Risk management options for Salmonella in poultry populations

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Better Training for Safer Food

Production de poulets en 2008

Répartition de la production totale de poulets:
- 28,000,000
- 140,000,000
- 2,800,000

Table eggs: 12 billions per year
France

Poultry production: 5th world producer/1st in Europe for poultry, turkey and guinea fowl
Importance of export sector
Eggs:
  7 hatcheries
  2000 farms
  13 billions eggs per year
  330 000 tonnes egg products
Hatcheries: 6
Laying hens: 153 farms
Broilers and fattening turkeys: 980
PART 1: How to identify risk management options

Part 2: Guidelines for good hygienic practice

PART 3: Vaccination and use of antimicrobials
PART 1: How to identify risk management options
Food-born outbreaks

Verified food-born *Salmonella* outbreaks in people, 2008

128 outbreaks / 51 % of total food-borne outbreaks with causative agent detected

*Salmonella enteritidis* 22,7 %

*Salmonella typhimurium* 47,7 %
Results of EFSA baseline surveys

- **layers**: *Salmonella* ssp 17.2%, SE/ST 8%
- **broilers**: *Salmonella* ssp 6.2%, SE/ST 0.5%
- **breeding turkeys**: *Salmonella* ssp 1.6%, SE/ST 0.5%
- **fattening turkeys**: *Salmonella* ssp 13.3%, SE/ST 3.8%
Salmonella Control

- Breeders: 1982: optional sanitary charter/ incentives if infected
- 1998: salmonella regulation in law for breeders and laying hens
- Turkeys: private sanitary charter promoted by producers organization
Today:
Main points of French control program

Breeders and layers

✓ **incentive system** in law for compulsory slaughter of breeders/ heat treatment of eggs for layers or slaughter of the birds

✓ Goog Hygiene Practice Guide as a precondition

Broilers and fattening turkeys

✓ Control of cleaning and disinfection for positive flocks

For Both Financial help for decontamination of infected premises
Part 2: Guidelines for good hygienic practice
Contents

✓ **Location** of the farm
✓ **Hygiene management** at farms
✓ Monitoring of *Salmonella* status of the flock
✓ Measures to *prevent incoming infections* carried by animals, feed, drinking water, people working at farms
Location of the farm
Avoid potential sources of contamination in the surroundings

✓ Other poultry premises
✓ Other livestock premises (particulary pigs)
✓ Manure spreading zones
✓ Other potential contamination sources such as slaughterhouses

Diapositive 40
Hygiene management at farms
Site of the poultry holding

The **boundaries** of the site must be marked

- The whole **perimeter** can be fenced (breeding flocks)
- **Entry** must be clearly forbidden

- A bell, a phone number or a notice should be placed at the entry to **inform** the farm staff of the arrival of visitors
Equipment at the entrance

✓ Footbath and brush – well maintained
✓ Gatehouse where visitors can change into overalls and boots
✓ Cleaning of vehicles
✓ Visual check of vehicles before entrance
✓ Vehicles disinfection system
Cleanliness of the surrounding areas: **no vegetation** near the walls of the houses, no old material.

- Poultry houses **entry**: must be hard-surfaced

- Gutters on the roof – **rainwaters** flowed towards a ditch regularly maintained

- Free range system: **no other animals**
Poultry house: entrance

**Ante-room**: in each house if possible

- 2 or 3 parts:
  - Part 1: Armoire for outdoors clothes and shoes
  - Part 2: intermediary zone - washbasin with cold and hot water, materials for cleaning hands and hygienic drying
  - Part 3: clean zone: clothing and shoes special for the premise

**Showers**: compulsory for breeding flocks
Poultry house: construction

- **Floor**: concrete firmly advised (breeding flocks)/
  pest prevention
- **Walls**: smooth, hard and impervious surfaces
- **Insulation cladding**
- **Waterers and augers**
- **Maintenance is essential**
- **No storage of material (litter, foodstuff...) inside**
Poultry house: equipment

- **Conception** of material: cleaning and desinfection easy (the material must be easy to take apart)
- Foodstuff and water **circuits**
- **Water tank** must be covered
- **Dust** collectors if necessary (top of cages)
- **Ventilation**: air entrance and air way-out accessible and easy to clean
Waste management

Carcasses: must be put into locked containers (freezers) regularly cleaned and sampled for *Salmonella*

Disposal: Incineration or collection by licensed waste handlers of carcasses

Diapositive 47
Monitoring of *Salmonella* status of the flock

**Written sampling plan**
- in accordance with country law
- including the best methods

**Reported** at the farm

**Staff training**

**Supervision**

**Accreditated laboratories**
Measures to prevent incoming of infections by:

- People working at farms
- Animals
- Feed
- Drinking water
Farm staff: HEALTH

Salmonella carrying prevention

- No personal poultry at home (breeding flocks)
- Annual medical inspection
- Medical investigation in case of gastro-enteritis
- Regular hand washing (disinfectant spray...)

