General protocol for clean disinfecting poultry house

Ensuring good flock health starts with healthy chicks placed in a clean environment. Cleaning and disinfection go hand in hand. There has to be a good balance between soaking, cleaning and disinfection chemicals. Depending on the type of poultry and poultry house a special protocol must be applied.

The starting point of “field biosecurity” is the reception of a healthy flock from the hatchery. This also implies healthy breeders and a good biosecurity program both at the hatchery and during the transport of the chicks to the house. But, as today’s genetics became so high performing, they became less and less resistant and therefore require optimum biosecurity conditions at the farm.

There are numerous views about how clean poultry farms and the equipment should be. They vary from ‘everything has to be practically sterile’, to ‘just visually clean is sufficient’. HACCP rules and integration regulations however prescribe approaches where a certain antimicrobial effect has to be achieved. This means that disease-causing micro-organisms, e.g. E. coli, Salmonella and Campylobacter, have to be eliminated so they cannot infect birds or spoil meat or eggs. Pathogens such as NCD, AI, IBDS, Marek etc., should also be eliminated so the new flock can start under optimal conditions, with a minimal risk of contamination by the environment, including rodents, insects and free flying birds.

There is no single best method or protocol for cleaning and disinfection of poultry houses. But there are certain matters of vital importance that simply may have been neglected or even forgotten over the years.

The majority of matters summarized in this article are well known and seem to be obvious, but it can be useful for refreshing memories or prevent business blindness.

What to do?
Keep always in mind that disinfection without cleaning is a waste of time and money. Cleaning is basically the management of dirt that can be seen partially: to separate and remove this dirt from a surface, by means of water and a detergent.

Cleaning and disinfection activities in poultry husbandry boil down to the following general list of activities:
• Remove equipment from the poultry house
• Remove litter
• Dry cleaning of building and all non-reovable equipment (“broom clean”)
• Soak with water plus detergent
• Cleaning of nipple drinker system
• Clean poultry house and equipment with water
• Remove remaining water from floor and other surfaces
• (partially) Reinstall equipment
• Disinfect with water plus disinfectant
• Dry disinfection with fog

Cleaning and disinfection have to be considered as two separate actions, which need specific chemicals that do not interfere with each other. The presence of residual organic material in a poultry house may inactivate the chemicals used and the presence of fat is an excellent protector for bacteria and other microbes. A fat solvent such as lye may prevent this protection, supposing that soaking time is sufficient.

Cleaning comes first
For proper and effective cleaning of a poultry house and its direct environment the various activities have to be performed in the right order. Before starting one should be sure that all equipment used is performing to the expectations. The same counts for the cleaning water used. It is most important that the water used for cleaning is fit for animal consumption and has to be free from organic or inorganic material that may negatively interfere with disinfectants used. A good cleaning job should allow for an 80 % reduction of microorganisms, generally known as a “sanitised” situation. This will allow the disinfectant to reduce the rest of the pathogens easier.

22 steps to clean a poultry house
1. Directly after removal of animals start the fight against insects such as darkling beetles and larvae, by spraying insecticide to the wall, in seams between floor and wall and in cracks in concrete floors. Litter has to be removed from the floor and the cracks. Beetles and larvae not only disappear into the ceiling, but most
of them disappear through crack under the concrete floors or bore holes into clay floors.

2. Service rooms, hygiene barrier and other rooms that are connected with the poultry house interior have to be cleared and thoroughly cleaned.

3. Feeder conveyers have to be empty completely. Feed residues should be removed and the feeder equipment has to be cleaned. Do not forget to do the same with silos, conveyers connected with silos and feed weighing equipment.

4. Equipment that cannot be cleaned at the spot but can be dismantled should be removed from the poultry house and temporarily stored in a place where it can be cleaned. Make sure this place has an effective water outlet that is not connected with the poultry house.

5. Now remove litter and move it directly outside the farm site. If it has to remain on the site cover it immediately and process it as soon as possible. Insects present in used litter happen to migrate back quickly to the nearest poultry house.

6. Roof fans have to be removed from the sockets in order to clean the sockets and shafts. Wall fans can be cleaned without dismounting, but one has to be sure that cleaning water and dirt will be removed effectively.

7. Air intake valves and shafts, are often difficult to reach but have to be dry cleaned both inside and outside. Cleaning of the outside is important since dust with contamination can easily be drawn inside. Animal and bird protection gauze preferably has to be removed. Compressed air may be of help in this respect.

8. When equipment cannot be water cleaned, it has to be dry cleaned and covered with plastic for protection.

9. Clean out the house while still dry and remove remaining faecal and other organic material.

10. Empty the drinking water system, flush it and fill it with a suitable cleaning agent and leave this for a proper contact time to be effective.

11. In case of concrete floors: soak for at least 3 hours with water with a detergent, and clean with high-pressure hose. Extra attention should be paid to places where different materials join and seams between wall and floor, so that the disinfectant can enter deeply inside and be effective.

12. Ceilings, fan shafts and walls now have to be treated with a detergent on foam basis in order to stick longer on the sur-
faces. After approx. 30 minutes wash down with water, ceilings and shafts with a round spraying nozzle, walls can be hosed with a flat sprayer. While working from top to bottom.

