

## Salmonella Risk Mitigation Practices

*This list has been compiled by the NTF Technical and Regulatory Committee to spur conversation about Salmonella reduction among food safety professionals in the turkey industry. Not all interventions will be appropriate in all situations.*

### Breeder Hatchery Solutions:

- Sampling of breeders: consider sampling methods, testing methods, etc.
- Overall biosecurity on farm (boots, redress, showers)
- Hatchery/breeder farm: HACCP approach in beginning stages; testing or Bio-mapping approach
- Hatchery and breeder vaccination protocols
- Autogenous vaccines have been effective in breeders
- Egg Sanitation Practices
  - Selection of suitable hatching eggs (defined criteria)
  - Proper collection and handling
  - Minimization of shell bacteria with an egg-sanitizing machine or with fumigation
- Hatchery management
  - Sanitation protocols and products
  - Biosecurity and personnel protocols
  - Monitoring program and protocol

### On Farm:

- Feed management: Formaldehyde use in mash feed, or adequate feed pelleting.
- Consider use of probiotics/prebiotics
- Water sanitation and disinfection: water acidification at feed withdrawal or before live haul.
  - Biosecurity and personnel protocols
- Proper housing techniques and practices
  - Temperature monitoring
  - Air quality
  - Litter management: Sampling of litter; tilling of litter; keep litter dry; change of litter could be causing change of micro environment
  - De-Caker used on litter – tilling, composting & cleaning
  - Downtime and cleanout processes
- Facility and employee management
  - Employee training
  - All employees to wear barn specific boots/booties or disinfect boots between barns
  - Application crews and equipment sanitation
  - Environmental protocols
  - Inspection of cleaning
  - Keep records of all farm sources (feed, breeders, poult); farm security involved in internal animal welfare audits
- Vaccination programs
  - Vaccination protocols
  - Autogenous *Salmonella* vaccines
  - Observations: with elimination of one strain of *Salmonella*, another strain is right behind

- Pest management
  - Fly control
  - Darkling beetle control
  - Rodent control
  - Chemical class rotation (pesticides)
  - Dead bin management
  - Monitoring program and protocol
- Consider potential correlation between litter (on farm) and skin (post chill) testing or skin (live feathered) and skin (post chill) testing
- *Observations* –
  - Consider fecal specific feathered sampling as it may provide more accurate correlation than environmental testing
- Live Production arranging flock slaughter schedules at the processing plants based on farm *Salmonella* testing.
  - “Hotter” flocks scheduled at end of the day or last day of the week.

### Live Haul:

- Catching, transportation and hauling
  - Employee training
  - Equipment cleaning and maintenance
  - Animal welfare protocols
- Feed withdrawal range: Withdrawal time set from the point feeders are pulled up to the point the birds go on the shackles, typically 8 to 12 hours up to 16-18 in some cases
- Wash/disinfect all trucks after completion (visual inspection) with a 6-12 hour sit time before next pick up

### Processing:

#### Scald:

- Pre-scald scrub cabinet (dry or wet scrub removes debris organic/fecal material, primarily targeting the breast side of the bird)
- Temperature should be high enough to allow good promote feather removal
- Raising and/or lowering the pH with an approved chemical or antimicrobial.
- Water in scalders treated with antimicrobial.
- Evisceration water treated with antimicrobial or chlorine being collected and re-used in scalders.
- Calibration of equipment – make sure the temperature isn’t too low and incubating *Salmonella* – at least above the “danger zone” for *Salmonella*: 40 to 140 F.
- Continually overflowing scalders to keep water as visibly clean as possible (Volume undetermined, varies by scalders).

#### Picking:

- Water line above pickers treated with antimicrobial
- Pre and Post pick spray cabinets with antimicrobial
- Reuse of Pre-chill dip tank PAA in NY bird wash after pickers

**Rehang:**

- Automated hangers – if you can, rehang birds without them touching each other to reduce cross-contamination.
- Rinse hock cutter/belts with antimicrobial (could be PAA, ozone, ACH, chlorine, acid-based antimicrobial, etc.)
- Antimicrobial spray on birds prior to or after rehang/hock cutter
- Anywhere a belt could be replaced with a stainless-steel design to eliminate harborage would be ideal.

**Evisceration/Carcass Trimming/Final Wash:**

- Employees start shift by dipping hands/gloves/equipment in sanitizer
- Dip (gloved) hands in chlorine or antimicrobial mix between birds (20-50 ppm)
- Multiple treated or potable rinses/faucets for employees to remove contamination from gloves/PPE. May be potable water, warm water or treated water.
- Multiple anti-microbial sprays, brush wash cabinets, Inside/Outside bird wash, final rinse cabinet or dips.
  - Depending on antimicrobial there are numerous monitoring points for all sprays/cabinets: pH, ppm level, water pressure, water temperature, etc.
- Trimmers have knife sterilizers or knife sanitizers to reduce contamination.
- OFLR – approved antimicrobial used for all off-line carcasses.
- Pre-chill dip tank at 800 ppm for 22 seconds
- Strong Sanitary Dressing Programs that aide the establishment in controlling any contamination

**Chiller:**

- Approximately 1 gallon per bird of fresh water added to chiller system.
- Antimicrobial used in all chillers.
  - Depending on antimicrobial there are numerous monitoring points: pH, ppm levels, water temperature, etc.
- Take necks off before chiller – necks have own chiller
- Adjusting pH of chiller water to ensure proper efficacy of antimicrobials
- Adjusting the pH will allow you to run higher concentration of the PAA without product degradation.
- Saving of the chill water for numerous days. Results have shown more of a reduction than refilling every day with fresh water.

**Post-Chill/Pre-grind:**

- Multiple antimicrobial sprays on belts and parts along the deboning process.
- Antimicrobial parts dip. Some dips may have air-agitation.
  - Depending on antimicrobial there are numerous monitoring points: pH, ppm levels, water temperature, etc.
  - Any agitation – by a paddle or an auger are

advantageous to move the product around to treat the entire surface of the product, for quality purposes, some establishments pH adjust these dip tanks to allow them to run a higher PAA concentration and not lose the quality of the product. (pH adjustment can also help with odor as well some establishments have noted.)

- HPP
- Phages
- Assess use of necks, backs or wing meat in ground turkey

**Processing Production Line Solutions:**

- Processing line interventions
  - Dips, rinses and sprays
  - Sanitation sprays for equipment
  - Deep cleaning Sanitation Systems, such as routine steam cleaning, etc.
- Facility and employee management
  - Employee training
  - Environmental protocols

**Food Chain Solutions:**

- Safe food handling techniques
  - Temperature maintenance and monitoring
  - Food preparation protocols
  - Transportation and storage protocols
  - FSIS Food Safety Protocols