates the human error factor associated with manual administration of the vaccine. In addition, it provides a uniform coverage of the vaccine to all the poults. In the field, it has been observed that birds vaccinated via the spray cabinet do not have to be treated with amprolium 10 days following vaccination. Recently several field trials were conducted to evaluate the performance of poults vaccinated with Coccivac-T via the spray cabinet to different coccidiostat programs. In the first trial, Coccivac-T vaccinated poults were compared to poults fed ionophore A. There were 30 hen poults per pen and 10 pens per treatment. Ionophore A was fed for the duration of the trial and the level changed with each feed change. Both groups received 20 GMS/ton of virginiamycin for the entire trial. Live weights, adjusted feed conversion and mortality data were analyzed by the analysis of variance model.

Throughout the trial there was no evidence of coccidiosis in any of the groups. The results showed the Coccivac-T group weighed significantly heavier ($p \leq 0.05$) than the hens receiving the coccidiostat treatment (Table 1). Average feed conversions adjusted for mortality were not statistically different between the two treatment groups.

Mortality in this study was very low. No differences were found between the groups of this evaluation.

Table 1

Treatment	Feed Conversion	Weight(lbs.)
Coccivac-T	2.319	16.444 ^a
Ionophore A	2.333	16.04 ^b
Difference	.014	0.4

In another trial, the performance of Coccivac-T vaccinated hens was compared to hens fed ionophore B. The test house was divided into two equal pens by a high fence to prevent intermingling of the test birds. Approximately 1,148 hen poult were placed in each test group. All the poult were hatchmates from the same breeder flock. One group was vaccinated with Coccivac-T at the hatchery via spray cabinet application. The coccidiostat group received the ionophore in the feed continuously for 12 weeks. After 12 weeks, the coccidiostat was discontinued and both groups received 10 GMS/ton of virginiamycin for the duration of the trial. When the hens were 18 weeks, 4 days of age the study was terminated.

There was no evidence of coccidiosis during the study. Both groups performed well and there was no difference in performance between the groups (Table 2).

Table 2

Treatment	Weight	Feed Conversion	% Livability
Coccivac-T	23.92	2.57	84.1
Ionophore B	24.0	2.58	86.8

Conclusion

The above trials results demonstrate Coccivac-T is highly effective in preventing coccidiosis and is cost effective when compared to coccidiostat programs. Furthermore, the spray cabinet application of Coccivac-T provides added benefits such as: saves time in administration eliminates the human error factor associated with manual administration of the vaccine, and it provides a uniform coverage of the vaccine to all the poult.

This new application of Coccivac-T provides a new approach to controlling coccidiosis. It can be used continuously flock after flock or in a rotation program with coccidiostats. When used in a rotation program it has the benefit of seeding down the litter with highly sensitive oocysts resulting in dilution or displacement of any resistant strains present. When the switch is made to a coccidiostat, it should perform better.