13. Floors, feed- and drinker systems should also be foamed and washed with water after 30 minutes. Take care not to spread dirt onto clean surfaces again by application a (too) high water pressure. Water outlets must be sufficient in number to quickly drain the debris.

14. Heaters need to be cleaned on the inside also, or else when the poultry house will be warmed again, the dirt will dry and crumbles will be blown into the clean room.

15. Service pipes for water and electricity are often forgotten. This also applies for lamps where dust may accumulate.

16. Remove residual water from floors.

17. Every room that is connected to the poultry house, including the storage facilities for dead birds have to be cleaned and disinfected in the same manner.

18. Inspect all clean rooms and equipment for residual dirt.

19. Equipment that could not be spot cleaned, should be clean and germ free.

20. Reinstall equipment into the poultry house, but do not place on the floor. Place ventilators again and close the shafts.

21. Close the house, but provide good attainability of the surfaces to be treated, such as air intake valves.

22. Wash working clothes and clean boots.

Drinker systems
In case of closed systems such as nipple drinkers, try to establish the kind of pollution inside the water pipes and nipples by disconnecting at a small number of places. Roughly the pollution can be either organic material such as bacteria, algae or moulds or inorganic material like salts or calcareous materials. Organic material has to be removed with alkaline chemicals or hydrogen peroxide, inorganic material has to be removed with acidified chemicals, which by the way may cause corrosion. Make sure that not only the main pipes are flushed but also the support or sidelines.

Nipple or cup system:
- Flush the system with high pressure.

Table 1. Efficacy of disinfecting agents to different pathogens

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Myco-</th>
<th>Viruses</th>
<th>Fungal Spores</th>
<th>Nematode</th>
<th>Cocci-dia</th>
<th>Sensitivity to organic material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium hydroxide</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>Not sensitive</td>
</tr>
<tr>
<td>Chloride solutions</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Sensitive</td>
</tr>
<tr>
<td>Quaternary ammonia solutions</td>
<td>+</td>
<td>+</td>
<td>+/</td>
<td>-</td>
<td>+</td>
<td>Little sensitive</td>
</tr>
<tr>
<td>Phenol solutions</td>
<td>++</td>
<td>++</td>
<td>+/</td>
<td>-</td>
<td>+</td>
<td>Little sensitive</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>++</td>
<td>++</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>Little sensitive</td>
</tr>
<tr>
<td>Peroxide</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>Little sensitive</td>
</tr>
<tr>
<td>Ammonia</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>Little sensitive</td>
</tr>
<tr>
<td>Combination products</td>
<td>++</td>
<td>+</td>
<td>++</td>
<td>+</td>
<td>-</td>
<td>Little sensitive</td>
</tr>
</tbody>
</table>

++/ excellent efficacy ++ very good + good - not effective +/- works against certain viruses

30. Use low pressure for spraying disinfectant on floor, wall and ceilings, inlet valves. Always start at the rear end of the house and work towards the door.

Close the ventilation inlets valves.
7. Place equipment and tools that were already disinfected in the house.
8. Prepare a disinfectant stock solution for fumigation and fumigate through a small opening in door or wall. When the fumigator is placed in the house, it has to be pulled backwards, in order to prevent recirculation of fog.
9. Every room that is in connection with the poultry house can also be disinfected by fumigation.
10. Lock the doors and in case of formaldehyde leave everything for at least 24 hours, in case of other chemicals for at least 8 hours.
11. Start ventilating after the indicated contact time and raise temperature when necessary until 15°C. First open ventilation outlets, followed by air inlets. Residual formaldehyde can be neutralized by spraying a 25% ammonium solution. Leaving the doors open is not a good solution since it will allow free access to unwanted materials.
12. The inside of the feeder system cannot be reached for cleaning or disinfection, but when there is a reason to do so, they can be filled with feed or feed component, mixed with a high dose of disinfectant, e.g. 5% formaldehyde or organic acid. This can be done at start of cleaning and stay for a number of days of contact time. Feed silos including the weighing system and feed screws can also be treated in a similar way.
13. When necessary remove residual precipitations of formaldehyde with water. The environment of the poultry house, such as loader platform and air exhausting areas can be disinfected with sodium hydroxide or chlorine solutions.

Choice of disinfectant
The choice of disinfecting chemical depends on a number of factors, such as efficacy against different micro-organisms, the safety of the workers, and of course the price of the chemical. Table 1 shows the efficacy of a number of chemicals, as well as the sensitivity to organic materials. These are only indicative data.

The Dutch Animal Health Service tested the efficacy of formaldehyde and other disinfectants by measuring hygiene scores and found a better efficacy of formaldehyde. On the other hand there appears to be no difference in efficacy between formaldehyde and products containing formaldehyde in combination with others. When using combined products, cleaning has to be very good.

To conclude, biosecurity is about an integrated program that should be implemented and checked. Ideally, one supplier should provide you with all necessary products and advice. For integrated companies, the supplier should have both a field sanitation and a hatchery sanitation program.

This article is a compilation of two articles written by N.M. Bolter, ID-Lelystad, The Netherlands and Luc Ledoux, Cid Lines, Ieper, Belgium