

Reducing Pathogens, Optimising Performance: The Science Behind Effective Hygiene

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Hygiene as a Tool for Reducing Pathogen Load

Effective hygiene is a fundamental component of biosecurity and disease prevention.

- Cleaning and disinfection are routine between flocks, **but effectiveness varies.**
- Hygiene is often treated as a **checklist rather than a science-based process.**
- Understanding **pathogen survival and inactivation** is key to effective hygiene.
- Linking **pathogen biology and disinfectant chemistry** supports better on-farm hygiene.



Goal: Improve biosecurity, flock health, and production performance.

Cleaning VS Disinfection?

Which step reduces the most pathogens?

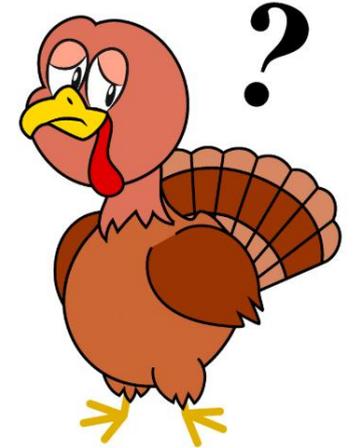


Cleaning

VS



Disinfection

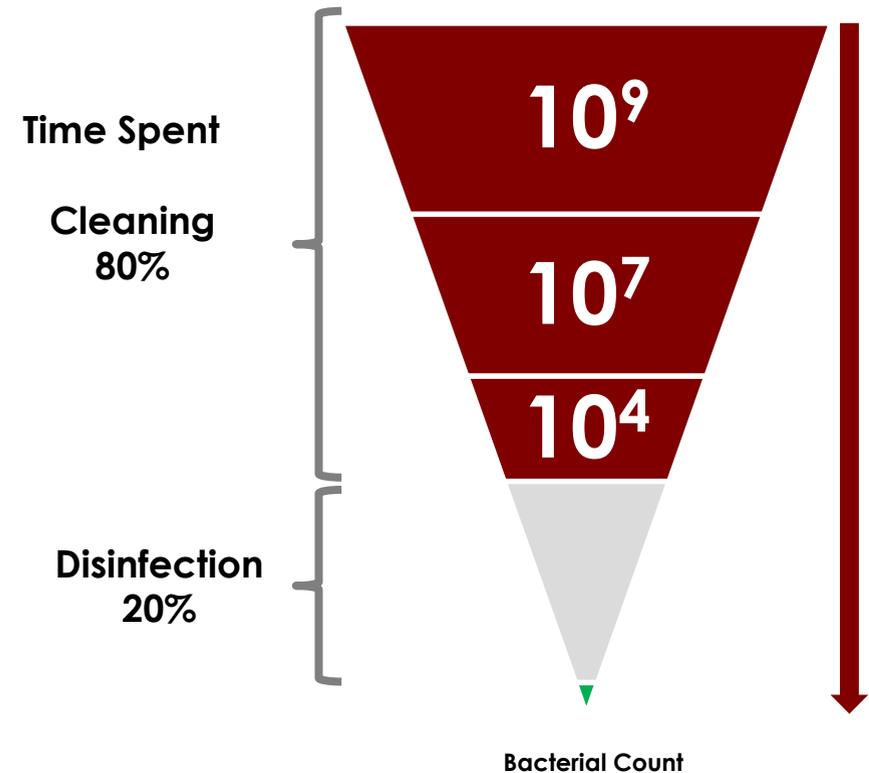


Most pathogen reduction comes from effective cleaning.

Organic Matter – You Can't Disinfect Muck!

