Biosecurity and Farm Sanitation

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Biosecurity is the term used to describe an overall strategy or succession of measures employed to exclude infectious diseases from a production site. Maintaining an effective biosecurity program, employing good hygiene practices and following a comprehensive vaccination program are each essential to disease prevention. A comprehensive biosecurity program involves a sequence of planning, implementing and control. Remember, it is impossible to sterilize a house or the premises. The key is to reduce pathogens and prevent their reintroduction. Outlined below are various key points to a successful bio-security program.

- Limit non-essential visitors to the farm. Keep a record of all visitors and their previous farm visits.
- Farm supervisors should visit the youngest flocks at the beginning of the day and working by age to the oldest flock for the last visit in that day.
- Avoid contact with poultry outside of the organization.
- If equipment must come from another farm it should be thoroughly cleaned and disinfected before it comes onto the farm.
- Provide wheel dips or wheel spraying facilities at the farm entrance and allow only necessary vehicles on site.
- Farms should be fenced.
- Keep doors and gates locked at all times.
- Absolutely no other poultry should be kept on the same farm as your poultry unit. Farm animals other than poultry should be fenced separately and have a different entrance from the poultry farm enterprise.
- No pet animals should be allowed in or around the poultry housing.
- All farms should have a vermin control plan which includes frequent monitoring of rodent activity. Adequate supplies of rodent bait must be maintained.
- All houses should be vermin proofed.
- All surrounding area around the poultry house should be free from vegetation, debris and unused equipment that could harbor vermin.
- Clean up feed spills as quickly as possible and fix any leaking feed bins or feed pipes because spilled feed attracts vermin to the poultry house.
- Farms should have toilet and handwashing facilities separate from the poultry house.
- A dedicated changing facility for protective clothing and footwear should be sited at the farm entrance.
- Provide hand-sanitizing facilities at the entrance to each house.
- Provide well-maintained footbaths at the entrance to each poultry house.
• Clean footwear before using footbath to remove organic material, which could inactivate the disinfectant.
• The choice of disinfectant for the footbath needs to be one that has a broad spectrum of activity and be fast acting because of limited contact time.

7.1 Biosecurity
• Footbaths should be covered.
• Single-age broiler farms are highly recommended to reduce the cycling of pathogens and/or vaccine agents within the farm.
• Birds should be placed from similar age parent flocks of the same vaccination status.
• Depletion of birds should be complete before arrival of new chicks.
• Catching crews should be provided with protective clothing. Equipment such as coops/crates and forklifts should be washed and disinfected before entry to the farm.
• Adequate down-time between flock placements is essential.
• If litter is re-used between flocks, all damp or caked litter should be removed and heat turned on in time to release any built up ammonia and to encourage drying of litter prior to placement of next batch of chicks.
• Drinking systems should be drained and flushed with an approved disinfectant before flock placement. Ensure that the system is again flushed with clean water before placement to remove any residue.
• Test water at least yearly for mineral levels and microbial quality.

7.2 Farm Sanitation
The single most important factor in keeping poultry healthy is maintaining good hygiene. Healthy parents and hygienic hatchery conditions contribute greatly to disease free chicks. Good hygiene standards will reduce disease challenge. Farm sanitation does not just mean the choice of the right disinfectant. The key to farm sanitation is effective cleaning. Disinfectants will be inactivated by organic material. The following points are the basic steps for effective farm sanitation. However, these steps are not applicable when litter is re-used.

Key points of a successful farm sanitation program
• At the end of each flock remove all the birds from the farm.
• Use an insecticide if insects have been a problem in the last flock of birds. This is best carried out immediately after depopulation and before the litter and building cool. Heavy infestations may require repeated insecticide application after the disinfection process is complete.
• Planned periodic preventative application of insecticide may be considered.
• Maintain the rodent control program after depopulation.
• Remove all unused feed from the feed system, including both bins and augers.
• Carefully consider the health status of the depleted flock before moving the feed to another flock.
• Clean out all the litter from each house and remove it in covered vehicles.
• Clean all the dust and dirt from the building, paying special attention to less obvious places such as air inlets, fan boxes and the tops of walls and beams.
• Dry clean any equipment that can not be washed directly and cover it completely to protect it from the washing process.
• Open up any drainage holes and water runoff pathways and wash down all interior surfaces of the house and fixed equipment with a general detergent through a pressure washer. If using a foam or gel, allow the recommended soak time to allow the product adequate time to work. The process should be carried out in a predetermined fashion, starting from washing the top to the bottom of the house (ceiling to the floor). If the fans are in the roof they should be washed first before the ceiling.
• In curtain sided houses special attention should be given to cleaning both the inside and outside of the curtain.
• The house should be washed from one end to the other paying special attention to fans and air inlets washing to the end with the best drainage. There should be no standing water around the poultry house and each farm should have adequate drainage that meets local legal requirements.
• House control rooms should be carefully cleaned as water may damage electricity control systems. Power air blowers, vacuums and wiping with a damp cloth (where possible and with safety in mind), may be helpful in such areas.
• If a water storage or header tank is present, where possible open it up and scrub it clean with a detergent.
• Drain the drinking system and header tank completely before adding cleaning solution.
• It is best, if possible, to circulate the sanitizing solution in your drinking system, if not leave it to stand in the drinking system for a minimum of twelve hours before completely flushing the system with clean water.
• Removed equipment should be cleaned, first with a detergent or if needed a scale remover and then thoroughly disinfected.
• Any equipment or materials such as fiber chick guard, or feeder lids that cannot be cleaned should not be reused for the next crop and should be safely destroyed.
• External areas such as gutters, fan boxes, roofs, pathways and concrete areas should be cleaned and maintained. Remove any washed out litter or organic matter from the farm compound. Unused and un-needed equipment should be removed from the farm.
• Carry out any equipment or facility repairs at this point and re-plug/fill any drainage holes opened up prior to washing.
• Outside concrete areas and ends of the house should be washed completely.
• Drying down after washing is advantageous. Heat and/or fans can be used to aid in the speed of this process.
• Staff areas, canteens, changing areas and offices should also be thoroughly cleaned. All footwear and clothing should be given a complete washing and disinfection at this point.

