Cleaning and Disinfection

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Outline

- Introduction
- Steps for cleaning and disinfection
- How to choose
- How to evaluate disinfectant

How do we reduce pathogens?

1. Increase immunity
2. Decrease exposure

Most poultry health professionals will agree that for total bird health, you should **always do both**

Terminology

Cleaning

Removal of all animal matter, manure, litter, refuse from a place or thing, soil and any other contaminated material that cannot be disinfected.

Disinfection

The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases including zoonoses; this applies to premises, vehicles and different objects which may have been directly or indirectly contaminated. *(OIE)*

Decontamination is a more appropriate term to apply to premises

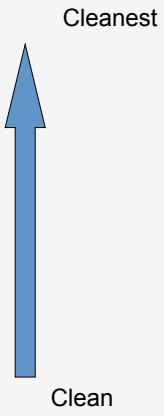
Terminology (cont.)

Sterilization – processes to destroy all microbial life including spores

Disinfectants – chemical compounds applied to inanimate (non-living) objects to destroy or irreversibly inactivate disease-causing organisms.

Antiseptic – chemical compounds used on living tissue to inactivate disease-causing organisms to a level determined to be safe.

Sanitizer – chemical compounds that reduce but do not completely eliminate the number of organisms on inanimate objects (usually refers to vegetative bacteria only).



Cleaning and Disinfection

Ideally

- Completely eliminate and/or inactivate the pathogenic agent, sources for its harbourage and carriage on premises declared infected

Practically

- Reduce the risk of disease transmission on and from an infected place
  - Reduce pathogen numbers
  - Reduce infectivity
  - Reduce survivability

C&D Steps

1. Cleaning
   1. Pre-cleaning / dry clean
   2. Foaming and soap
   3. Pressure rinsing
   4. Drying
2. Application of disinfection
3. Downtime

Must remove biofilms!

Remember: **YOU CANNOT DISINFECT DIRT!**

Preparation

- Turn fans off
- Disconnect electricity
- Remove sensitive equipment
- Alternative electrical supply for C&D equipment and lighting

Vectors

- To avoid transfer of pathogens
  - Detect and remove disease vectors
  - Seal rodent entrances
  - Remove and prohibit wild bird nesting areas
  - Eliminate insect breeding areas

Basic Protocol

- Systematic manner
  - Start at back and work toward front
  - Start at ceiling and work down walls
  - Small sections at a time
  - Work toward the drain
- Use marking tape to indicate completed areas

Dry Clean

- Use brooms, shovels, brushes, scrapers
- Moisten to control dust
- Remove
  - Visible organic material
  - Washable items
  - Rotten wood fixtures
- Scrape windowsills, floors
- Dispose of debris in biosecure manner

Wash and Rinse

- Wash area with detergent using sprayer, scrub brush
  - Avoid high pressure if highly contagious
- May need pre-soaked
- Scrubbing may be necessary
- Steam
  - Effective for cracks, crevices, pipework
- Rinse with clean, warm water
- Allow to dry (overnight)

Application of Chemical Disinfectant

- Start application from the top and work down to the floor
  - Make surfaces "**shiny wet**" (not just damp) for at least 10 min.
  - Porous surfaces require more disinfectant
- Close and lock the barn when done
- Allow sufficient contact time for the disinfectant to work
  - At least 1 hour
  - Make sure all surfaces are dry before preparing for new birds
- Ventilate the barn well before repopulating.
- You can monitor the C&D by taking environmental samples for bacterial counts