- Litter, faeces, blood, serum, feed residues can adversely affect disinfectant performance in at least 2 ways:
 1. **Binding to** the disinfectant active ingredients, leaving less effective biocide available – especially chlorine, iodine, and iodophors.
 2. **Acts as a physical barrier** that protects pathogens
- **Removal of organic material** before disinfection is essential. (Fotheringham, 1995)

Pathogen number before cleaning and disinfection



Pathogen number after a good cleaning and disinfection



Understanding Disinfectant Efficacy – Log Reduction

Q. What is Log Reduction?

A. Log reduction describes the decrease in pathogen numbers after disinfection.

Log Reduction	Number of pathogen remaining	Percentage Reduction
0 log	1,000,000	0%
1 log	100,000	90%
2 log	10,000	99%
3 log	1,000	99.9%
4 log	100	99.99%
5 log	10	99.999%
6 log	1	99.9999%

Cleaning & Disinfection Protocol

Removal of equipment and dry cleaning

- Remove all small tools and movable equipment.
- Insect control – if a problem is identified.
- Remove all litter from the building and ensure a proper removal from the site.
- Scrape out dirt from the floor.
- Always work from top to bottom.
- Dry cleaning removes organic material more easily than wet sludge
 - Reduces water consumption
 - Saves time in the overall process



Remove as much organic matter as possible before washing.

Cleaning & Disinfection Protocol

Water systems: pipeline cleaning

- **Biofilms can:**
 - Harbour pathogens
 - Clog water pipes
 - Capture medicine particles
 - Promote development of resistant strains



Start cleaning water systems as soon as possible.

Cleaning & Disinfection Protocol

Water pre-soak

- **One of the key steps** for successful cleaning.
- Helps rehydrate dried organic material that remains after dry cleaning.
- Reduces cleaning time and water use.
- Start soaking within 3–4 hours after birds are removed from the building.
- Can be done by:
 - Manual soaking
 - Automatic misting systems installed in the building.



Pre-soaking softens dried organic material, which makes the detergent step more effective.

Apply Detergent

- **Helps penetrate and lift organic matter.**
- **Alkaline detergent will assist open biofilms – water alone will NOT.**
- **Wear appropriate PPE.**
- **Apply by foam application, from bottom to top and the back to the entrance.**
- **Follow the usage guidance:**
 - Concentration
 - Application rate: e.g. 300 ml/m²
 - Contact time: 20-30 min, 1 hr max.



Check water quality and use clean water in all C&D steps.

Apply Detergent

Foaming is recommended



Improves **Visibility**



Quick to Apply



Increases
Contact time



Improves **Efficacy**



Safety for Operator



Apply Detergent

Cleaning and disinfection are more challenging on wood surfaces.