• Apply an effective broad-spectrum disinfectant through a pressure washer with a fan jet nozzle. Thoroughly soak all the interior surfaces and equipment working from top to bottom. Fan boxes, inlets, support beams and posts require special attention.

• After disinfection, biosecurity controls at house entrances must be reinstated.

• Adequate downtime between flocks will increase the effectiveness of the hygiene program. To monitor the effectiveness of the sanitation program, a visual inspection and microbial culture are suggested. The effectiveness of the sanitation program can be measured using quantitative laboratory tests. Sterilization of the facilities is not realistic but microbiological monitoring can confirm that non-desired organisms such as salmonella have been eliminated. A documented audit including microbiological monitoring and attention to the performance of subsequent flocks can help to determine the effectiveness and value of the sanitation program.

7.3 Fumigation

Formaldehyde has been used for many years as an effective poultry house fumigant. Human safety and legal usage of this chemical must be considered prior to its application in any sanitation program. The physical environment during fumigation is critical to its efficacy, and these are the points to follow

1. Increase relative humidity to 70-80%.

2. Ensure house temperature is at least 21°C (70°F) as formaldehyde gas rapidly loses efficacy as a disinfectant below this temperature.

3. Wash down all surfaces or place pans of water in the house, thus increasing the relative humidity and gaining maximum benefit from both the gaseous actions of formaldehyde and it’s condensation into a polymerized form.

4. The house should be sealed and left to cool for 24 hours after fumigation, thus promoting uniform condensation.

Fumigation methods

Formalin and potassium permanganate

These methods produce a violent chemical reaction that generates considerable heat and releases formaldehyde gas. Use 1 liter per 25m³ volume of space (40 fl oz. / 1000 ft³) formalin in the ratio of three parts formalin to two parts of potassium permanganate. Because of the violent chemical reaction, never use more than 1.2 liters (2 pints) of formalin in any one container. The container should have deep sides (at least 3 times the depth of the chemicals, with a diameter equal to the height) to prevent the mixture from bubbling over. The formalin must be placed on concrete or metal and not on shavings or any other flammable material. As an example a 1,705m³ (60,210 ft³) house would require: - 68.2 liters (2400 fl. oz. or 120 pints) of formalin - 60 containers - 45.36 Kg (100 lb.) of potassium permanganate Place 760g (27 oz) of potassium
permanganate into each container, preferably with two operators for safety. Start at the far end of the house placing as quickly as possible 1.2 liters (2 pints) of formalin into each container. Operators should wear a respirator throughout the entire procedure.

**Heating Solid Paraformaldehyde**

This is probably the most convenient method of producing formaldehyde gas. Paraformaldehyde prills are heated to a temperature of 218 °C (425 °F); generally 1 Kg of prills will be sufficient for 300 m³ (1 lb of prills for 5000 ft³). If the heating device is fitted with a time switch, this system can be fully automatic. Always follow manufacturers instructions.

**Formalin Vapors**

A mixture of equal parts of water and formalin dispersed as an aerosol is a very efficient method. Use 28 ml of formalin per 25 m³ mixed with 28 ml of water, or 5 fl oz of formalin per 1000 ft³ mixed with 5 fl oz of water. This should be generated as an aerosol using the necessary equipment. In each house it may be necessary to use more than one generator or employ some system of removing the generator and refilling. There are several companies providing such a service to the poultry industry.

**Precautions**

Formalin solutions and formaldehyde gas both represent a hazard to human and animal life. Operators must be trained and wear suitable protective clothing, respirators, eye shields and gloves and should be aware of current legislation concerning these products.