

Anticoccidial rotation and good husbandry can improve coccidiosis control

by Marco Quiroz, DVM, Director of veterinary technical services, Global Poultry, Zoetis Inc.

Poultry producers worldwide know the importance of cutting losses from coccidiosis – the parasitic disease that is still causing significant losses in growth rate and feed efficiency.

While in-feed anticoccidials and vaccines remain the mainstays of coccidiosis management, they can not do the job alone. Good husbandry, particularly practices that support gut health, are equally important for managing this disease and preserving the effectiveness of medications.

Take diet, for instance. Sound nutrition is key to many physiological functions, but some diets can dramatically and adversely affect gut microflora, allowing coccidiosis to take a heavier toll.

That is not to say that diet protects against Eimeria, the protozoan parasite that causes coccidiosis, because it most certainly does not. But there is clearly interplay between certain nutritional factors and the impact that coccidiosis and associated problems have on a flock.

Coccidiosis, including the subclinical form, hinders digestion and absorption. When it occurs in chickens that already have a diet-induced gut disturbance – particularly fast-

growing broilers – the birds often become predisposed to Clostridium perfringens infection and necrotic enteritis.

Chickens fed an all-vegetable diet, particularly one that features soybean meal as the major protein source, are more likely to experience a digestive upset compared to birds that receive a mixed protein diet containing vegetable and animal protein.

The adverse impact of an all-vegetable diet may be counteracted by adding enzymes that target the carbohydrate fraction of soybean meal, though the results may be 'hit or miss.' Other options for reducing the likelihood of a gut disturbance include feed additives that promote harmonious microflora, such as prebiotics or probiotics and, where permitted, the judicious use of an antibacterial such as bacitracin or bambermycins.

Ensuring digestibility

Feed must be digestible for good gut health, and there are three keys toward that end:

- If soybean meal is used, especially for birds on an all-vegetable diet, it is critically important to make sure it is not 'over-toasted' or 'under-toasted'. The greater the percentage of soybean meal in the diet, the more important this becomes and there

tends to be more soybean meal in all-vegetable diets.

If soybean meal is overtoasted, the amino acid lysine is going to be less available, which can hinder bird growth. If it is undertoasted, protein digestion may be impaired, leading to digestive upset. It is essential that poultry nutritionists monitor the urease index and potassium hydroxide solubility to determine the degree of toasting.

- If meat and bone meals are used in the poultry diet, they should be monitored to ensure they are properly processed and that fat is stabilised. This guards against mucosal damage from oxidative rancidity associated with the fat component of the animal by-product.

- Feeds based on coarse grains such as wheat or barley are not as digestible and can result in thick, viscous digesta that can encourage C. perfringens overgrowth, resulting in necrotic enteritis. This adverse effect can be countered with the addition of enzymes. In fact, the addition of enzymes in this case is essential. For wheat, the enzyme xylanase must be present; for barley-based diets, glucanase enzymes are needed.

Again, the use of an in-feed antibiotic, where available, is helpful for controlling C. perfringens when these types of diets are fed to commercial flocks.

Litter

Proper litter moisture is another aspect of husbandry that is vitally important to good coccidiosis management. Coccidia need moisture to sporulate and reproduce. If the litter is too wet, sporulation will accelerate and produce a stronger coccidiosis challenge.

Coccidiosis management is often better when litter is reused versus using new litter with each flock. Used litter tends to provide a more dependable and consistent coccidial challenge by allowing birds to develop some immunity gradually. This is probably because reused litter has been exposed to heat and air in the poultry house and tends to be drier than new litter.

Consider the case of a poultry operation that was focused on foot quality and the

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Table 1. Pros and cons of various anticoccidials.

Anticoccidial type	Pros and cons
Ionophores	Slow development of resistance compared to synthetics, but reduced efficacy over time. Cross-resistance can occur to anticoccidials in the same class.
Synthetics (chemicals)	Highly effective but if overused, resistance can develop quickly.
Synthetic-ionophore combinations	Highly effective but if overused, resistance can develop.
Vaccines	Give in-feed anticoccidials a rest and replace wild coccidia strains with vaccinal oocysts that are sensitive to in-feed anticoccidials. Initial setback in performance can be managed with judicious use of an ionophore after birds develop vaccine-induced immunity against coccidiosis.

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prevention of footpad dermatitis. The producer tried using new litter and had more serious coccidiosis problems. The results were improved when only half of the old litter was removed and replaced with new litter.

Other important husbandry practices that can improve coccidiosis management include appropriate stocking density for the type and size of the birds grown, as well as proper maintenance of water lines and ventilation because they can all affect litter moisture.

Anticoccidial rotation

With no new in-feed anticoccidials expected to come to market anytime soon, it is essential that the poultry industry preserve the efficacy of the ones that are still available by preventing the development of anticoccidial resistance. To do this, anticoccidial rotation is necessary.

One example of a rotation plan is a 'shuttle' program, where one in-feed anticoccidial is used in the starter feed and another in the grower/finisher feed until it is time to withdraw the drug in preparation for marketing.

Another type of rotation is a 'full' program, where the same flock receives the same in-feed anticoccidial from day one until

withdrawal, and the in-feed anticoccidial used on the farm is changed about every 4-6 months.

For best results, it is best to develop a long-term rotation plan, perhaps 18 or even 24 months, because it takes time to rotate enough different products and give each one an adequate rest.

For example, avoid rotating among ionophores that are in the same class. If you use the monovalent ionophore salinomycin, do not rotate to monensin or narasin because they are also monovalent ionophores and because they all work similarly; if resistance develops to one, it is likely to develop to another. It is better to rotate to a divalent ionophore such as lasalocid or to a synthetic anticoccidial or vaccine.

Synthetic anticoccidials are highly effective and excellent for clean-up programs, but must be used sparingly because resistance develops to them quickly. Generally, the same synthetic should be used only once a year or every two years.

Knowing the pros and cons of each type of anticoccidial can help formulate a good rotation program (Table 1). Ideally, the program should be tailored to each farm based on its history of success or failure with various anticoccidials and anticoccidial sensitivity testing, which will indicate which anticoccidials are going to be the most effective.

Vaccination

When managed effectively, a coccidiosis vaccine can be a valuable addition to any rotation program.

Vaccination gives ionophores and synthetic anticoccidials a much-needed rest, thereby reducing the development of resistance. It also helps preserve the efficacy of in-feed anticoccidials by seeding the poultry house with coccidial oocysts that are still sensitive to in-feed anticoccidials.

Sometimes, vaccinated flocks experience a drop in performance during the first production cycle, but this setback can be controlled with the use of an in-feed ionophore administered after birds develop vaccination-induced immunity to coccidia.

In addition, performance generally improves with subsequent cycles of vaccination.

As we all know, coccidiosis remains a huge problem. Prevention of the disease in broilers alone is reportedly costing the global poultry industry more than US \$3 billion annually.

In addition, coccidia are tenacious and eliminating them from the poultry house is virtually impossible.

The goal, which must be to keep the damage as low as possible while staying economically sound, can be achieved by combining good husbandry with a carefully devised anticoccidial rotation program. ■