

Hatchery hygiene – getting the basics right for Grade A chicks

by **Luc Ledoux, Business Unit Manager, CID Lines nv, Waterpoortstraat 2, 8900, Ieper, Belgium.**

The starting point of hatchery hygiene is obviously a healthy breeder flock and fresh quality hatching eggs coming in. However, their genetic potential can still be wasted by pathogens on the long 21 day road to chick development.

Ideally eggs (or embryos) should be disinfected as soon as possible after collection at the breeder farm, and again upon arrival at the hatchery. The hatchery is the crucial ‘funnel’, collecting eggs from many breeder farms (or imported eggs) and distributing day old chicks to many farms.

The incubators not only incubate embryos, but also many bacteria. In multi-stage setters, this growth of bacteria is uninterrupted, unless a regular spray or mist disinfection is carried out and exploded eggs are removed and their debris is cleared up.

Fumigation in the setter with formaldehyde, a carcinogenic product, cannot be done between 24 and 96 hours of embryo development. Moreover, formaldehyde has no residual action so it does not prevent recontamination.

In the hatchers, at pipping, the germ counts explode logarithmically. Remember that bacteria can double every 20 minutes.

Table 1 shows what bacteria need for growth and how we can reduce this growth.

The hatchery lay-out should consider four flows:

1 Product flow: no crossing of eggs and chicks.

1 People flow: from clean (egg) zone to dirty (chick) zone, ideally with colour coded areas, with showers, hand washing facilities and foot dips at the entrance and foot dips between every production zone for the personnel. Truck drivers should never enter the building. Offices, showers and toilets should ideally be separated from the production rooms.

1 Air flow: positive pressure in the clean zone with no air intake near a dirty zone exhaust.

1 Waste water flow: separate drains for clean and dirty areas.

Product procedures

Hatching eggs can be washed with alkaline products, either chlorinated or non-chlorinated, based on potassium hydroxide. Proper temperature control (42-45°C or 108-113°F) is crucial.

Contact time should be limited to approximately five minutes, in order not to affect the cuticle. Disinfection afterwards should be at a slightly higher temperature, to prevent the product from entering the pores (45-47°C or 113-117°F); after rinsing at the same temperature. Ideally, products with a residual action should be used, to prevent early re-contamination.

As an alternative to formaldehyde fumigation, the Dutch Research Institute Praktijkonderzoek Pluimveehouderij Beekbergen found CID 2000 in an ultrasonic fogger as efficient as formaldehyde, without affecting hatchability. Field tests have shown that it is

also possible to evaporate the same product and disinfect by vapour.

Trays, crates and baskets can be washed with the same chemical as the eggs in a tunnel washer. It is important that the products do not foam when doing tunnel machine washing.

Do not forget to clean the tunnel washing machine itself as a lot of dirt can get caked inside it. Obviously, temperatures should be higher (50-60°C or 110-140°F), but not so high as to damage the plastic.

Ideally, these alkaline products which remove mainly fat and proteins should be rotated with an acid, non-foaming detergent to remove mineral deposits (limescale and iron) and residues from the alkaline cleaners, especially if the water is hard and leaves scale deposits.

If setter trolleys and trays go back to the farm, they must be disinfected. If farm buggies are being used, they should equally be disinfected.

Floors, walls and setters can be washed with a universal cleaner, designed specifically to remove the typical debris of the clean zone (yolk, albumen, blood). This detergent should also be suitable for application with a foam lance or scrubbing machine and therefore have good adhesion.

It is advisable to alternate once per month with an acid foam in the case of hard water. A good foam formulation will cling to ceilings and vertical surfaces, allowing a longer contact time for the chemical to act.

Be careful with alkaline cleaners (especially chlorinated) on aluminium: they may corrode it (showing typical white spots).

Today, special corrosion inhibitors allow alkaline cleaners to be used that do not corrode aluminium and thus protect your investment.

The characteristics of detergents are:
1 Wetting: decreases surface tension.
1 Dispersing: splits up dirt particles.
1 Emulsifying: splits and suspends oil and fat.
1 Suspending: floats and carries away dirt particles.
1 Sequestering: dissolves salts.

The terminal disinfection should also be versatile enough to be applied by spraying, foaming and fogging. Room fogging (or misting) in the setter and hatcher rooms allows

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Table 1. Factors encouraging bacterial growth and how to prevent it.

| Factor | Bacteria growth | Prevention |
|-------------|--------------------------------------|--|
| Food | Yolk and albumen | Remove waste, keep clean |
| Water | In egg and via humidifier | Avoid leakage, treat water |
| Temperature | In incubator | Store eggs in cool and clean area |
| Shelter | In eggshell, fittings, ducts | Clean and disinfect eggs, rooms machines and equipment |
| Air | Ventilation of machines and building | Spray or fog in machines, mist in rooms, renew air filters |