Farm staff TRAINING

✓ Knowledge of the means by which infection can reach the houses
✓ Risk for human health
✓ Prevention measures

A specialized manager can co-ordinate the trainings sessions of the company

A farm hygiene guide can be available
Workers

Clothing:

✓ Overalls / one for each house if not disposable ones
✓ Working boots: one pair for each house
✓ Gloves if necessary
✓ Mobcap

Occasional workers:

✓ Visitors‘ book: address and last poultry site visited
Poultry

- **Salmonella** free status for chicks: serotypes depending on the production, at least S.Enteritidis and Typhimurium Pullets:

- **favorable results** of monitoring 2 weeks before transfer

- if several houses
  - Only one species
  - All-in all-out

- **Vaccination status**
Feeding

Feedstuffs: origin

✓ Plants implementing rules of EU regulation: HACCP
✓ Thermization of industrial compound feed (breeding flocks)

Measures at the poultry site

✓ Regular cleaning and disinfection of feed bins and feeding material
WATER

✓ Must be of good quality
✓ Sanitanization is possible but must be controlled
✓ No access to surface water (free range)

LITTER

✓ Traceability: sawdust, shavings - straw
✓ Transport: cleanliness of lorries
✓ Storage:
  ✓ Birds and rodents
Implementation of GHP

✓ Commercial contracts
✓ Private insurance
✓ State contracts including incentives for monitoring measures and or depopulation of infected flocks
Part 3: Vaccination and use of antimicrobials
Vaccination: a potential specific control method

- Available vaccines: live and inactivated
- Serotypes: *Salmonella* Enteritidis and Typhimurium
- Actions on birds
  - Reduce the colonisation of reproductive tissues
  - Reduce the faecal shedding
Vaccination: Advantages

decreasing of public health risk by:

- reduced contamination of environment
- reduced contamination of poultry products

but

- level and duration of these actions not well known under field condition
Vaccination: disadvantages

- Interferences with *Salmonella* detection methods
- Live vaccine: possible transmission of the strain to humans
- S.E. : interference with *Salmonella* Pullorum/Gallinarum sera detection methods
- Lesser respect for the good hygienic practices
Vaccinate or not?

- Aim of the action:
  - Reducing shedding and egg contamination
  - Eradication: no

- Serotype: SE/ST...

- Level of prevalence: if high

- Type of poultry:
  - Breeders of layers/broilers, pullets, laying hens: possible
  - Great grand parents: no (eradication)
Implementation of Salmonella vaccination in risk flocks:

Vaccination scheme

Rearing parent flocks
2 - 3 x S. Enteritidis S. E. (+ S. Typhimurium, S. T.) live vaccine
2 x S. Enteritidis (+ S. Typhimurium) inactivated vaccine per injection, interval 4 – 6 weeks

Rearing end products (pullets):
standard:
2 - 3 x S. Enteritidis live vaccine

Positive S. Enteritidis (or S. T.) findings in the previous laying period:
2 – 3 x S. E. live vaccine + S.T. live vaccine
additional 1 x S.Enteritidis/S.Typhimurium (inactivated vaccine), 4 weeks before bringing the pullets into the laying farm

Time schedule for rearing parent flocks:
Day 3-4 live Vaccine SE + ST, oral or spray
week 6 live vaccine SE + ST, oral via drinking water
week 12 inactivated vaccine, injection
week 14 live vaccine SE + ST, oral via drinking water
week 18 inactivated vaccine, injection

Above mentioned vaccination strategy is only suitable to prevent salmonella shedding. To reduce the salmonella prevalence to zero optimal housing conditions and hygiene measures are the requirements to prevent vector born and endemic infections.

Shedding of Salmonella vaccine strains might last up to 10 days!
Use of Antimicrobials

Limits in the use of Antimicrobial treatment: reducing of in-flock prevalence and excretion, but no eradication risks:

✓ good hygiene practices less applied
✓ interference with monitoring
✓ emergence and spread of resistance in different zoonotic bacteria
✓ loss of effectiveness of live vaccines
Use of Antimicrobials

Regulation

Antimicrobials must be limited to
- *Salmonella* clinical infection, in order to reduce morbidity and mortality

Antimicrobials must be forbidden
- in breeders – risk of spread of resistant strains
- in layers: risk of keeping the infection during the whole cycle of production
To keep in mind!

Risk management options depend on each country characteristics:

- type of organization of the production
- kinds of poultry
- eggs, chicks or pullets origin
Control program must be regularly evaluated and improved if necessary.

Narrow links must be developed between:

- import services
- veterinary services in charge of food control
- veterinary services in charge of animal health

Importance of:

- regular inspections and official controls
- training of official veterinary inspectors
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Site of the poultry holding
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Poultry house: construction
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