

Treatment as part of a global strategy to fight coccidiosis

The first step to fight coccidiosis is biosecurity. Removing litter, cleaning materials and the building are important to decrease the infection pressure at the start of the flock. Some hygiene products, like Prophyl S (chlorocresol + glycolic acid), have specific action against oocysts and can be used to specifically decrease oocyst loads. But even with the best biosecurity measures, an anticoccidial programme is indispensable.

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Coccidiosis is mainly controlled by applying anticoccidial products in feed and/or by applying coccidiosis vaccines. To limit the resistance development of the parasite, it is important to use a rotation programme, alternating ionophores, synthetics and coccidiosis vaccines for good coccidiosis control. Within a group of anticoccidials, it is advisable to also rotate active compounds.

There are several factors that can trigger a coccidiosis outbreak. When outbreaks occur when anticoccidial products are being used, it is advisable to check the level of the anticoccidial products in the feed to confirm the dose of the anticoccidial used. It is possible that a mixing problem or a mistake occurred at the feed mill and the feed contains a suboptimal concentration of the anticoccidial product. A second point to check is the history of

Product	Concentration	Posology	Withdrawal time meat/offal	Withdrawal time eggs	Solubility	Immunity development	Total treatment cost
Amprolium (amprolium)	400mg/ml	20mg/kg/day for 5-7 days	0 days	0 days	High	Yes	Low

Table 1. Amprolium's main features.

anticoccidial use. If the same anticoccidial is used for too long, resistance can occur.

For any problem, it is a necessity to carry out lesion scoring by necropsy. It is possible that the birds are suffering from some other disease. It is important to confirm whether coccidiosis is involved in the problem, which species and to what extent.

Lesion scoring is also important to check subclinical coccidiosis, caused by some *Eimeria* species such as *E. acervulina* in chickens, resulting in no obvious clinical signs but reducing general flock performance. Regular monitoring by lesion scoring to check the status of the flock is key to control coccidiosis and to take decisions.

Therapeutic molecules should not be used as a preventive tool. As with the anticoccidials used in feed, over using the same treatment product can cause coccidiosis resistance and result in a decrease of efficacy.

Different molecules for treatment

In the EU there are only three veterinary products registered to treat coccidiosis: sulphonamides, toltrazuril and amprolium. The advantage of these products over

natural ones is that their efficacy and safety for the target species and consumer have been validated by the authorities. The use of sulphonamides, which also exert antibiotic properties, is decreasing due to the increased pressure in poultry production to decrease antibiotic usage. Amprolium (amprolium 40% Huvepharma) is a veterinary product with a zero day withdrawal time for meat and offal.

This allows usage at any time during production, which is important for treating possible late coccidiosis outbreaks. It is the product of choice for short-living birds, such as broilers.

Amprolium can also be used to treat layers. Sulphonamides and toltrazuril are not authorised for use in poultry producing eggs for human consumption, whereas the Amprolium withdrawal time for eggs is zero days. This makes Amprolium appropriate for any production type.

Another advantage of amprolium is the low resistance build-up as it allows immunity to develop. The leakage effect of amprolium was nicely illustrated in a trial comparing the efficacy of amprolium and toltrazuril in chickens with subclinical infection of caecal coccidiosis. In the group treated with amprolium, oocyst excretion remained evident, whereas for toltrazuril, the oocyst

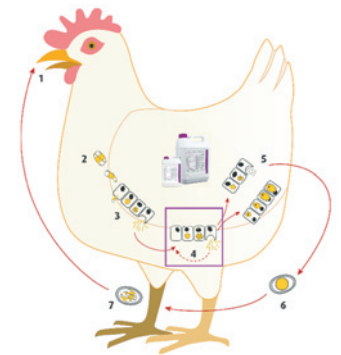
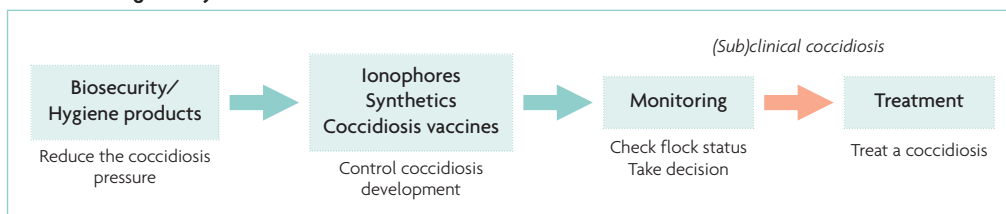


Fig. 2. Action of Amprolium in the Eimeria life cycle.

count was low. This higher shedding of parasites (leakage) allows the birds to be in contact with low levels of the parasite, which stimulates immunity development. It is assumed that by shedding sensitive parasites in the environment, the house will not be flooded with resistant strains, explaining the slow resistance development against amprolium.

Average body weight at the end of the trial was significantly higher for the amprolium and toltrazuril group than the control group, and not significantly different from each other. This result highlights that a high oocyst count is not necessarily linked to decreased performance.

Fig. 1. The fight against coccidiosis involves different tools in order to be efficient. Respecting biosecurity rules, using disinfectants between flocks, rotating between ionophores, synthetics, coccidiosis vaccines, and carrying out monitoring are key to control coccidiosis. Treatment is the solution when outbreaks occur.



