

# Country report on the Swedish experience relating to the control of *Salmonella* in the national herd, with specific focus on the salmonella policy related to poultry production, and the results regarding *Salmonella* prevalence and human salmonellosis incidence

by the Ministry of Agriculture, Food and Fisheries (Sweden)

## Country Report proposed by Sweden

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- Summary
- The Swedish *Salmonella* control programme
- *Salmonella* in poultry
- Correlation of salmonella control in live animals and human salmonellosis incidence

## SUMMARY

Sweden has achieved an efficient control of *Salmonella*, despite the industrialisation of animal production. The prevalence of *Salmonella* in feed, live animals and animal products produced in Sweden is very low. In beef and pork it is less than 0.05% and less than 0.1% in poultry at slaughter. This unique position has been achieved by a national control strategy from feed to food, which was initiated more than 40 years ago. A severe domestic *Salmonella* epidemic during 1953, involving more than 9000 people of which a few died, demonstrated the need for a more comprehensive control programme.

## THE SWEDISH SALMONELLA CONTROL PROGRAMME

Sweden's *Salmonella* control programme for live animals, eggs and meat was approved by Commission Decision 95/50/EC.

The overall aim of the Swedish *Salmonella* control programme is that animals sent for slaughter shall be virtually free from *Salmonella*, which ensures that animal products for human consumption will be free from *Salmonella*. The strategies to reach this aim are:

- to prevent *Salmonella* contamination in all parts of the production chain,
- to monitor the whole production chain. Surveillance programmes for feed, live animals, carcasses, meat and food of animal origin are in place,
- at any finding of *Salmonella*, obligatory actions are taken to eliminate the infection/contamination. Any food item contaminated with *Salmonella* is deemed unfit for human consumption.

*Salmonella* infection in any animal species is compulsorily notifiable, irrespective of serotype. All primary isolates are characterized by sero- and phagotyping and tested for antibiotic resistance.

## SALMONELLA IN POULTRY

As the frequency of *Salmonella* isolation in Swedish poultry is very low, most of today's measures are of preventive nature. Four factors are of major importance to maintain the favourable situation:

- The breeding pyramid is kept free from *Salmonella*: All grandparent animals are imported and all are quarantined and repeatedly tested negative for *Salmonella*.
- Feed free from *Salmonella*: The control consists of three parts; import control of feed raw materials, mandatory heat treatment of compound feeding stuffs for poultry and an HACCP-based *Salmonella* control in the feed industry.
- High hygiene and biosecurity standards are in place, preventing introduction of *Salmonella*.
- Elimination of the herd is always carried out in case of *Salmonella* infection in poultry irrespective of serotype.

### Sampling

An extensive sampling programme continuously monitors the *Salmonella* situation (see table 1). In addition to the sampling at flock level, samples are collected at all poultry slaughterhouses to monitor the end product. Sampling strategies are outlined in the Swedish *Salmonella* control programme approved by the EU.

### Measures in case of *Salmonella* infection

If *Salmonella* is isolated from a poultry flock an official veterinarian immediately places restrictions on the whole farm. An investigation to trace the source of the infection or any spread of the infection is carried out and official samples are collected. The *Salmonella* infected flock is destroyed irrespective of serotype and the empty poultry house is thoroughly cleaned and disinfected under supervision of the official veterinarian. Environmental samples are collected after disinfection and have to be negative before restrictions are lifted and new birds are allowed into the house. Since 1995, eggs from *Salmonella* infected flocks are not allowed for direct human consumption. Eggs from flocks infected with a non-invasive serotype may be used after pasteurisation.

Vaccination of poultry against salmonellosis is not allowed in Sweden.

### Occurrence

#### Breeders

No cases of *Salmonella* have been notified in breeders.

#### Layers

During the last 10 years, the *Salmonella* situation in layers has improved considerably. On average six positive farms have been identified annually between 1995-2000. The dominating serotype has been *S. Livingstone* which accounts for about 67% of the cases in the 1990s. The total number of herds infected with *S. Enteritidis* is limited to seven farms. This supports the fact that Sweden has not been involved in the world wide spread of this serotype in the beginning of the 1990s. In 2000 *S. Livingstone* was isolated in 3 flocks and *S. Yoruba* in one flock.

## Broilers

The situation in broilers is very favourable and has improved considerably since the 1970s. In 1995-2000, less than five infected flocks have been detected annually. In 2000 the identified serotypes were *S. Havana*, *S. Senftenberg* and *S. Mbandaka*.

## CORRELATION OF SALMONELLA CONTROL IN LIVE ANIMALS AND HUMAN SALMONELLOSIS INCIDENCE

Salmonella infection in humans is notifiable.

During the last three decades different serotypes of Salmonella have increased in the intensive animal production in several countries. For example, the evolution of the *S. Enteritidis* pandemic which began in the 1980s and reached its maximum in 1992, led to increased foodborne illness in many countries. The outbreaks were associated with consumption of poultry and eggs or products thereof. However, due to the Swedish Salmonella control programme, these serotypes have never spread in the animal population and a unique position with an extremely low Salmonella prevalence in both live animals and animal products has been achieved.

As Swedish red and white table meat and eggs are virtually free from Salmonella, the risk of contracting salmonellosis in Sweden is small. Since many years approximately only 10-15% of all notified human cases of salmonellosis have been domestically acquired. Since 1980 the annual incidence (cases per 100 000 inhabitants) of notified domestic Salmonella cases has varied between 3 and 14.

**Table 1.** Mandatory *Salmonella* sampling scheme in poultry. Total number of sampling occasions and (frequency of sampling occasions) in different categories of poultry.

Category of poultry	Production period				
	Rearing	Egg-production	Hatchery	Sampling prior to slaughter	Slaughter
Grand parents	5 <sup>a)</sup>	~ 10 <sup>b,c)</sup>	~ 20 <sup>b,d)</sup>	1	<sup>e)</sup>
Parents	3 <sup>a)</sup>	~ 10 <sup>b,c)</sup>	~ 20 <sup>b,d)</sup>	1	<sup>e)</sup>
Layers	1	3	n.r.	1	<sup>e)</sup>
Meat producing poultry <sup>f)</sup>	n.r.	n.r.	n.r.	1	<sup>e)</sup>
Ratites, breeders	4 sampling occasions per	n.r.	n.r.	1	
Quails, eggproducing	n.s.	2 sampling occasions per year	n.s.	n.s.	

a Extended sampling compared to the zoonosis directive (92/117/EEC)

b Sampling according to the zoonosis directive

c One sampling per month

d One sampling every second week

e Monitoring at slaughter. Annually about 4000 neck skin samples are collected.

f Broilers, turkeys, ducks, geese, ratites

n.r. not relevant  
n.s. no sampling