**SALMONELLA CONTROL: EFFECTIVE CLEANING AND DISINFECTION OF POULTRY HOUSING**

### The Issue
- Salmonella is the second most common cause of food poisoning in humans and is a very persistent bacterium.
- It can survive months or years in the right conditions, especially in dust and contaminated feed or feeding equipment.
- It is more resistant to disinfectants than most poultry disease organisms.
- If Salmonella is present on your farm you may need to upgrade cleaning and disinfection procedures to eliminate it.
- Cage systems for laying hens are particularly difficult to clean and disinfect effectively.

### Planning
- Check that your disinfection programme is suitable for control of Salmonella if it is introduced.
- If Salmonella is found aim for enough time to eliminate any farm pests such as litter beetles or rodents in houses and to thoroughly wash, dry, disinfect and dry again before restocking.
- Ensure that enough disinfectant of a suitable type is ordered so that all surfaces can be saturated to run-off point at the appropriate dilution rate.
- If possible try to allow enough time to test and re-disinfect before restocking.
- Aim to test subsequent flocks in a previously positive house early to provide enough time to eliminate infection after the next flock if necessary.

### Water System
- Keep header tanks closed at all times when the house is occupied and during general washing of the house.
- Clean all external surfaces of water systems carefully, removing limescale if necessary.
- After washing the house, drain water lines and fill system with suitable disinfectant.
- Regular use of water acidification during production can reduce contamination problems in water systems.

### Feeding System
- Plan feed orders to leave bulk and slave hoppers empty at depopulation.
- Do not take residual feed to another farm.
- Clean bulk bins to remove residues, disinfect and thoroughly dry if feed was the source of Salmonella.
- A formaldehyde or organic acid-based feed additive can help reduce contamination of feeding systems.
- Remove any pooled water in feeders before disinfection.

### Washing
- Use a detergent, soak to loosen adherent organic matter.
- Wash thoroughly using high pressure jet washer or steam cleaner.
- If Salmonella is present, add disinfectant to wash water to reduce contaminated aerosols.
- Pay particular attention to ensure that feeders, drinkers and drinker spillage cups or channels are well cleaned as residual contamination can multiply in these.
- Ensure that all sides of housing and fittings are cleaned and that splashed material is removed.
- Ensure that ventilation ducting above roof fans, cracks in floors and walls, service areas and store-rooms are included in the wash.
- Check with a powerful torch and white baby wipes or paper towels that a thorough job has been done - before the cleaning team leaves the site.
- To avoid recontamination do not wash material from the outside of the house back into the house.

### Repairs and Maintenance
- Plan maintenance carefully to avoid recontaminating cleaned houses by dislodged dust, etc.
- Complete before washing, certainly before disinfection.
- Provide maintenance personnel with suitable protective clothing.
- Seal any damaged areas that could harbour pests, placing bait, insecticide, etc. where necessary.
- Seal drain holes against rodents with wire plugs.

### Dry Cleaning
- Vacuum dust or blow down brush on to litter as thoroughly as possible - include ventilation ducting.
- Remove all litter, manure, feathers, etc. as thoroughly as possible.
- Remove spilled litter and dust from the surroundings of houses.
- On free-range sites scrape up faecal contamination in the area immediately around the house.
- Take litter for disposal well away from the site in sheeted trailers.

### Cleaning and Disinfection of Moveable Equipment
- Beware of recontaminating a disinfected house by bringing in undisinfected equipment.
- Take equipment that has been removed from the house for cleaning back into the house for disinfection.
- Thoroughly disinfect an area of floor then place disinfected equipment on this area after disinfection.
- Ensure that items of equipment such as partitions do not prevent disinfection of the floor beneath.
**General Disinfection**
- Replace disinfectant foot dips before the start of disinfection.
- Chlorcresol-based foot dips are most effective against Salmonella.
- Ensure that equipment and surfaces to be disinfected are clean and dry before disinfection.
- Formaldehyde-based disinfectants are best for disinfesting houses and equipment - ideally as two applications sprayed from different directions on consecutive days.
- Apply disinfectants at high pressure and to saturation (run-off point).
- Good disinfection of feeding and drinker equipment, cage systems and nest boxes is especially important - do not disinfect with vents closed.
- Service areas and store rooms should also be disinfected, as should outside areas around house entrances, to avoid recontamination.
- Use Defra General Orders Rates for disinfectants if Salmonella is present (www.defra.gov.uk/animalh/diseases/control/testing_disinfectants.htm).
- Higher concentrations (eg. maximum recommended rate) and application rates of disinfectant can be used in houses that are difficult to clean.
- Allow sufficient time for thorough drying before re-stocking.

**Pest Control**
- Infected or contaminated pests, especially rodents but also litter beetles and flies in some cases, can undermine previous cleaning and disinfection efforts.
- They should be reduced as much as possible before depopulation.
- Carefully check for signs of pests in empty houses, using a powerful torch.
- Do not miss any chance to bait rodents in the empty houses if they are present - before mucking out, before washing, before and after disinfection.
- If there are rodents present intensify baiting using a choice of palatable products and use traps and bait-take to monitor reductions.
- Bait should be supplied little and often.
- Baiting points should be placed within wall and ceiling insulation if rodents are established there, and around access points to the house.
- Rodent faeces and carcasses should be removed before restocking and the areas re-disinfected.
- If litter beetles are present use a contact insecticide on walls and posts as soon as the house is emptied and again after the house has dried after disinfection.

**Fogging and Fumigation**
- Fogging can be used to supplement spray disinfection but is not effective alone and is not necessary when spray disinfection is done properly.
- Formaldehyde is the most effective fogging agent for Salmonella.

**Microbiological Assessment of Cleaning and Disinfection**
- If Salmonella was present in the flock test key areas of the house for residual contamination.
- Samples should be taken after disinfectants have dried using moist gauze or sponge pads.
- Buildings in which formaldehyde has been used should be thoroughly ventilated and free of formaldehyde smell before sampling.
- Key areas to sample are:
  - drinkers, including spillage cups or channels
  - feeders, including corner units and slave hoppers
  - cage or nest box interiors, including inaccessible areas
  - floor surfaces, including cracks
  - surfaces of walls, posts and partitions - including damaged areas
  - inlet and exhaust ventilation shafts
  - manure belts and scrapers
  - egg belts, conveyors and elevators
  - ledges, pipes and beams
  - ante-room surfaces and fittings
  - tools and protective clothing
  - entrances to houses
  - any area which has not been well cleaned
- Any rodents, rodent faeces or other pests found can also be tested.
- Samples should be kept cool and tested as soon as possible after collection, or ideally be collected directly into Buffered Peptone Water and tested on the day of collection.

Additional tests to determine surface counts of enterobacteriaceae may also be useful, especially when Salmonella is not present or at low levels.