Descaling Drinker Cups

Descaling with acid detergent

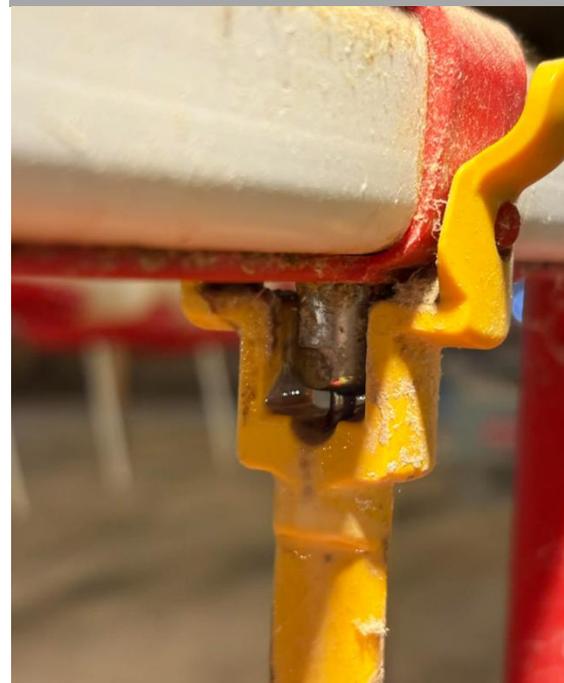
Before



After



Before



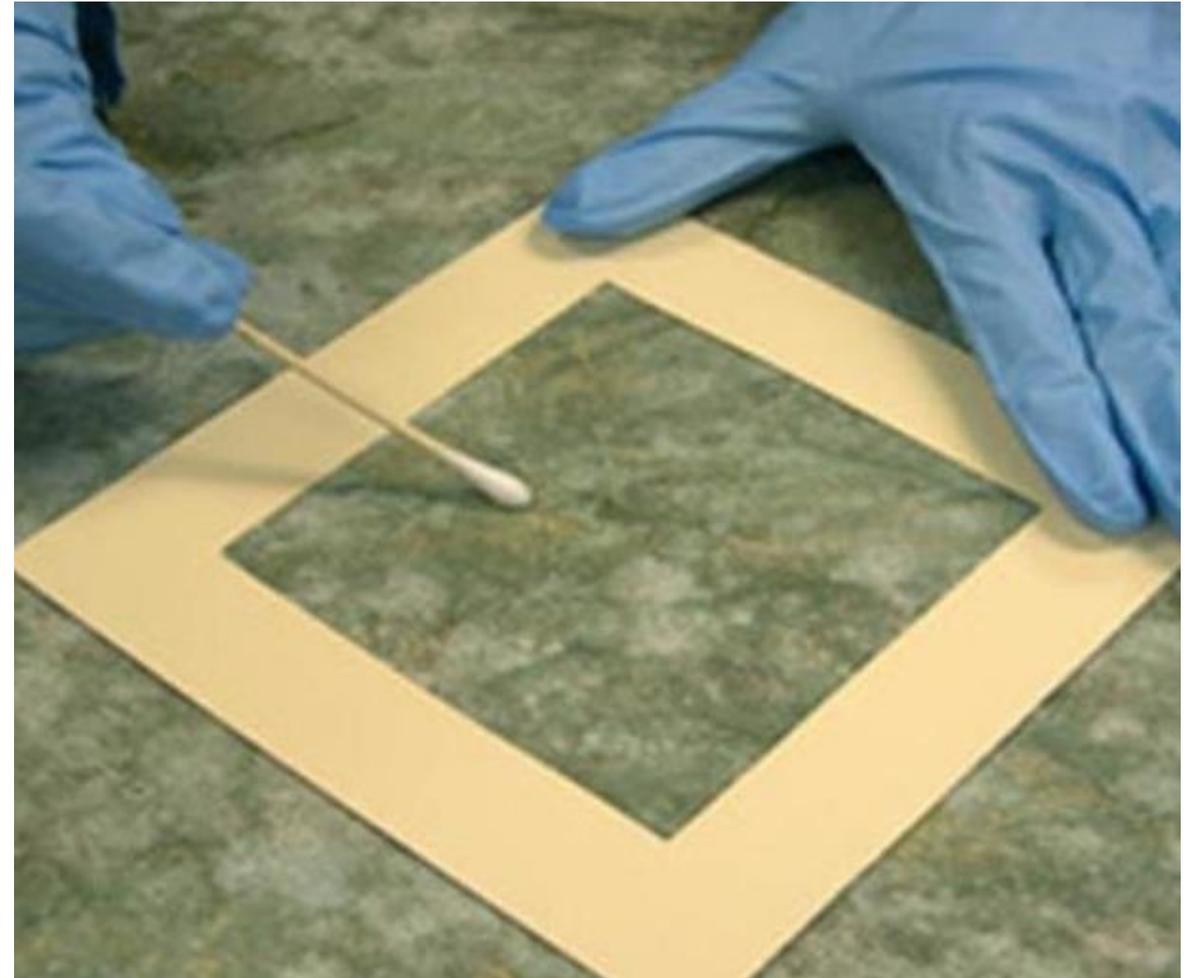
After



Monitoring Cleaning Protocol

How to know if the surface is clean?

- **Visual observation**
 - How to ‘Look’ for remaining dirt on the surface.
 - Feel with your hands on the metallic parts, if it feels greasy you still have biofilms.
- **Microbiology tests**
 - Surface swabs, agar plates
 - Take a minimum of 10 samples



Disinfection

Select disinfectants approved for farms

- **Wear PPE.**
- **Follow the usage guidance:**
 - Dilution & contact time
 - Application rate indicated e.g. 300 ml/m² or to the point of run-off
- **Allow sufficient contact time** to ensure the best disinfection efficacy!
- **Ensure no standing water after rinsing.**
 - This will dilute the disinfectant solution as well as reduce the foam adherence onto surfaces.



