How to prevent the introduction of African swine fever virus in non-commercial pig farms

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What is African swine fever (ASF)?

ASF is contagious haemorrhagic viral disease, that affects pigs of all breeds and ages. It does not affect other animal species or humans. The virus causes a haemorrhagic fever with high mortality rates in pigs. ASF virus is highly resistant to inactivation in the environment and it **can survive long periods**, even months, in suitable conditions. ASF virus can persist for weeks or months in uncooked meat and even years in frozen meat or meat products derived from infected pigs.

Figure 1. Infected pig

What are the main routes of transmission?

ASF can be transmitted by **direct contact** between pigs but the stability of the ASF virus, and high levels of environmental contamination, also facilitate disease spread via **contaminated vehicles, equipment, instruments and clothing**. Indirect transmission includes animal consumption of **contaminated pork or pork products**. For this reason, **swill feeding should be strictly forbidden**. The resistance of the virus to various environmental conditions favours its spread, which can be also promoted by poor farming practices and swill feeding. **Biosecurity** measures in pig farming are recognized as the most important control measure.

ASF can reach up to 100% mortality in infected pigs and is considered as one of the most serious diseases of pigs that can severely affect and disrupt regional and international trade of animals and animal products. In the affected countries, ASF has a serious socio-economic impact on pig farming due to the direct and indirect cost linked to the presence of the disease.

What to do to protect your farm from ASF?

Since there is no vaccine or treatment for ASF, the only way to prevent ASF virus introduction in the herd is the implementation of preventive measures. Among those, regular and thorough cleaning and disinfection (**C&D**) procedures are an important routine. Proper cleaning can remove over 90% of microorganisms[1] and improves disinfection efficacy since most disinfectans have reduced, or absent, effectiveness in presence of organic material.

How to prevent ASF in non-commercial farms?

General preventive measures are:

- Farms should be registered and animals should be identified.
- Buying pigs with known health status.

- No contact between the pig(s) of the NCF, pigs from other holdings and feral pigs or wild boar. Pigs should be kept in a way that ensures that there is no direct, neither indirect, contact with pigs coming from other holdings or with pigs outside the premises nor with wild boar.
- No swill feeding. Animals should be exclusively fed on pig feed.

[1] NAHEMS Guidelines: Cleaning and Disinfection FAD PReP - Foreign Animal Disease Preparedness & Response Plan. July 2014.
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/cleaning_disfection.pdf

- Natural mating should be avoided when the boar came from another farm and its health status is not known for sure. Sharing boars between neighbouring farms can be a source of risk and infection.
- Restrict vehicles access to the farm, precautions should be taken for every transport of animals and goods.
- Restrict access to pig's facilities only to staff (no visitors).
- Dedicated change of staff clothing for operations in contact with pigs. Such clothes and footwear should be regularly washed and never leave the farm.
- Thoroughly wash hands with soap before entering and leaving the premises.
- In front of each entrance the footbath with disinfection (Table 1) must be placed. Organic material should be removed from footwear prior disinfection.
- Pig pens should be cleaned regularly and all manure must be removed.
- Use separate equipment for manure and feeding.
- Maintain and clean all equipment regularly.
- In areas at risk for ASF in wild boar, effective disinfectants should be used and renewed, around pig's stable and at the entrance.

Figure 2. Cleaning before entering the pig facilities

- No hunting activity should be carried out 48h prior being in contact with pigs.
- In affected territories, green mass (grass and grains) or straw as bedding material should be avoided unless treated to inactivate ASF virus.
- No food should be brought into animal facilities.
- No sharing equipment between farms.
- Dead animals and other disposable material should be properly removed to avoid the spread of potentially contaminated material and attraction of scavenging animals.
- All dead animals found in the stable must be reported to the official veterinarian.
- Pest control should be conducted on animal facilities periodically.
- Self-consumption slaughters should be performed under veterinary supervision. Cleaning and disinfection protocols have to be applied after slaughtering on the facilities and to the slaughter tools.
- No other animal species should enter the pig stable.

What are the general principles of C&D of stables and feeders?

