Hatchery cleaning and sanitation for good health and zoonotic freedom: II

Cleaning and disinfection have always been important for optimum hatchery performance. Effective cleaning and disinfection must prevent biofilm from establishing by removing all organic and inorganic residues, foreign bodies and micro-organisms, from surfaces.

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Cleaning and disinfection are two separate and distinct steps in the hatchery sanitation process.

Cleaning

The cleaning process removes around 90% of the total microbial load from a surface. The aim of cleaning is to remove organic matter so disinfectants, which are inactive in the presence of organic matter, can be applied successfully.

Cleaning must be completed in the egg, setter and hatcher rooms; setter and hatcher interiors; hallways; washing rooms; trays, boxes and baskets; chick processing and holding areas; laboratory and vaccination equipment; all ventilation system components – ducts, plenums, inlets, outlets, filters, air handling units; water plumbing, humidification system; and egg and chick transport trucks.

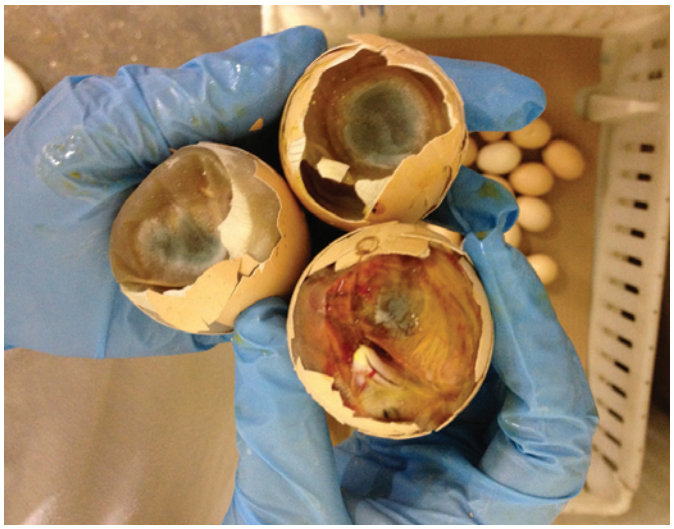
If any of these areas is omitted, any microbes present in that area will proliferate and cross-contaminate clean areas.

The cleaning process can be divided into dry and wet cleaning.

Dry cleaning

Dry cleaning is the simple mechanical removal of the dust, dirt, spider webs, chick fluff, egg shells and organic matter (blood, meconium) that may neutralise the disinfectant.

This stage prepares surfaces and equipment for wet cleaning, and consists of sweeping, scraping or vacuuming to remove all visible organic matter. It is important to include ventilation systems in routine dry cleaning to avoid the accumulation of debris, dust and fluff inside the ducts or onto fan blades, which may affect their operation and be sources of Aspergillus sp. contamination to the incoming air.



Inoculation site presenting fungus halo in old embryos – cross contamination due to a failure in disinfection procedures.

Wet cleaning

During this second stage of the cleaning process, applying water alone without completing an initial dry clean is not efficient. Wet cleaning involves a wash down with water, foam cleaning or detergent application, rinsing and drying.

The initial wash-down with water should be done with pressurised water to soften and remove any remaining organic matter. Water temperature must be below 50°C (122°F) to prevent protein coagulation.

The efficacy of the detergent used will depend on adhesion time and consistency of the foam carrier. Dirtier areas and material such as hatchers and hatch baskets will require more powerful detergents and longer contact time to degrade organic material. The choice of detergent will depend on the residues being removed. Grease and protein residues, most common in hatcheries, require alkaline detergents, while mineral residues, present on some hatchery equipment, require acid detergents. Neutral detergents are used for general cleaning.

When incubation equipment is excessively dirty (egg trays after transferring, hatch baskets after hatch, chick boxes after placement), with organic matter crusts on the surface, it should be soaked in warm water to allow the residues to soften before proceeding to the cleaning and disinfection procedures.

When using automatic washers, keep an eye on the detergent tank to ensure it correctly refills throughout the day, and to check belt speeds. Belt speeds that are too fast will result in insufficient contact time and ineffective removal of dirt.

Following wet cleaning, rinsing and drying must occur.

Rinsing

The rinsing step is mandatory, as the pH of some detergents can affect the action of disinfectants or may be incompatible with the disinfectant being used.

Drying

Drying is a crucial stage before starting any disinfection step, since excess water can dilute the disinfectant and affect its performance. Most hatcheries skip this step and as a result can have trouble with sanitiszing efficacy.