Disinfection

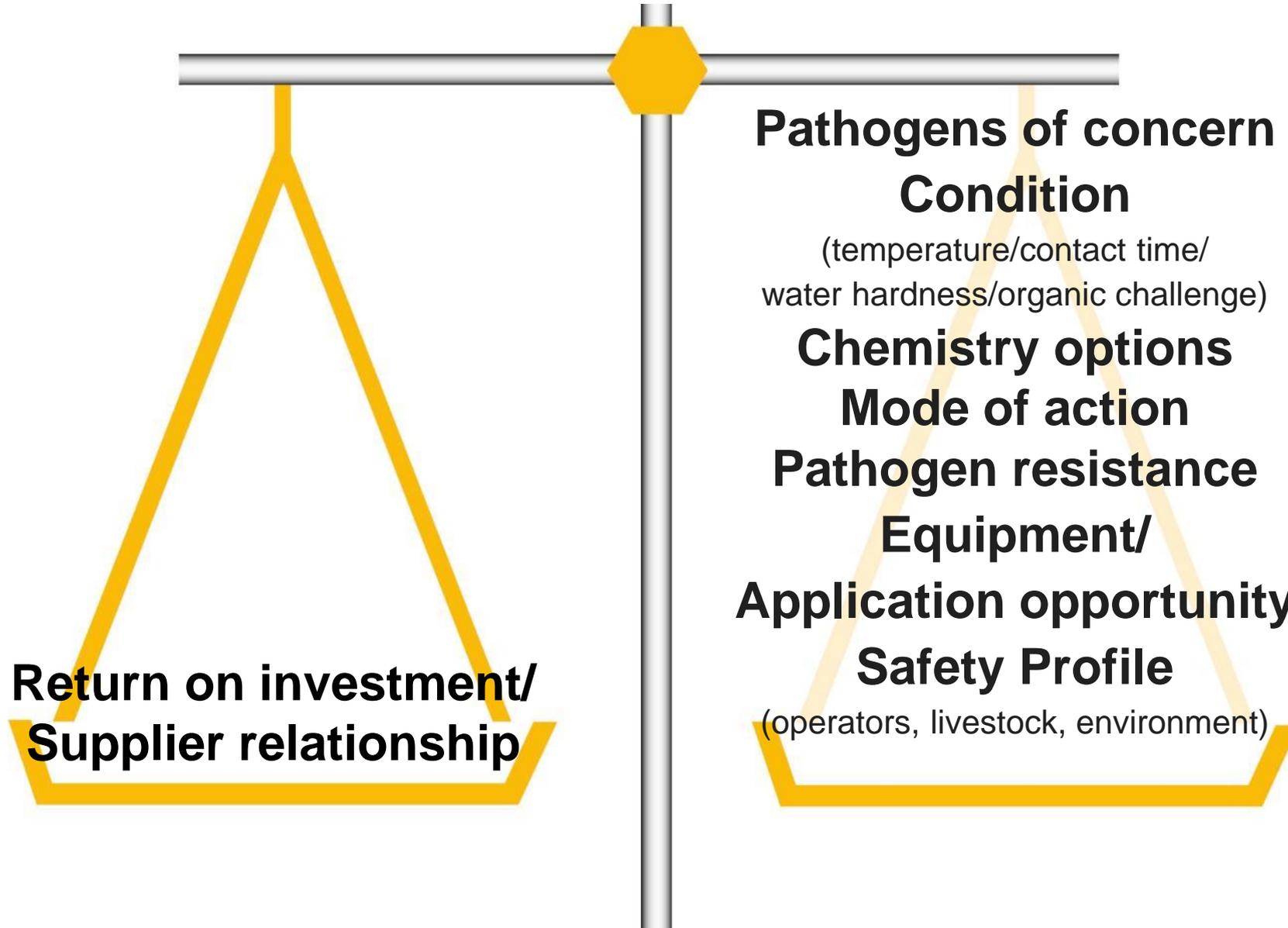
Disinfection: thermal fog

- Help control pathogen recontamination from during setting up the house for animal placement.
- Help improve the disinfection efficacy especially inaccessible/hard to reach areas.
- Should be an additional application, not a substitution of a spray/foam application.