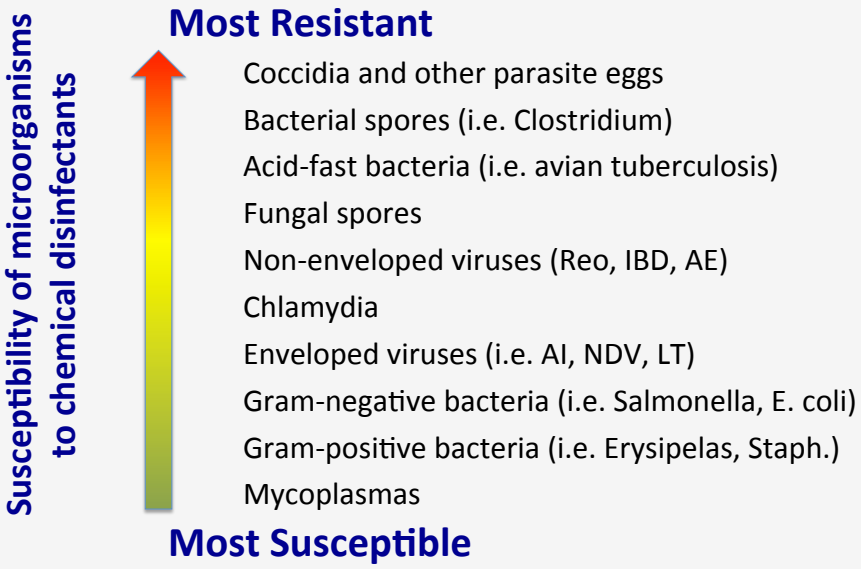
Building Exterior

- Width may vary
  - May be as wide as 10 feet
- Flame gun
  - Tip: Wet surfaces prior to distinguished areas treated
- Fan inlets
  - EPA-registered disinfectant with low pressure sprayer

Downtime

- Free of any animals or activity
- Reduces pathogens by drying
- Block of area

Microorganism Considerations



Cleaning agents

There are two basic types of detergents that can be used:

- Alkaline-based detergents that remove proteins and fats
- Acid-based detergents that remove mineral deposits like scales.

Disinfectants

- Physical
  - Heat
  - Light (sunlight, ultraviolet lamps)
  - Radiation (microwave, gamma radiation)
  - Impact (sonication, explosive)
- Chemical
  - Acid
  - Alkalis
  - Alcohols
  - Quats
  - Phenols
  - Aldehydes
  - Oxidizing agents
  - Hypochlorites
  - Iodophores

	Halogen compound		Phenols	Quats	Chlor-hexidine	Peroxy-gens
	Chlorine	Iodine				
Toxicity	Fumes are toxic	NO	NO	NO	NO	NO
Organic material	NO	NO	YES	SOME	---	YES
Residual activity	NO	NO	YES	YES	---	YES
Corrosive (metals)	YES	NO	NO	NO	NO	VERY

C&D Non-metal Materials

- Rubber and plastic may interact with chemical disinfectants
  - Heat can melt plastics
  - Phenols absorbed by plastics
  - Avoid sodium hydroxide (NaOH, caustic soda, lye)
  - Iodophors may stain and corrode
  - Alcohol can swell and harder rubber
- Concrete: porous, do not rinse
  - Flame guns
- Wood: extremely porous, do not rinse with plain water
  - Disinfectant registered for wood or exempted pesticide
- Soil: cannot be disinfected

Good Practices

- Read chemical labels thoroughly and the MSDS (Materials Safety Data Sheet)
- Always wear protective equipment (clothing, mask, eyewear)
- Apply the disinfectant to a dry surface
- Prepare the disinfectant solution based on the total area to be treated
- Use the concentration provided by the manufacturer
  - More is not necessarily better
  - Do not mix disinfectants

How to sample

- Large surfaces: sponge and 30 cm^2 template
- Small surfaces: swab and 5 cm^2 template
- Environmental swabbing How-To http://www.youtube.com/watch?v=tXXkSHbL8DE
- May need to use neutralizing agent

Conclusions

- Steps for effective C&D
  - Preparation
  - Dry clean (elbow grease) is 80% of the effort
  - Provide contact time of disinfectant
- Choose correct disinfectant
  - Good practices
  - Evaluation