

Maintaining chick quality with effective pathogen control

Good chick quality is an essential stage in achieving high productivity in poultry businesses. Hatchability, uniformity, low mortality as well as a good response to feed and animal health products in early life all contribute to overall profitability.

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There are multiple factors that affect chick quality, starting with breeder welfare to egg handling, incubation and management of hatched chicks. At each stage of the process, attention to detail leads to improved performance. Producers have made great strides forward with egg handling and incubation which are mission critical to any poultry business. However, these should not be the only areas to focus on when aiming for better quality chicks.

Throughout the chick's life, exposure to pathogens in feed can lead to a significant dip in performance, even when the effects are subclinical. Being pro-active with pathogen control leads to healthier chicks that are better able to use feed to reach their genetic potential.

Modern breeders all have great genetics but poor production choices can squander that potential. Any decline in animal health means you get further away from reaching that potential – and that is the same whether we are talking about breeders or broilers. For any grower striving to increase chick quality, the aim should be to preserve genetic potential at every step so the best place to start is where the potential is highest, with the

breeder. In the breeder house, there are a wide range of physical measures that can increase egg output and quality such as improving lighting, ventilation and stocking density. Physical improvements should be matched by a commitment to clean feed. Clean feed is treated then handled to minimise microbiological contamination which is needed for health and productivity of poultry.

Help breeders reach their potential

Using clean feed improves gut health which translates into better nutrient utilisation by the bird and more eggs/hen housed. Less foreign bacteria in the gut also results in less microbiological contamination of the egg shell which improves hatchability.

Reduced mortality is another benefit of reducing the microbiological contamination of feed as a 2008 study by Anitox shows. Breeder flocks fed with Termin-8 treated feed saw a significant drop in mortality compared to controls.

In a flock without historical disease problems, there were two more chicks per hen at 48 weeks coupled with a lower mortality rate.

In two 'problem flocks' with track records of salmonella infection, mortality was reduced by more than 30% in females and males after 59.5 weeks. Lower female mortality will clearly boost total flock egg production but data from the same study shows improvements in egg number per live bird and hatchability. Overall, the count of viable chicks per hen increased by 12.9%.

Improvements in hatchability are the result of healthier hens producing better quality eggs with cleaner



egg shell surface. Both the egg shell and membrane are porous when laid so harmful bacteria can enter the shell and cause poor development of the embryo.

The consequences of this bacterial attack are that fewer eggs reach maturity and those which do may produce lower quality chicks.

Research into laying hens has demonstrated that using feed with improved microbiological quality reduced the presence of shell surface enterobacteriaceae (colony forming units/egg) by 87.5% to 1,460 cfu/egg. Lower eggshell counts not only reduce the risk to individual eggs but lower the risk of cross-contamination during handling and incubation.

Supporting the immune system

The breeder's immune system should be a top priority for poultry producers. Firstly, any breeders in poor health will produce fewer chicks and they will be of lower overall quality for the reasons detailed above.

Secondly, immunity is passed from mother to chick in the form of maternal antibodies in the yolk sac. These maternal antibodies protect the chick until its own immune system is functional at day 18-21. This means for nearly half its life, the chick is entirely dependent on its mother's legacy for immunity. Consequently, it is worthwhile

taking steps to increase the quantity and longevity of these antibodies in the chick.

The breeder house is a demanding environment, so we need to do everything we can to support the bird's immune system by reducing exposure to pathogens and judicious use of vaccines. Using pathogen controlled feed reduces microbiological risk in the diet which improves the animal's response to vaccination. Clean feed means that the birds immune system is not busy dealing with foreign bacteria problems in the gut so it can respond to vaccines and produce antibodies more efficiently without a decline in performance.

Anitox research has found that the improved vaccine response is carried over into antibody titers in the egg yolk. In this study, all birds received intramuscular vaccination for Salmonella enteritidis, next they received either treated or untreated diets. Vaccine performance was tested by measuring antibody levels in the yolk. Across the trial, clean feed resulted in an average 4% increase in antibody levels with a much more uniform response compared to untreated feed.

Once the egg is hatched, reducing bacteria levels in feed supports the development of the hatchling's immune system. Studies show that using clean feed increases the absorption of maternal antibodies giving chicks more capacity to fend off infection in the crucial early

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Table 1. Circulating antibody levels at one, two and three weeks after hatching.

Treatment	Infectious bursal disease antibody levels (% Day 0 value)			
	Day 0	Day 7	Day 14	Day 21
Control	100	32.03	12.08	1.06
Termin-8	100	50.40	19.76	2.56

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weeks. Work done by Anitox looked specifically at the transmission of antibodies for infectious bursal disease between mother and chick. Circulating antibody levels were significantly higher at one, two and three weeks after hatching as shown in Table 1.

Once the broiler's own immune system is functioning, it continues to benefit from pathogen control in feed. A related study showed that broilers fed with clean feed had a consistently higher antibody count to infectious bursal disease vaccination until day 42. The net effect of this was a reduction in the overall mortality rate from 5.45% to 2.56%.

Guarantee early growth

After hatching, producers require good early growth so birds reach their potential. But early growth depends on the diet consumed by the breeder as well as the chick. Breeders which consume feed with low microbiological risk produce chicks that grow well from the start.

The benefits from controlling pathogens in breeders' feed clearly translate to the chicks' performance in early life and, in fact, continue all the way to day 42. When we looked at this, we found that hatch weights

and body weight gain to day 10 both increase, crucially feed conversion rates also improve – so it is not a case of supplying more feed with diminishing returns. Instead, the bird is in better physical condition to convert feed to body weight more uniformly.

For example, when we investigated turkey production, poult hatch weights increased by 1.83% and final body weight increased by 7.41% because of pathogen control measures in the breeder diet.

Limiting exposure to pathogens in chick diets also boosts weight gain and feed conversion rates. In Anitox research from South Africa, average seven day weights in broilers were 6.2% more. This headstart was converted into a better feed conversion rate for the whole life and birds reaching their final weight sooner – all due to the benefits of a diet with improved microbiological quality.

Supplying clean feed

Feed borne micro-organisms clearly reduce breeder, chick and broiler performance, so what is the best way to stop them cutting into productivity?

Feed needs to be clean at the point of consumption for breeders and chicks alike. If micro-organisms



are present, then you are going to miss out on productivity.

Heat treatment or chemical treatment both significantly reduce the presence of micro-organisms in feed but only something that provides immediate kills and residual protection from recontamination is certain to reduce microbiological demands on the bird.

Without residual protection, micro-organisms can quickly recolonise and cause problems for your stock. If there is a short time lag between heat treatment and usage, then you will still get protection but if the feed is sitting on a truck or placed in a silo for any length of time then you will see the consequences in your chicks. Using

a treatment such as Termin-8 or Finio which provide market-leading control and residual protection against pathogens for two weeks or more is recommended.

Moreover, the performance of these treatments far exceeds what can be expected from organic acids which have questionable kill activity with no residual control.

Reliable protection will prove its worth when you look at the data for breeders and hatchlings – and the benefits are by no means just a question of chick quality – effective control increases all the main metrics of productivity and minimises the overall risk to your flock from disease by keeping environmental pathogen levels much lower. ■