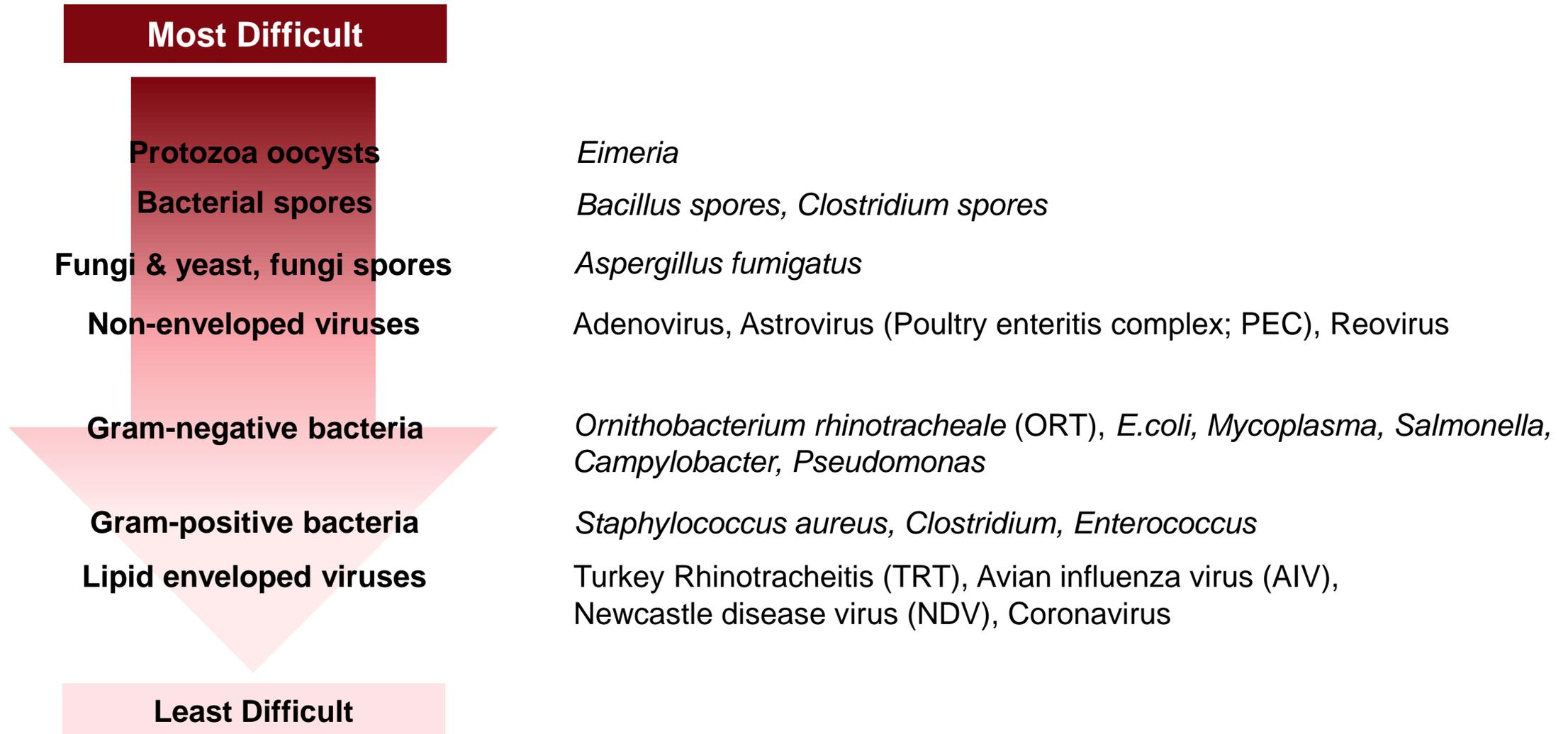
An alternative to formaldehyde fumigation

