

The importance of cleaning and disinfection control

Many pig farmers are familiar with modern cleaning and disinfection protocols. However, these protocols are often not applied correctly. Research done by the Animal Health Care Flanders (DGZ), Belgium, shows that the use of microbiologic monitoring which has been applied in the poultry sector for a long time – is also applicable in pig houses to check the efficacy of the cleaning and disinfection procedure.

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Proper cleaning and disinfection (C&D) of pig houses is essential to control different pig diseases. However, it should be stressed that C&D-protocols, that are not carried out correctly, are an extra risk for digestive, respiratory and reproductive



Feeders, often forgotten, are the main cause of infections in pig houses.

diseases. Post-weaning Multisystemic Wasting Syndrome (PMWS) is an example. C&D will also play a key role in the new European *Salmonella* legislation.

The efficacy of a C&D procedure depends fully on the sequence and correctness of the execution of all the steps in the plan. This is why the Belgian hygiene company Cid Lines created a hygiene procedure which involves several steps to clean out pig houses (Table 1).

Soaking

Soaking the pig house with water for more than six hours loosens the dirt and makes it soluble.

There are two options: soaking with a detergent before the actual cleaning step, in order to reduce the actual cleaning time, or after the actual cleaning step, to improve the results of your disinfection.

The application of detergent enhances the penetration of water in the dirt

thanks to its wetting properties. It then dissolves the faecal grease and facilitates the destruction of biofilms. So, the softened dirt in suspension is more easily removed during the washing phase. Using detergent before the main washing phase is preferred in strongly contaminated fattening houses.

The use of a detergent after the main washing phase improves the quality of the cleaning. Therefore a better result of the disinfection may be obtained. This option is the preferred one in less contaminated rooms like the farrowing room. This is also the selected option for the standard protocol.

Foaming or not?

Foam increases the contact time with surfaces. Foaming products have a better penetration result in porous walls. It does not drain away fast, and less product is needed and less time necessary for application. Lastly, foaming increases the visibility of the disinfection. In this way, people tend to

Table 1. Hygiene programme: cleaning and disinfection.

Application	Product	Frequency	Application time
1. Dry cleaning: take away all rests of manure and feed			
2. Pre-soaking	Low pressure water	Every (half) hour	Six hours or more
3. Main cleaning	High pressure water		
4. Foaming	Strong alkaline gel		15 minutes
5. Second cleaning	High pressure water		
6. Rinse	Low pressure water		
7. Disinfecting	Broad spectrum disinfectant	Surface can be humid but not wet	(minimum) 10 minutes
8. Close the room 'hermetically', take care to close off openings (manure pits) to prevent contact with populated compartments			
9. Thermal fogging	Broad spectrum disinfectant (quat and aldehyde based)	1 day after step 7	(minimum) 10 minutes

remember having to do the corners or edges.

Second disinfection

Thermal fogging is the process of spreading a warm, ultra-thin mist in a hermetically closed stable. Due to the difference in temperature of the mist and the surface, a condense layer is spread on all surfaces. A second disinfection by means of a thermal fog generator will result in better disinfection results. This step is less expensive than the first disinfection.

However, the impact of this extra disinfection on the sanitary level and the performance of the farm is not known. This procedure should be considered on high health farms and on farms where infection pressure is high.

Field trial

Field trials were held on six farms in West-Flanders, Belgium, where the usual hygiene procedure was compared with that of the standard hygiene protocol. Two similar rooms (farrowing houses etc.) were emptied simultaneously. Room 1 was cleaned and disinfected according to the strict standard hygiene plan. Room 2 was cleaned and

disinfected in the standard way. After the procedure, Animal Health Care Flanders (DGZ) performed the microbiological monitoring with RODAC-plates (see box). The results revealed critical points. In semi-slatted rooms, the parts with full concrete floors displayed systematically bad results. This was probably because after the cleaning phase, proper rinsing was not carried out very often. This should be performed with water at high flow but low pressure. In this way, all loose dirt disappears in the manure tank.

An even more important point, seemed to be the feeders. The feeders were cleaned 'properly', but due to flying dirt they were soiled again and again. Also, rinsing in this case is the solution. Afterwards (and definitely before disinfection) the feeder should be emptied completely. In this way the remaining water and organic material can be removed. After that, a perfect result of disinfection can be obtained.

These two critical control points were carried out in strict procedure. There are two explanations for this. On one hand, the importance of rinsing has been stressed during the preliminary discussions on every farm. On the

Table 2. Field trial results.

	Room 1		Room 2		Average score
	CFU	Score	CFU	Score	
Separations	3	1	3	1	1
Separations	0	1	9	1	
Floor	36	1	99	2	1.25
Floor	11	1	105	2	
Rooster	14	1	50	2	1.25
Rooster	26	1	39	1	
Wall	25	1	23	1	1.25
Wall	45	2	18	1	
Wall up	9	1	15	1	1
Wall up	29	1	4	1	
Feeder	37	1	97	2	1.75
Feeder	40	2	65	2	
Total score		0.82		1.82	1.29

Source: DGZ

CFU = colony forming units

The calculated total score is the average of the total score per farm.

other hand, the effect of the second disinfection did not pass unnoticed. Results of plates taken on walls above animal level proved the efficacy.

It is sensible of pig breeders to regard good biosecurity practices a bare necessity, in order to make C&D key areas in the management of a pig farm. **PP**

Microbiological monitoring as a controlling tool

In the poultry industry, microbiological monitoring is used as a routine. So far this method has found little application in pig industry. At first, the result of cleaning and disinfection in pig houses was thought to be inferior to poultry houses (which are completely emptied after every batch). That's why people were hesitant to use this control method. Field trials ran by DGZ also proved that in pig rooms, microbiological monitoring is a useful tool to check whether the C&D protocol has been done appropriately, or to make an evaluation of changes made to the protocol.

How does it work? In some rooms of the animal house, the agar surface (the so-called RODAC-plates – Replicate Organism Detection and Counting) is pressed on the sample surface at several places; this is done by a certified sampler. The plates are then put upside down in the incubator of the laboratory for 24-hours after which the colonies are counted. The result is a good reflection of the total number of viable germs that remained

after the disinfection. Per RODAC-plate, the total number of Colony Forming Units (CFU) is counted. This results in a score per sample surface:
 Score 0 = very good
 Score 1 = good
 Score 2 = average
 Score 3 = bad
 Score > 4 = very bad
 Per room, different places are sampled (floor, wall, ceilings, separations, feeders, etc.). The average of all scores per sampled surface gives the overall score. The interpretation is as follows:
 Score ≤ 1 = good
 Score > 1 = average
 Score > 2 = bad
 Score > 3 = very bad



The RODAC-plate is pressed on the sample surface at several places, this is done by certified sampler. After that, the plate is put upside down in a laboratory incubator for 24 hours after which the colonies are counted. The result reflects very well the result after the disinfection.

The microbiological monitoring gives a clear and objective image of the thoroughness of the executed disinfection. To check cross-contamination from one batch to the next one, the technique can be applied in farms that are using all-in/all-out and good hygiene management and despite this, still suffer from high infection pressure. It can be used in farrowing pens, weaning rooms and fattening units. It will definitely be used on high risk farms in the framework of controlling *Salmonella*. Taking hygiene to a higher level is essential when implementing *Salmonella* control programmes. Finally, every farm that wants to grow to a higher sanitary status can use this method to check the cleaning and disinfection procedure.