

Finland

TRENDS AND SOURCES OF ZOONOSES AND ZOOTIC AGENTS IN FOODSTUFFS, ANIMALS AND FEEDINGSTUFFS

including information on foodborne outbreaks,
antimicrobial resistance in zoonotic and indicator bacteria
and some pathogenic microbiological agents

IN 2014

PREFACE

This report is submitted to the European Commission in accordance with Article 9 of Council Directive 2003/99/EC*. The information has also been forwarded to the European Food Safety Authority (EFSA).

The report contains information on trends and sources of zoonoses and zoonotic agents in Finland during the year 2014.

The information covers the occurrence of these diseases and agents in animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and indicator bacteria as well as information on epidemiological investigations of foodborne outbreaks. Complementary data on susceptible animal populations in the country is also given. The information given covers both zoonoses that are important for the public health in the whole European Union as well as zoonoses, which are relevant on the basis of the national epidemiological situation.

The report describes the monitoring systems in place and the prevention and control strategies applied in the country. For some zoonoses this monitoring is based on legal requirements laid down by the European Union legislation, while for the other zoonoses national approaches are applied.

The report presents the results of the examinations carried out in the reporting year. A national evaluation of the epidemiological situation, with special reference to trends and sources of zoonotic infections, is given. Whenever possible, the relevance of findings in foodstuffs and animals to zoonoses cases in humans is evaluated.

The information covered by this report is used in the annual European Union Summary Reports on zoonoses and antimicrobial resistance that are published each year by EFSA.

* Directive 2003/ 99/ EC of the European Parliament and of the Council of 12 December 2003 on the monitoring of zoonoses and zoonotic agents, amending Decision 90/ 424/ EEC and repealing Council Directive 92/ 117/ EEC, OJ L 325, 17.11.2003, p. 31

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1 ANIMAL POPULATIONS

The relevance of the findings on zoonoses and zoonotic agents has to be related to the size and nature of the animal population in the country

1.1.1 Information on susceptible animal population

Sources of information

Data on holdings and live animals: Animal keeping and holding place register (pheasant, turkey, geese, mallard, ducks etc), Evira Animal register (sheep, goats, pigs), EviraBovine register (bovine inc. Bison Bison), EviraPoultry (Gallus gallus), Natural Resources Institute Finland, Structure of agricultural and horticultural enterprises Horses, Suomen Hippos, the Finnish Trotting and Breeding Association Reindeers, Statistics of the Reindeer Herders' Association Farmed deer, Provincial veterinary offices Data on slaughtered animals: Meat inspection statistics of Finnish Food Safety Authority Evira

Dates the figures relate to and the content of the figures

Data on holdings and live animals: Final data, situation as of 1.12.2014 (pigs, sheep, goat), 1.3.2014 (bovine) Data on reindeers: Final data, 2013/2014, reindeer herding year: 1 June-31 May. Data on slaughtered animals: All animals slaughtered in 2014.

Definitions used for different types of animals, herds, flocks and holdings as well as the types covered by the information

Fattening pigs contains all pigs except boars and sows. Bisons are included in Bovine population and Mouflons (farmed) in Sheep population.

National evaluation of the numbers of susceptible population and trends in these figures

Number of bovine animal holdings has still decreased. In 2009 there were in average 54 bovine animals in a holding, whereas now five years later the number is 68, so the number of animals in a typical bovine holding has increased notably. The number of sheep and goats has not varied. However, the number of sheep farms reported for 2014 is respectively higher than reported in the past years; earlier reporting has taken into account only farms which have professional animal keeping, but from 2014 also smaller, hobby sheep keepers are included in this report.

Geographical distribution and size distribution of the herds, flocks and holdings

Livestock production is concentrated in certain areas and, thus, there are large differences in livestock numbers between different parts of the country. Main areas for professional animal production especially for poultry and pigs are southern and western parts of the country. Dairy production is concentrated on Central Finland. Sheep farms are common also in the northern Finland.

2 DISEASE STATUS

2.1 TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.1.1 General evaluation of the national situation

2.1.1.1 Mycobacterium - general evaluation

History of the disease and/or infection in the country

M. bovis was eradicated to a large extent during the 1960's. The last case of M. bovis infection in cattle in Finland was detected in one herd in 1982. Finland has been granted the officially tuberculosis free status of bovine herds according to Council Directive 64/432/EEC. The disease status was established by Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC in 2003.