Successful Disinfection is a Balance of Several Factors





Pathogen Susceptibility to Disinfectants



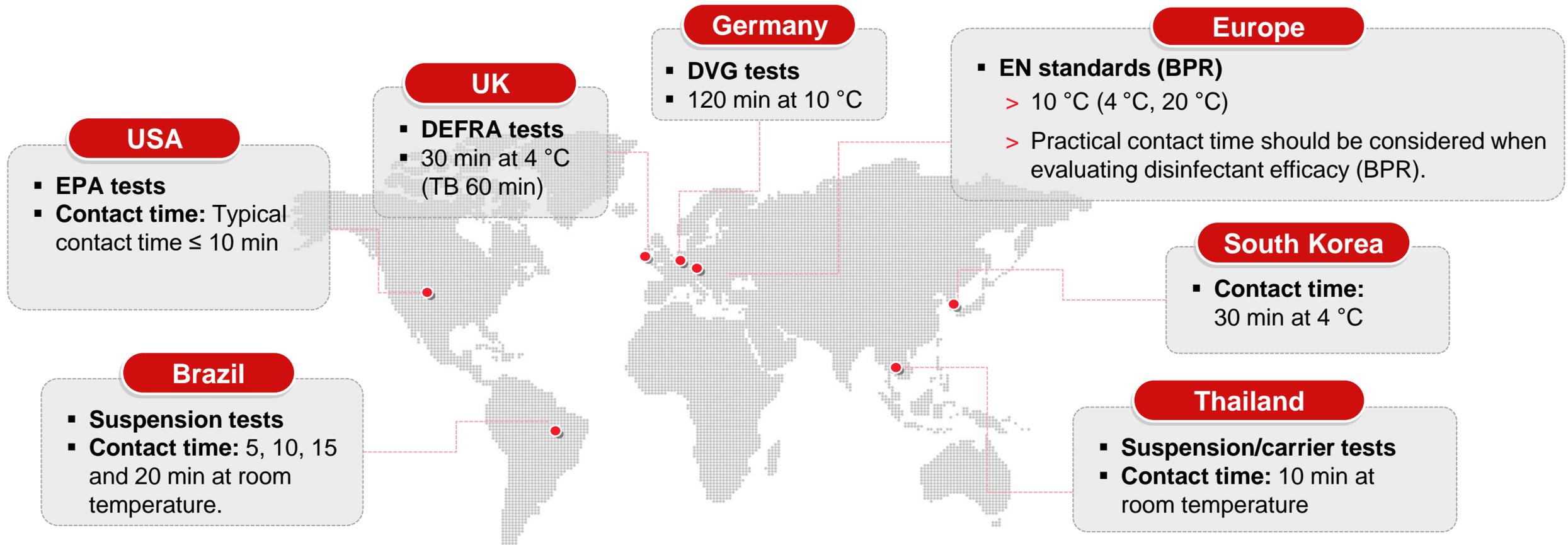


Selecting a Disinfectant – Understand the Chemistry

Chemistry	Bacteria		Mycobacteria	Spores	Fungi & Fungi spores, Yeast	Viruses	
	Gram +ve	Gram -ve				Enveloped	Non-Enveloped
QUATs	+++	+	+/-	+/-	+	++	+/-
Iodophors / Iodine	+++	+++	+	++	+++	++	+
Chlorine / Hypochlorite	+++	+++	+/-	+	++	++	+
Alcohols (Meth, Eth, Iso)	+++	+++	++	+/-	+/-	++	+/-
Aldehydes	+++	+++	++	++	++	+++	++
Phenolics	++	++	++	+++	++	++	+
<i>Oxidizing Chemistries</i>							
Hydrogen Peroxide (H ₂ O ₂)	+++	+++	+	+	++	++	+
KMPS	+++	+++	+	+	++	++	+
Peracetic Acid + H ₂ O ₂	+++	+++	++	+	+++	++	+

Lanxess' disinfectants are formulated products combining different chemistry and ingredients e.g. chelating agents, surfactants etc. to support applications under farm conditions.

