Technical information

Managing feed biosecurity in HatchCare

Carla van der Pol, MSc.

Introduction

Maintaining the highest possible biosecurity is an important challenge in any poultry operation. Contamination of the feed can lead to health issues in the chickens themselves, and may threaten the human customer after consumption of poultry meat or eggs. The main threats to animal feed quality are fungi such as Aspergillus, Penicillium, and Fusarium species and bacteria such as Salmonella and Clostridium serotypes (Maciorowski et al., 2007). Fungi in feed can produce mycotoxins, which can have a variety of effects: for example, they can be carcinogenic, hormone disruptive, immunosuppressive, or they may affect the nervous system. Presence of Salmonella in the feed can infect the animal, and consumption of an infected poultry products may lead to food poisoning in humans. Clostridium serotypes can produce toxins with various negative health effects. It is therefore of the utmost importance to ensure that contamination of poultry feed with microbes is minimized. Just like in other commercial poultry farms, hatcheries that work with HatchCare should be aware of the biosecurity challenge that is related to providing feed to newly hatched chicks.

Environmental conditions

Complete elimination of contamination of feed by fungi does not seem to be achievable. Care should be taken to provide the least optimal microclimate possible for fungi to grow on. In HatchCare, air temperatures are maintained between 35 and 37°C. To compare, in a broiler house, air temperature will usually be around 32°C upon placement of the chicken. Fungal growth is not a large risk in HatchCare, as most fungi commonly found in feed show highest germination at ambient temperatures below 30°C. For example, Penicillium verrucosum (Pardo et al., 2006) and Fusarium graminearum (Ramirez et al., 2006) show higher germination levels at 20-25°C than at 30°C. Schindler et al. (1967) found highest growth for Aspergillus flavus between 29 and 35°C ambient temperature, but mycotoxin production (which are the main threat from fungal growth) was highest at 24°C. Furthermore, fungi need a humid environment to grow on. Unlike a traditional Hatcher, HatchCare maintains the relative humidity between 40 and 50%, which will limit fungal growth. The constant air flow in HatchCare ensures that no micro climate with higher humidity levels can form in the feeding troughs. Within the 3 days feed is present in a HatchCare system, germination of Aspergillus, Penicillium,

and Fusarium species should therefore not pose a problem in terms of mycotoxin production if initial levels of mycotoxin levels and fungal contamination are minimized at the feed mill.

Bacteria, too, require a source of moisture to replicate, and the constant air flow in HatchCare will therefore limit bacterial growth. However, the high ambient temperatures preferred by the newly hatched chickens are ideal for growth of bacteria such as Salmonella enteritidis, which shows the highest growth rate around 37°C (Fehlhaber and Krüger, 1998), or Clostridium perfringens, with highest growth between 30 and 47°C (Craven, 1980). Bacteria furthermore require less time to grow to harmful numbers than fungi. Therefore, the key to limiting bacterial contamination of the feed in HatchCare lies in prevention: using clean feed, eggs, and equipment will result in uncontaminated feed residue and chicks at pull time.

Prevention

A vital step to maintain a high biosecurity standard is preventing that the feed becomes contaminated in the first place. This requires adoption of a 'garbage in, garbage out'-perspective. If source material is contaminated and brought into the hatchery, a biosecurity problem may be on hand; but if protocols are followed to ensure a high biosecurity standard of incoming material and procedures, the hatchery will remain a clean and secure place. Four important sources of contamination can be identified.

Feed – The first step is to ensure that any feed delivered to the hatchery meets the highest possible quality standards. This requires careful monitoring and strict control measures from the feed mill. Microbial contamination may occur on all levels of feed production. Control measures should therefore include prevention of contamination of raw ingredients, reduction of microbial growth within the feed mill, and eradication of the pathogen (Jones, 2011). Monitoring should be rigorous and samples should be taken at all levels of the feed production cycle. Basic spot sampling of the feed may not be enough to bring all contamination to light, as contamination is usually not spread uniformly within a batch. The task to ensure optimal biosecurity in the feed lies with the feed mill. Once the feed is at the hatchery, care should be taken to store it adequately – either in bags in a dry place within the hatchery, or in a clean, dry silo.

Eggs – The hatching eggs can form a second source of contamination. During the hatching process, microbial pressure peaks, and microbes may be spread to the feed through circulating fluff. The contamination risk is increased even more when bangers are present. It is important to minimize contamination in the eggs from the moment they arrive at the hatchery. Floor eggs should not be used as hatching eggs. Follow strict storage and disinfection protocols, and prevent condensation at any point in the incubation process. If possible, use heart beat technology at candling so only live embryos are transferred to HatchCare, and bangers are avoided.

Personnel – Hatchery personnel should be trained in recognizing and avoiding biosecurity risks. Access to the hatchery should be controlled and limited to authorized persons. To avoid contamination from personnel itself, all staff should be required to shower and change before entering the hatchery. Contact with live poultry should be avoided outside of the hatchery operation. All staff must be encouraged to follow the hatchery's biosecurity procedures.

Hatchery equipment – Another possible source of contamination is the hatchery itself. With every batch of eggs or feed, fresh microbes are inevitably introduced into the hatchery even when the strictest biosecurity regulations are applied. Residual microbes after hatching should be eradicated from the equipment to start with a clean slate for each new hatch. Incubators and equipment should therefore be cleaned and disinfected after each use. They should furthermore be allowed enough time to dry before being used again, as wet spots form the ideal climate for harmful microbes to grow in.

Conclusions

To conclude, care should be taken to minimize microbial contamination of the feed in HatchCare. Because microbes can be introduced through the hatching eggs, personnel, and hatchery equipment, control of microbial contamination should occur at many levels. This requires a solid biosecurity plan for the hatchery. When correct cleaning and disinfection protocols are followed, feed contamination risk should be minimized.

References

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1cm The decisive difference in chick length

HATCHTECH PROVIDING SUPERIOR CHICK QUALITY