It is often recommended if drying has not been completed to increase the concentration of the disinfectant being used. Unfortunately, this often results in excessive use of disinfectant without assuring its efficacy. For this reason it is worth getting surfaces dry before applying any disinfectant.

Disinfection

After ensuring all organic material and other residues have been removed from the surfaces, disinfection can occur.

Disinfection may appear to be a simple procedure after all the cleaning, but it is susceptible to minor mistakes that can significantly affect the efficiency of the whole process.

- Always follow the manufacturer's recommendations on product dilution rates.
- Make sure that equipment is dry before trying to disinfect it.
- Keep disinfectant containers well sealed to maintain product concentration and quality.
- Always follow the contact time recommended by the manufacturer.
- Do not mix too much disinfectant at one time. It is common for hatcheries to prepare a big volume of disinfectant that is used over the whole week, but some disinfectants lose effectiveness quickly after being mixed with water and must be applied straight after dilution in order to work.

Continued on page 14

Continued from page 13

● When using an automatic washer, it is important to refill the disinfectant container throughout the day.

Disinfectants can be compounds of ammonia, phenols, halogens, acids, alcohols, iodine, and aldehydes among others.

Whatever type of disinfectant is chosen it must be effective against the pathogens that are actually present in the hatchery or that are most common in the region.

In order to avoid resistance it is necessary to rotate the use of disinfectants with different active ingredients.

Process practices to reduce contamination levels

● **Management of bangers and potential exploders**

It is important to remove bangers and potential exploders from the setters, registering the quantity during candling and residue break outs.

Bangers are the result of bacterial gas production inside the eggs causing an explosion which will spread bacterial contamination throughout the setters/hatchers.

The most common gas producing bacteria are Pseudomonas sp.

● **Egg transfer management. How to avoid cross contamination**

At day 18-19 of incubation eggs are transferred from setters to hatchers. Transfer is a critical management point, as all the eggs from a number of different flocks will pass through the same area.

It is strongly recommended to transfer floor eggs and eggs laid by old flocks at the end of the process to avoid contaminating nest eggs laid by younger flocks.

When in ovo vaccinating, it is important to check that the injector disinfection is operating correctly and with the correct concentration of disinfectant.

Inefficient needle disinfection will allow fungi/bacteria to cross infect eggs vaccinated later.

The photograph on the previous page shows eggs that were contaminated with fungus during in ovo vaccination.

This can happen due to inefficient needle disinfection or because the hatcher environment was dirty when transferring, allowing spores to penetrate the inoculation hole.

Before transferring eggs it is crucial to make sure that the hatchers are clean and disinfected. Never transfer eggs to hatchers that are still wet or have not been disinfected. The environment where the chicks are hatching can directly affect their quality and first week mortality.

This includes the hatch baskets which need to dry after being cleaned and disinfected. Automatic washers are commonly used to clean and disinfect hatcher and chick baskets, but many do not remove organic material from the previous hatch effectively, which means disinfection cannot be efficient.

● **Keeping pathogen levels low after hatch**

One important management tool to control microbial numbers around the time of hatch is fumigating chicks inside hatchers during the hatch process to reduce contamination levels from the environment and yolk sac.

The most effective practice is formalin fumigation, but due to restrictions in some countries, alternative disinfection methods are being increasingly used.

Regardless of the method and disinfectant applied, it is important to make sure dosing rates are correct and timing optimal. Disinfection must reduce the pathogen number without harming the chicks.

Once hatched, chicks can still be exposed to contamination sources through sexers, the hands of other staff, dirty chick boxes and dirty/wet conveyor belts.

After hatch, chick navels are still healing: placing chicks in chick boxes that are dirty or are lined with poor quality or non-disinfected paper, can allow bacteria to penetrate the yolk sac and cause omphalitis.

It is important to ensure that the chick box paper quality is high and that chick boxes and belts are dried and disinfected before processing the chicks.

Conclusion

It is possible to produce good quality and healthy chicks without using antibiotics within the hatchery. It is essential to reduce pathogen levels in all areas of the hatchery. Choosing the best procedures, detergents, disinfectants and application methods is essential.

The efficacy of the cleaning and disinfection process must be evaluated routinely through microbiological monitoring. All process areas should be sampled for bacteria and fungus and ideally for viruses.

Ensuring contamination entering the hatchery is low through good biosecurity and processes to reduce contamination levels during the hatch process are key. ■