Disinfectant Regulations - Efficacy Testing



Disinfectant efficacy testing requirements vary by country – always follow local regulations.

Monitoring Cleaning & Disinfection Protocol

Microbiology tests

- **Voluntarily but highly recommended to ensure effective cleaning & disinfection protocol.**
- Should be done after cleaning and disinfection
- Surface swabs, agar plates
 - To test for TVC (total viable counts), Enterobacteriaceae counts, *Salmonella* counts





Monitoring Cleaning & Disinfection Protocol

Total viable count (cfu per cm²) - Example

Area	Pre Wash	Post Wash	Post 1 st Disinfection	Post 2 nd Disinfection
Floor A	>30,000	>30,000	4	0.5
Floor B	>30,000	>30,000	2.3	0.4
Wall A	>30,000	>30,000	1.1	1.9
Wall B	>30,000	>30,000	<10	<10
Feeder A	>30,000	>30,000	<10	<10
Feeder B	>30,000	>30,000	2.2	<10
Drinker A	>30,000	>30,000	<10	0.9
Drinker B	>30,000	>30,000	6.9	<10
Fan A	>30,000	>30,000	0.6	530
Fan B	>30,000	>30,000	6.9	3.4

C&D – What to look for?

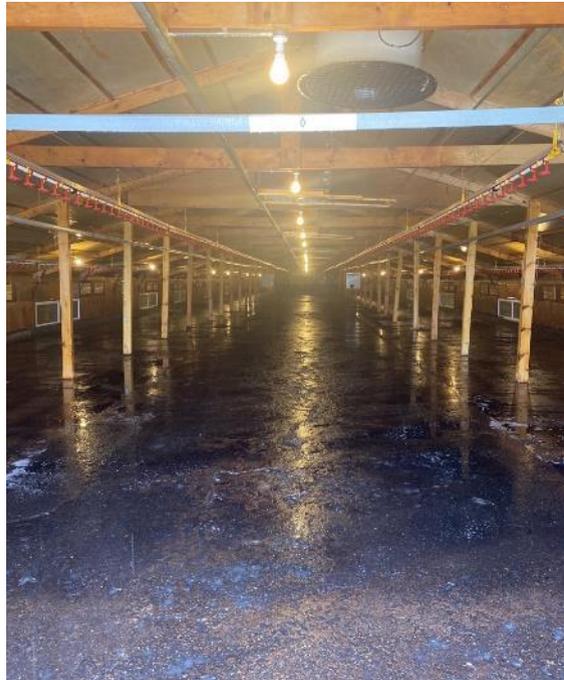
Soap up

Ensure soap up being carried out correctly



Disinfectant

Monitor mixing and application



