

The Importance of Day Old Chick Quality

New and familiar challenges

The last quarter of 2014 and early 2015 saw the re-emergence of *highly pathogenic avian influenza* (HPAI) throughout the Northern Hemisphere from Korea and China in the east, westwards in Russia, Germany, Holland, the UK and also across the Atlantic to Canada and the US. In Europe this led some to question whether free-range layer flocks should temporarily be kept inside to reduce contamination risk from wild bird populations.

Better biosecurity is one way to prevent diseases entering the farm environment and can contribute to a reduction in antibiotic usage—a goal now gaining strength throughout the world.

One of the main reasons for antibiotic usage in poultry production is to prevent mortality in the first 2 weeks of life. Improving the health status of the day old chick is therefore of prime importance. In this issue of **Science & Solutions** we explore ways of enhancing chick quality from the breeder to the broiler farm.

Last harvest also saw a dramatic rise in the mycotoxin contamination of corn (maize), leading some Southern and Eastern European governments to issue warnings to the feed and livestock industries. Given the prominence of corn in poultry diets, this year's high levels of deoxynivalenol, zearalenone and fumonisins is worrying. In this issue we highlight fresh research on the latter—often considered the main mycotoxin in corn—showing fumonisins' potential to harm poultry and an innovative way to combat them.

Finally, this issue brings the fourth part of our series on differential diagnosis covering egg production and quality issues.

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Biomim



A 1-day old chick has the potential to become a broiler chicken, a layer or breeder. Given this versatility, the quality of day old chicks (DOCs) matters immensely to poultry businesses. This article addresses key development stages, focusing on most frequent disturbances in the field and relevant solutions.

Mycotoxin contamination can in some cases be vertically transmitted, negatively impacting embryo development and thus future flock growth.

Healthy chicks are the starting point for good poultry performance. Yet, any number of problems — some difficult to detect early on — can impact the quality of day old chicks. From the breeder’s farm to the hatchery and transportation to final farm reception, management practices have a real impact. Optimized processes and preventive measures can give chicks the right start.

Handle with care

At the hatchery, attention to hatchery process is vital to avoid poor chick quality. Special care should be taken for long time storage, separating small eggs from bigger eggs by donor flock age, hatchery hygiene and transportation conditions. Long storage can reduce hatchability, impairing the animal’s future growth rate. Separation of chicks coming from young and older breeder flocks will improve homogeneity. Yolk sac infection and aspergillosis can be linked to hatchery hygiene, but also to the cleanliness of the egg.

Get the bugs out

At hatch some chicks are already contaminated with bacteria that can lead to high mortality from yolk sac infection or bacterial chondronecrosis with osteomyelitis (BCO). As young chicks develop, fast growth of the birds

can produce microscopic cracks in the cartilage of the femoral head. Opportunistic bacteria can move from the digestive tract to the blood system and finally to inflamed areas such as these. If not caught and addressed in a timely manner, it becomes considerably more difficult and costly to control these pathogens. One field trial held in Holland showed that day old chicks infected with *Enterococcus* later developed BCO due to an earlier infection in the circulatory system. Solutions that counteract bacteria at early stages of this journey can be effective.

Species-specific probiotics, for example, can deter the attachment of opportunistic bacteria to the intestine receptors and thus limit infection. Trial results comparing the effectiveness of probiotics to antibiotics show that probiotics significantly reduce instances of BCO lameness while improving feed efficiency and final body weight.

Pathogens, a poor inheritance

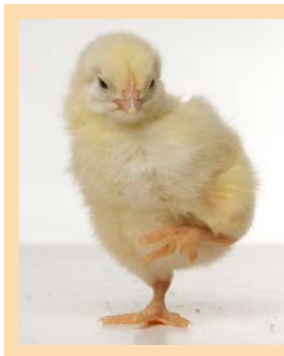
Vertical transmission of bacteria (from mother to her offspring) can negatively impact chicks’ health and resistance to diseases, with further consequences in terms of growth and livability. It is important to control Gram-negative bacteria such as *Salmonella* and *E. coli* and Gram-positive ones such as *Enterococcus* and other aggressive agents at all stages.

Gram-negative bacteria in particular spread easily from breeder houses to hatcheries and day old chicks, leading to high mortality and costly antibiotic treatments that are best avoided.

