Coccidiosis: Preventing the Effects of Low Level Coccidiosis on Broiler Performance

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In modern poultry production systems, chickens are grown at higher densities; this higher concentration of animals contributes to a greater volume of fecal material, which provides the ideal medium for the exogenous development of coccidia. Layers of hard walls protect coccidia oocysts, but the oocysts are susceptible to protein denaturation and desiccation. Millions of dollars are spent annually for the treatment and prevention of coccidiosis.

The performance of broiler chickens can be significantly impaired by coccidiosis. Impairment of performance is attained through the following; reduced absorption levels of carotenoids, reduced absorption levels of gut sugar, lowered levels of weight gains, and higher rates of feed conversion. An estimated performance loss due to coccidiosis for a 1 million broilers per week operation could be in excess of $2 million per year.

Oocysts ingested can either be (1) fail to become established (inappropriate host) (2) the infection become established, developed in large numbers and the host is overcome by the infection. (3) Become established but do not developed pass the trophic stage. This indicates that the host overcomes the infection, and the host is refractory to the infection. (4) coccidia become established and stages develop but the host and parasites reached a balanced state. This state is unstable, and can revert to 2 or 3 under certain situations.

Control

Non pharmaceutics - this involve the removal of the birds from the coccidia or the removal of the coccidia from the birds. Sometime ago, attempts were made to grow broilers in cages; but birds developed breast and leg problems. Regular clean –outs or removal of litter is an effective way of reducing the coccidia load in the chicken house. However, this method leads to other major issues, such as environmental problems and depletion of litter supply.

Manipulations, of nutrients have been investigated as a method of controlling coccidiosis, but with limited success. Brittan *et al* (1964) showed that reducing dietary protein by 5-10% reduced the severity of E. tenella. Jensen *et al* (1978) showed that selenium and vitamin E facilitated an earlier and better immunity to coccidia in young chickens.

The hard oocyst walls allow the oocyst to be resistant to several commonly used sanitizers, but are susceptible to desiccation and protein denaturation. Sterilization produced by moist heat (65° C for 15 minutes) is very effective in a closed area.

Genetic resistance is an effective way of controlling coccidiosis; however, this practice is not practiced by most of the breeder industry. It has been shown that some lines of commercial broiler stocks are more tolerant of coccidia infections than others (unpublished data).

It has long been demonstrated that immunization of chickens with live coccidia is an effective way of controlling coccidiosis, (Edgar 1958). Immunity to coccidia develops over an extended period and immunity also wanes with time. Control provided by immunization can be obtained by several small doses/exposures to coccidia oocysts over an extended period. It is believed that virulent live coccidia vaccines can harm the host, and therefore might be limited use in the small broiler-type birds.

Since the discovery of the sulfas in the late 1930's, pharmaceutical agents have become the primary method of control. In later years less toxic and more host friendly chemicals were developed and used. This then

lead to the development of the ionophorous anticoccidials. These products were more user and host friendly in the designated hosts than the chemical anticoccidials. The chemical anticoccidials were less tolerant of misuse and abuse than the ionophores. Most of the anticoccidials currently being used have demonstrated good efficacy against several field strains of coccidia.

Resistance/tolerance is certainly more rapid in the chemical group than the ionophore group. Extended use of these products by production companies have lead to the development of resistance or tolerance (reduced efficacy) of several of anticoccidial drugs). One of the methods employed by production companies to try and slow or delay the development of resistance is to use two or more products in sequence (shuttle) during the life of the animals. A second method used to slow the process of resistance is to use several in rotation. A third method used is to use live coccidia vaccines for one to two flocks then go back to an anticoccidial program. The oocysts from the vaccines are susceptible to almost all anticoccidials currently being used. These methods are not guaranteed to eliminate the development of resistance, but most definitely will slow down the process of resistance development.

References

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