"Many Hands Make Light Work": Solutions for *Salmonella* Control on Farm

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BACKGROUND

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Salmonella: A Brief History

- *Salmonella* is ubiquitous in nature
- The discovery of *Salmonella* began more than a century ago when American scientists, Daniel Salmon and Theobald Smith, first isolated *Salmonella choleraesuis*, now known as *Salmonella enterica*, from pigs in 1886
- To date: 2,649 *Salmonella* serotypes have been identified

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Salmonella: Survival & Growth

- The optimal growing conditions: 35-37 °C and pH's of 6.5-7.5
- But…can grow between 5.2 to 46 °C and pH's of 3.8 to 9.5
- *Salmonella* are resilient bacteria capable of surviving extreme conditions; for example:
  - Low moisture foods such as peanut butter and chocolate
  - Dry environments such as milk powder (e.g., powdered infant formula);
  - Highly acidic environments such as those produced by the stomach

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Salmonella on the Farm

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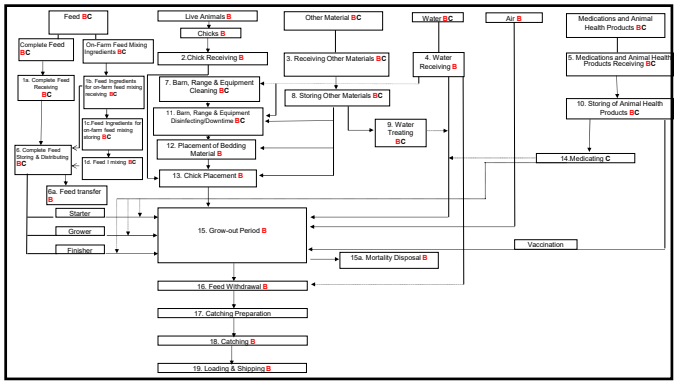

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Control Strategies

- Given that there are numerous entry points for *Salmonella* on the farm…NEED multiple solutions for *Salmonella* control

1) Farm Management
2) Biosecurity & Pest Control
3) Feed & Water
4) Cleaning & Disinfection

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Farm Management and Biosecurity

- For successful implementation of biosecurity protocols by farm workers, visitors and catching crews focus on education and time.

1. **Training/Education:** Improving biosecurity training, providing educational material on why and how to apply biosecurity measures is essential to decreasing the food safety risk.
2. **Time**: Everyone is aware of how to perform their role and the various issues of pathogen control, however under time constraints, mistakes happen = food safety risk

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Cleaning & Disinfection

- A thorough cleaning protocol that uses a combination of several steps is most effective in reducing the bacterial load in your barn.
- These include the dry-clean process or wash to removing organic matter, pressure washing with water followed by application of a detergent with a water rinse, and/or disinfectant and drying/downtime
- Each one of these steps plays an important role in breaking the cycle of contamination.

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Study: Example of Cleaning & Disinfection

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Typical Cleaning Regimes

1. Wash (with or without high pressure) to remove gross organic matter; OR
2. High-pressure wash + detergent + water rinse to remove the detergent + disinfectant (left to dry or removed with water after a sufficient contact time); OR
3. High-pressure wash + disinfectant, with or without a water rinse; OR
4. High-pressure wash + detergent + water rinse

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Example Protocol from Research

Type of Protocol	Cleaning and Disinfection Steps	Sampling Day
Routine Cleaning (Monday to Thursday)	Before Power Wash (1) After Power Wash (2) After Quaternary Ammonium Chloride (QAC) Disinfectant (Holquat®) or After Chlorocresol Disinfectant (Interkokask®)	Mid-Week (Tuesday/Wednesday)
Intensive Cleaning (Friday)	Before Power Wash (1) After Power Wash (2) After Detergent (Rapier®) (3) After Detergent + QAC Disinfectant or After Detergent + Chlorocresol Disinfectant	End of Week (Friday/Saturday)
Drying Following Intensive Cleaning (Sunday)	(4) After QAC-Drying or After Chlorocresol-Drying	Sunday

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Before Power Wash

After Power Wash

After Detergent;
After QAC Disinfectant;
After Chlorocresol Disinfectant

After QAC Drying;
After Chlorocresol Drying

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SALMONELLA PREVALENCE

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Study Outcomes

- Power washing alone was not successful in reducing the prevalence of *Salmonella*
- Intensive cleaning, combining detergent with a chlorocresol disinfectant, without drying was more effective at reducing *Salmonella* than using detergent with a QAC disinfectant.
- Drying (following an intensive cleaning protocol) resulted in a reduction to eradication in the prevalence of *Salmonella*.
- Practically of drying especially in winter months might be challenging and so use of tools to help speed up the drying time can work.

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Challenges with Cleaning & Disinfection

- Research is not conclusive as to which cleaning & disinfection protocol is best
- Why? Due to the following:
  - It depends on the type of bacteria present in the barn
  - The correct use of products
  - The accuracy of the procedure

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CONCLUSIONS

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Take Home Messages

- No silver bullet!
- Have several control strategies in place for incremental risk reduction.
- Combining cleaning and disinfection step(s) with high levels of biosecurity provides balance for both the food safety and production aspects on farm.
- Farm Management is critical! Without this, any *Salmonella* control measure put into place will eventually fail.

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