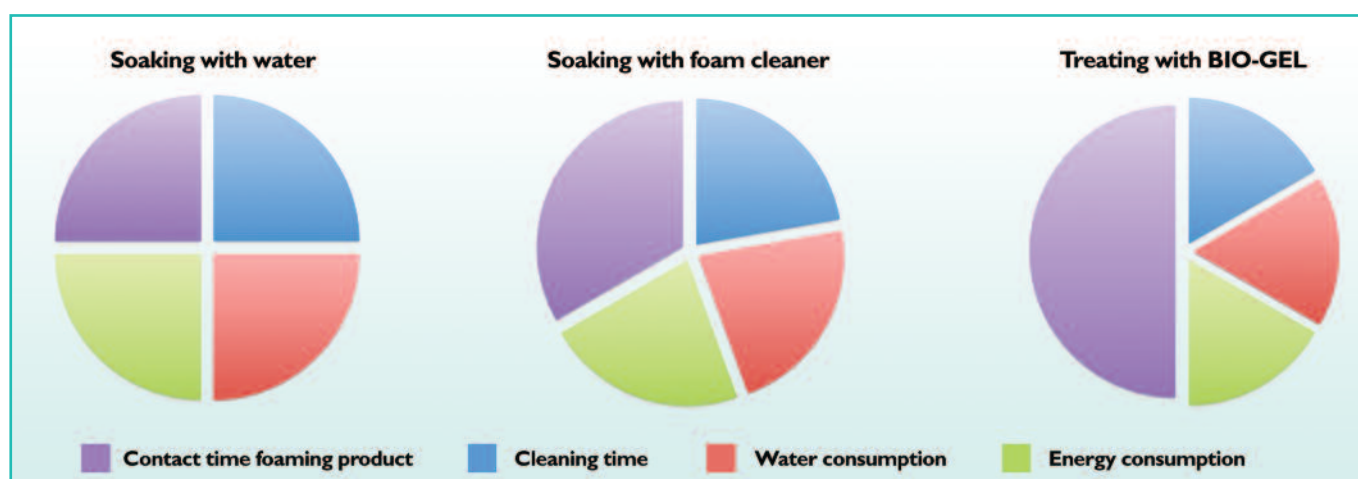


Fig. 1. Cleaning with water, foam and gel.

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the product to enter the machines through the air inlets and to disinfect the incubators and the air extraction ducts (or plenum) at the same time.

Personnel rooms and wash rooms can be scrubbed or hosed down with a universal cleaner, rotated with an acid if scale builds up, rinsed and disinfected weekly with the terminal disinfectant.

The same disinfectant can be used for foot dips at the entrance and in every production room. Ideally they should be renewed every other day.

It should be standard operating procedure to wash and disinfect the hands when entering the hatchery and when leaving the toilet.

In the dirty zone (hatcher room, chick room, wash room, reception and storage of dirty boxes), stronger cleaning products are advised; especially for cleaning the hatches and plenums, where lots of fluff needs to be removed (salmonella can live for years in fluff).

An alkaline foaming detergent, or even better, an alkaline, non-corrosive gel with

higher viscosity will do the job properly.

Gel clings longer on vertical surfaces and ceilings and will not dry. Hence, it is rinsed off easier, reducing water consumption and labour costs.

Instead of relying on 'elbow grease', it is better to rely on the chemistry of specially designed products, allowing for a long enough contact time and thus saving on water consumption, energy costs and cleaning time (labour cost).

In the industrialised world, labour accounts for >85% of your cleaning cost. In the developing world, it is still >60%.

It is advisable to rotate on a monthly basis with an acid foamer. Especially in the dirty zone, it is important to follow the correct procedures:

- 1 Remove all visible debris manually (with shovel and brush).
- 1 High pressure wash with foam lance.
- 1 Rinse.
- 1 Allow to dry.
- 1 Disinfect.

Often, step four is forgotten. When the disinfectant is sprayed on a wet surface, it may become diluted more than it should.

Moreover, the surface tension of water that is still present in cracks and holes will impede good penetration of the disinfectant solution (even if it does contain surfactants).

A well formulated product with good surfactants will penetrate dry cracks more easily. You will have noticed that there is no need for rinsing the disinfectant from the hatcher cabinet.

When the product has a residual action of at least three days, you can simply spray, or (even better) foam it on all surfaces, load in the transferred eggs and close the doors.

The product will keep on working throughout the hatching process!

Excellent results have been observed by misting disinfectant in hatcher cabinets.

When a vacuum waste removal and silo system is not available, the offal containers also need cleaning (with a universal detergent) and disinfecting.

The trucks should be washed outside (with a special traffic film remover) and inside (with a universal detergent). Outside

disinfection is important when entering the hatchery premises so use a wheel dip and a spray installation.

Disinfect inside with a non-corrosive disinfectant, after washing out with detergent. Always pre-wash with recommended detergents, preferably from the same supplier as the disinfectants.

Table 2 shows that you do not need that many products (to keep the logistics simplified), but it is important to use the right product in the right place.

Sanitation plan

A hatchery sanitation plan should be part of the Integrated Quality Control system.

ISO certification will require a detailed program with well defined standard operating procedures, both for implementation and control of hygiene.

ISO certified hatcheries should preferably require their hygiene supplier to be ISO and GMP (Good Manufacturing Practice) certified as well.

The operational biosecurity must discipline and motivate the personnel through communication, implementation, control and feedback of the results. Correct hygiene management of the three 'Ps' (people, products and procedures) will lead to the ultimate goal of every hatchery – more grade A chicks and thus more profit. ■

Table 3. Summary of product needs.

| |
|-------------------------------------|
| Cleaning |
| One/two alkaline foaming detergents |
| One acid foaming detergent |
| Disinfection |
| One disinfectant (spray/foam/fog) |
| Automated tray wash |
| One alkaline non-foaming |
| One acid non-foaming |