Latest thinking on coccidiosis control in commercial poultry

Commercial food animal production has long since relied on the sub-therapeutic use of antibiotics to promote health, thus aiding in efficient, profitable production. However, actions like the 2006 EU ban on antibiotics as growth promoters and the 2013 FDA announcement to phase out medically important antimicrobials in food animals for food production purposes has the potential to significantly change the landscape we have grown accustomed to over the past 30+ years.

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In 2004, Hucon Poultry Inc started to use coccidiosis vaccines to re-establish sensitivity to some of the anticoccidials that had lost efficacy.

Continuous vaccination, along with effective, more natural alternatives led to total withdrawal of all in feed and water medications in 2010.

Success of this program was accomplished through changes in nutrition and management. With the attitude of the North American consumer, increasing resistance issues, and few replacement antimicrobials in development, we realised that we needed to change our production model.

Deviating from the constant antibiotic regime and including such products as coccidiosis vaccines and non-antibiotic alternatives allowed us to rest the antimicrobial, while reseeding our facilities with sensitive strains of Eimeria. If successful, this would allow us to reduce our dependence on antibiotics as well as extending the life span of such products used in our feeding program.

On farm risks

Was antibiotic reduction or antibiotic-free a reasonable goal? We were aware of small flock successes, but on the other hand, we new of sizeable negative impacts on performance and health when tried on a larger, commercial scale.

Primarily, this was related to the general well being of the animal, with respect to increased disease prevalence. With the insult of challenges normally kept in check by antibiotics, performance and profits would potentially suffer. It was entirely possible that we would end up using more antibiotics to treat than to prevent.

It was also probable that due to low disease challenge in our facilities, we would be successful initially. However, it was conceivable that in the absence of antimicrobials, we could allow disease pressure to build over consecutive flocks.

If the point of clinical disease was reached while producing antibiotic-free in our facilities, would we be able to restore the environment back to a stable, hospitable microflora, which we knew was favourable for bird health?

Experiences

In the spring of 2004, we rotated from the standard regime of rotational anticoccidial use to a cocci vaccine for three consecutive flocks. Some management and nutritional changes were to be implemented so as to have the optimum chance for success.

The first flock achieved fair performance. There was an increase of four points in average feed conversion (which was partially attributed to heat stress). During the two following grow-outs, no negative impacts on health were noted.

Our conclusions were that a hatchery administered day of age cocci vaccine was a viable alternative to ionophores or chemicals to control coccidiosis on our farms. Upon returning to a chemical in-feed anticoccidial, we observed a performance decrease in average daily gain and feed conversion.

Previous commercial experience in the USA had shown the ability to reseed the poultry house with sensitive strains of coccidiosis after three flocks. Consequently, in our regulated 'clean' environment, we were not able to re-establish sensitivity in the same time frame. Essentially, we were eradicating all we were trying to seed after the flock had been shipped. We removed litter, we cleaned, as well as washed and disinfected.

The following year, we implemented the same three cycle program. We observed a small decrease in days to market and feed conversion with each successive flock of vaccination. We questioned the ability to vaccinate through the winter flocks due to the reduced amount of ventilation during this period. A decision was made to continue vaccinating, for cocci, but would be monitored on a flock by flock basis.

No problems with respect to disease or performance were observed. The performance continued to marginally increase, cresting around one year of consecutive vaccination.

We then focused our efforts on the chick's first seven days of life. Research has shown that early post hatch management and nutrition is essential to having a robust bird through to market. We looked at bird migration in the barn, the needs of supplemental feed and water, lighting and temperatures. As well, we felt the nutritional components of our starter phase were grossly underestimated. We formulated a pre-starter to emulate the swine industry's experience in the benefits of enriched early wean feeding.

Early gut development was crucial. The importance of having a solid feed stimulus (birds consuming feed as early as possible) was crucial. The residual yolk contains valuable biomolecules such as maternal antibodies that are better used for passive immunity than as a source of amino acids.

To find out where we were exactly, we needed to establish a baseline of performance. Automatic weigh scales were installed. The data was graphed and compared to the daily growth potential published by the bird's genetic company.

As a result of the data obtained, we were able to make adjustments based on certain 'stalls' that were seen in the growth curve. These stalls could be correlated to the absence of proper management. With changes in place, our day seven weight increased significantly, with some flocks attaining more than a 5X gain from placement weight. The early gain achieved was linearly translated into end weight. Our weights were now encroaching on genetic potential. At this point, we were confident in our bird's ability to be more vigorous in defending against insults related to bacterial challenges due to further antibiotic removal.

Benchmarking

In 2008, we started to collect, count and graph oocysts per gram of litter in our facilities. Over time, this benchmarking allowed us to establish a defined target for cocci cycling, and through specific management techniques, we were able to produce a more uniform, predictable response to cocci vaccination.

With predictable cocci cycle in our houses, we started to look for opportunities to reduce the use of the necrotic prevention drug from our feed ration. Non-antibiotic alternatives were tested and placed into the ration at specific times where it was felt the Gram positive targeting necrotic prevention antimicrobial was not as critical.

With the most efficacious alternative, we were able to remove the necrotic prevention antimicrobial in the starter and finisher rations without sacrificing zootechnical performance. The only antimicrobial used in our rations was in the grower feeds, which was from day 14 to 28.

Experience and constant bench-marking allowed us to refine our management and nutrition, taking us further into development of an antibiotic-free regime.

Performance to date is acceptable, with an expectation of 1-2% in increased mortality and 2-6 points higher feed conversion. ■

References are available from the authors on request