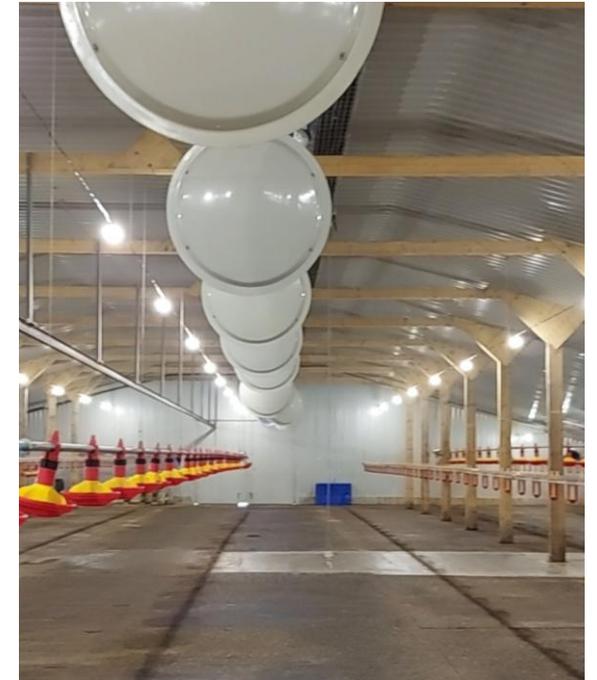
Drinker

Endoscope inspection of drinkers



Final

Inspect final quality



Audit – The ~~Good~~ the Bad and the Ugly

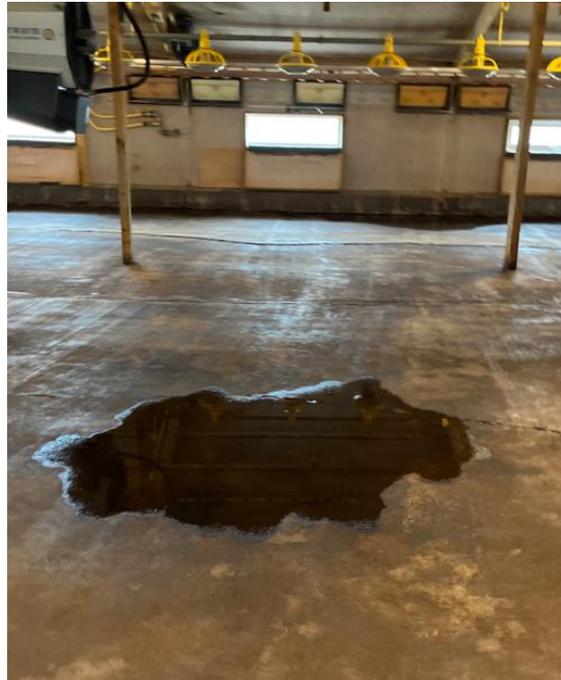
Foaming

All surfaces were foamed except the floor...



Water puddle

Water puddle dilutes disinfectant solution



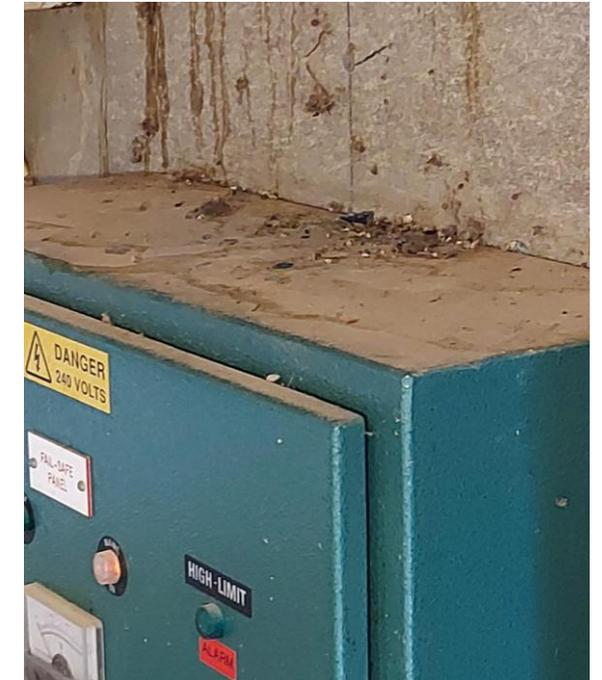
Feeders

Feeders not removed for washing



Control rooms

Farm staff to help clean control rooms





Take Home Messages

Effective hygiene is critical for biosecurity and flock performance

- Hygiene programs should be **adapted to farm conditions and disease challenges.**
- **Key steps**
 - Remove organic matter → Clean water systems → Apply detergents & disinfectants correctly
- **Correct concentration, contact time, and application** determine disinfectant effectiveness.
- Effective hygiene **reduces pathogen load and improves flock health and performance.**
- Protocols should be **practical, consistent, and regularly reviewed on-farm.**



THANK YOU FOR YOUR ATTENTION!

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