Generally, bacteria control starts with breeder house management using a proper vaccination program and controlling water and feed hygiene. Disinfection of eggs right after laying and rejection of dirty eggs further reduces the risk of contamination.

Feed and water

Pathogens can also contaminate feed and water. Feed and water hygiene thus play an important role in breeder house management to prevent bacterial contamination



Smart shopping

Buying day-old chicks from a reputable hatchery company and providing them a clean, warm place to grow with easy access to clean fresh water and good-quality chick feed will generally result in healthy chicks.

However, heterogeneity, omphalitis and other bacterial infections that could affect normal growth of the chick may only exhibit after a few days. Seven-day mortality can offer a rough guide to brood health.



passing from breeders to eggs and chicks. A combined organic acids plus permeabilizer solution weakens the outer membrane of Gram-negative bacteria and kills microbes—thus protecting the host animal.

It is important to check all raw materials, especially cereals and protein sources, for *Salmonella* contamination. While heat treatment of feed is a common method to control bacteria, it does not guard against recontamination during transportation and storage. As shown in *Figure 1*, the bacterial count of feed rebounds in the hours and days after treatment.

Because *Salmonella* can persist in contaminated drinking water systems for several weeks, it is advised to use acidifiers in animal's drinking water in addition to chlorination or other measures in order to preserve hygienic quality. A combination organic acids and chlorinated water enhances hypochlorous acid levels, having strong disinfectant and antioxidant effects.

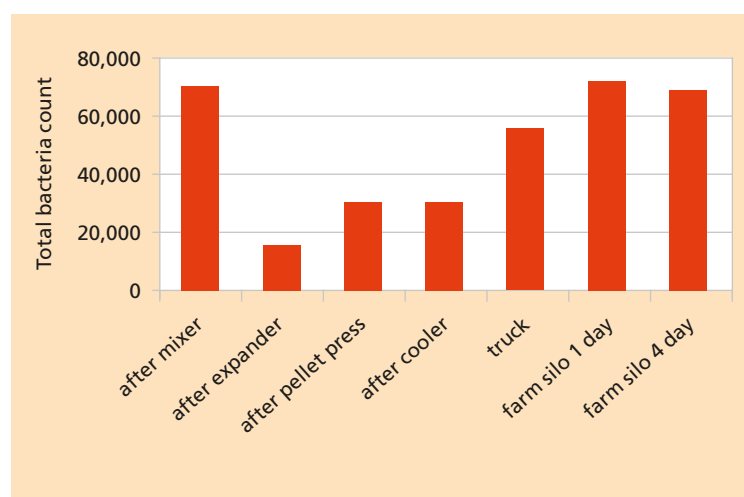
Gut health

Non-starch polysaccharides (NSPs) are anti-nutritional compounds in the feed that increase the viscosity of the gut content, resulting in greater bacteria proliferation and sticky droppings—thus increasing the number of dirty and contaminated eggs. Enzymes that breakdown NSPs may offer one possible solution. Phyto-genics also support gut performance: certain plant-derived substances are proven to decrease microbial overload, improve nutrient digestibility, boost animal performance and improve egg shell quality.

Mycotoxin contamination

The occurrence of mycotoxins — toxic fungal metabolites found in raw materials and feedstuffs — has increased in recent years and poses a threat to livestock production globally. Some mycotoxins hamper the immune system's response to vaccines, weakening animals' defenses. Others interact synergistically with pathogens, having compound negative effects on animal health and performance. Mycotoxin contamination

Figure 1. Recontamination of feed without acidifier



Source: Israelsen et al., 1996

can in some cases be vertically transmitted, negatively impacting embryo development and thus future flock growth.

Given the numerous harmful effects of mycotoxins on poultry, preventive feed application measures are strongly recommended in breeders and in broilers alike. Fortunately, Mycofix® effectively combats not just for adsorbable mycotoxins but also non-adsorbable ones using enzymatic biotransformation to convert them into non-toxic metabolites.

Conclusion

Ensuring day old chick quality puts chicks on the right path to good health and performance. Pathogens and mycotoxin contamination —whether via ingestion or vertical transmission— can cause real harm whose effects multiply in the presence of both.

Modern management practices that support strong gut performance and mycotoxin risk management are the foundation for success in all stages of poultry production. 🍃