C&D is a general prophylactic measure aimed to reduce infection pressure and possibly improve overall health of the animals. When considering ASF, C&D is very important, complementing other preventive and control measures. The person in charge of C&D should carefully read all products instructions and take all necessary safety measures, including personal safety, precautions when using disinfection equipment and protection of the environment. Appropriate safety measures should be implemented during C&D, including protective clothing, boots, hats, visors, gloves and respirators. Cleaning should be carefully conducted prior disinfectant application. Walls, floors, equipment and possibly, ceiling should all be cleaned. C&D should be performed from clean to dirty areas and, if possible, removable equipment should be taken outside and C&D separately. Many different environmental factors may have possible influence on the final outcome C&D. For some products during cold seasons unheated facilities need to be treated with heated solutions. It is very important to include as much as possible the whole stable and all working equipment in **C&D.**

A C&D protocol consists of several equally important steps. The **C&D steps** are:

- Removal of organic material (**dry cleaning**). Physical removal of dirt such as manure, feed, dust. This ensures that following disinfections steps are more effective. The equipment that is usually used in this step include shovels, scrapers, brushers etc.
- **Pre-soaking**. It is recommended that this step last at least two hours. All stable surfaces should be moistened with water.
- **Washing**. This step can be performed by scraping, scrubbing and flushing by high-pressure water. Whenever possible, warm to hot water 32-54°C (90-130 ºF) or higher should be used. This can increase efficacy for some products and may be important for the proper dissolution of certain chemicals.
- **Application of detergent**. Always check compatibility of already used cleaning product with the selected disinfectant.
- **Rinse** to remove the detergent. May be carried out using high volume at low pressure cold water. Surfaces should be carefully inspected to ensure they are visibly clean.
- **Drying**. Treated surfaces should be completely dry (possibly overnight) before disinfection, since remaining water may dilute the applied disinfectant concentration and it may harm equipment.
- **Application of disinfectant**. Solutions should be clean and freshly made and instructions on the label should be carefully followed.
- **Contact time**. The amount of contact time needed can vary depending of the used product, follow product recommendations.
- **Rinse** to remove the disinfectant and **Drying**. Most chemical disinfectants can be harmful to animals and should be rinsed with potable water and surfaces should be allowed to air dry prior to restocking of the area.

C&D is effective only if all the steps listed above are carefully followed. The efficacy of the approved disinfectants (Table 1) must be regularly checked before use and the choice should be made considering the nature of the premises, vehicles and objects which are to be treated. Technical parameters indicated by the manufacturer must be observed. Following C&D **re-contamination should be avoided**.

What are the general principles of C&D of equipment?

Equipment may include any items used for the care, treatment, as well as any restraint equipment (e.g., halters, ropes), or any sort of materials in contact with infected animals. All these **can transfer microorganisms** to other locations and to susceptible animals, if the items cannot be adequately cleaned and disinfected, they should be appraised and disposed of[1].

C&D equipment (e.g., rakes, shovels, brushes, sprayers) must be cleaned and disinfected after use and stored in a secure location. Items or equipment removed from the area, including those used for cleaning (e.g., brooms, shovels, buckets, hoses), must be disposed of or disinfected after their use. Special care should be performed when cleaning and disinfecting rubber equipment since many disinfectants are corrosive to rubber. Strongly consider an appraisal of these items and destroying them[1].

Which are the active chemicals against ASF virus?

ASF virus can be inactivated by **heat** (56°C/70 minutes or 60°C/20 minutes), radiation or by **chemicals** (**Error! Reference source not found.**).

The use of disinfectants must meet regulatory requirements, as some of these disinfectants may have residual effects or prove damaging to the environment.

Table 1. Chemicals effective in ASF disinfection

Active ingredients	**Concentration**	**Exposure time**
Ether and chloroform		
Sodium hydroxide	8/1000	30 minutes
Hypochlorites	2.3%	30 minutes
Chlorine	2.3%	30 minutes
Formalin	3/1000	30 minutes
Ortho-phenylphenol	3%	30 minutes
Iodine compounds	(0.015%-0.0075%)	
Sodium hypochlorite	8/1000	
Citric acid	1%	
Quaternary ammonium compounds	0.003%	

For detailed information on how to **prevent** ASF from entering the farm, please see the WG3Report file on www.asf-stop.com/dissemination

Pictures were courteously provided by:
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