A highly concentrated amprolium

Introduced in the 1960s, amprolium was first used as an anticoccidial in feed to control coccidiosis. This in feed use is still significant in some countries, like the USA, but not in Europe, where amprolium is used only for treatment.

Amprolium acts as a competitive

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thiamine antagonist, preventing carbohydrate synthesis required for coccidia multiplication and survival. The parasite is more sensitive to amprolium than the host.

This unique mode of action is interesting to prevent cross-resistance. Regarding the parasite life cycle, Amproline inhibits the development of merozoites and the formation of second-generation schizonts (Fig. 2). The administration of Amproline resulted in a proportion of morphologically abnormal macrogametes and oocysts which may be considered the reason for a reduced sporulation rate.

Belgium data analysis has been carried out using Aviapp, Huvepharma's monitoring software. Thanks to Aviapp, the Total Mean Lesion Score (TMLS) of flocks treated with amprolium and untreated flocks was compared between January 2019 and February 2020. The results show an average TMLS decrease of 65% for the amprolium group, whereas it was an increase of 38% for the untreated group, between the first and the last

Fig. 3. Evolution of the TMLS score between the first and last monitoring day for amprolium treated flocks and untreated flocks.

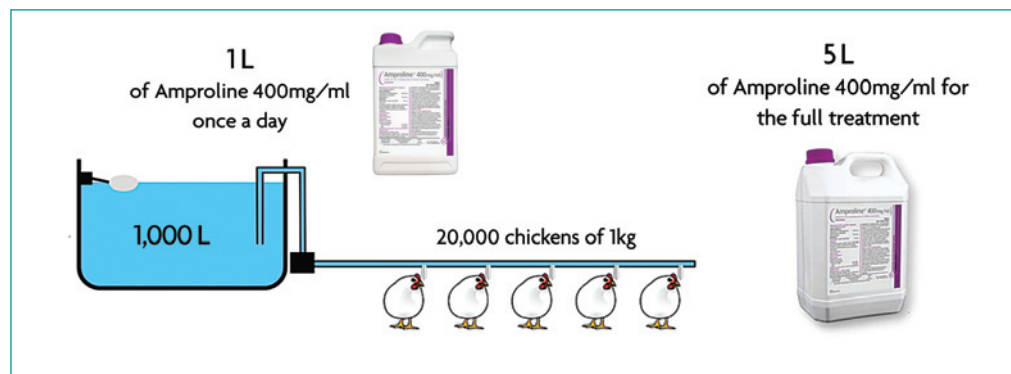
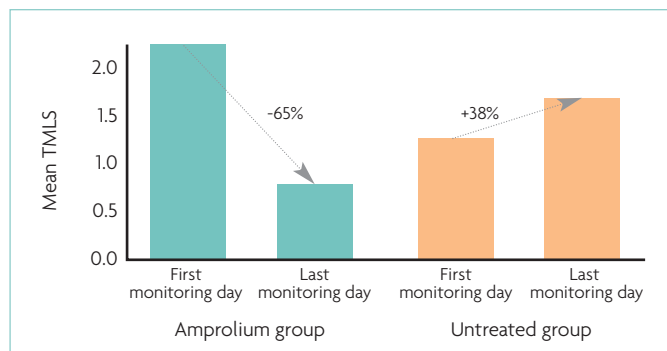


Fig. 4. The quantity of Amproline needed for a flock is easy to calculate. The posology is 50ml Amproline/tonne body weight/day, which means 1L Amproline/20,000 chickens of 1kg/day, and with the 5L you can treat the flock for the entire treatment duration.

monitoring days (average of six days for both groups) (Fig. 3). These results show that amprolium is an efficient molecule to treat coccidiosis.

Amproline is a 400mg/ml amprolium solution for use in drinking water for chickens and turkeys. The unique 40% concentrated amprolium is easier to stock than a 10% product, as it takes

up less room and is a convenience which is appreciated by veterinarians.

The higher concentration is convenient for stocks, transport to the farm and beneficial for waste management for the environment. Amproline can be stored for four months after first opening.

Amproline can be administered for 5-7 days. A long treatment period can be interesting to treat heterogeneous flocks, with some birds infected earlier than others.

Amproline is highly soluble in all types of water: tested in a laboratory with soft water (pH = 6.1, hardness = 5.3°F), hard water (pH = 8.5, hardness = 39.2°F) and very hard water (pH = 7.7, hardness = 57°F).

No problems with the drinking water system, and no influence on water intake are reported.

Conclusion

Treatment is part of a global strategy to fight coccidiosis. Despite a good coccidiosis control programme,

(sub)clinical coccidiosis outbreaks can still occur, for which treatment is required.

Only a few products are registered in Europe, of which Amproline is the best option taking the following into account:

- **Efficacy against coccidiosis.** Amproline's specific action against coccidiosis and a strong affinity for coccidia have been proven.

- **Withdrawal time.** Amproline can be used in any production type because of the 0 day withdrawal time for meat/offal and for eggs.

- **Convenience.** Amproline is the highest concentrated amprolium. It is easy to store, easy to carry, and easy to use on farm by application via the drinking water. ■

References are available from the author on request