National evaluation of the recent situation, the trends and sources of infection

The national situation remains favourable.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

The risk of introducing infection from animals, feedingstuffs or foodstuffs to humans remains negligible.

2.1.2 Mycobacterium in animals

2.1.2.1 M. bovis in animal - Deer - farmed

Monitoring system

Sampling strategy

Post mortem examination is performed on all slaughtered animals and samples are sent for examination if there is a suspicion of tuberculosis. Deer in the farms that are in the voluntary control program are tested regularly with intradermal comparative test. An official veterinarian is responsible for performing these tests. Imported deer are tested before import. Clinically ill deer are killed and tested if tuberculosis is suspected.

Frequency of the sampling

In the voluntary control program the intradermal comparative testing is initially done three times (the minimum time between the first and the third testing is 12 months), then repeated at 24 to 30 months interval.

Type of specimen taken

Intradermal comparative test. In suspect cases and post mortem examination lymph nodes.

Methods of sampling (description of sampling techniques)

At meat inspection, lymph nodes are collected from suspected animals. When tuberculosis is suspected at farm, a whole animal or its head and organs including lymph nodes from chest, abdomen and groin are sent for examination.

Case definition

The intradermal test is considered positive if the bovine tuberculin injection site is more than 2,5 mm thicker than the first measure or at least the size of the avian tuberculin injection site or there are other clinical signs of positive reaction. Case is also considered positive if *M. bovis* is isolated.

Diagnostic/analytical methods used

Histology, Ziehl-Neelsen stain, cultivation.

Vaccination policy

Vaccination against tuberculosis is prohibited.

Control program/mechanisms

The control program/strategies in place

The voluntary control programme with regular intradermal testing of herds is described in the Government Decree No 838/2013 and in the Decree No 843/2013 of the Ministry of Agriculture and Forestry. The measures for control of *Mycobacterium bovis* are in the Animal Diseases Act No 441/2013 and in the Decree No 27/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive animals in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, epidemiological investigation and movement restrictions of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Notification system in place

Mycobacterium tuberculosis complex -infections in cloven-hoofed animals are immediately notifiable and classified as dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

No cases of *M. bovis* were detected in farmed deer in 2014. To one farmed deer an autopsy was performed at Finnish Food Safety Authority Evira and samples from it were examined with negative results.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The relevance seems to be negligible.

2.1.2.2 *M. bovis* in animal - Cattle (bovine animals)

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Finland has been granted the official tuberculosis free status of bovine herds by a Commission Decision 94/959/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC.

Monitoring system

Sampling strategy

All AI-bulls are tested by intradermal tuberculin test not more than 28 days before entering the quarantine accommodation of a semen collection center. The bulls are tested annually in the semen collection center thereafter. Clinical suspect cases are investigated by pathological examination of suspect lymph nodes or lesions. All slaughtered animals are inspected for tuberculous lesions.

Frequency of the sampling

AI bulls are tested annually. In addition, samples are taken from all suspected cases.

Type of specimen taken

Lymph nodes or tuberculous lesions.

Methods of sampling (description of sampling techniques)

Testing in live animals is done by intradermal tuberculin testing. In suspect cases, biopsy of a lymph node or a whole lymph node is taken from a living animal. One or more tuberculous lesions are collected from a dead animal. These samples are divided into two parts, one of which is sent without preservatives and the other part in 10 % buffered formalin solution.

Case definition

Confirmation of an inconclusive or positive intradermal testing is done by comparative intradermal tuberculin testing. Comparative testing is considered positive if bovine tuberculin injection site reaction is more than 4 mm thicker than avian tuberculin injection site when skin fold is measured or if there are clinical symptoms related to bovine tuberculin injection. Case is also considered positive if *M. bovis* is isolated. The whole herd is investigated as defined above in case of a suspicion in one animal.

Diagnostic/analytical methods used

Histology, Ziehl-Neelsen staining, cultivation.

Vaccination policy

Vaccination of animals against tuberculosis is prohibited in Finland.

Control program/mechanisms

The control program/strategies in place

The measures for control of *Mycobacterium bovis* are in the Animal Diseases Act No 441/2013 and in the Decree No 27/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive animals in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, epidemiological investigation and movement restriction of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Notification system in place

Mycobacterium tuberculosis complex -infections in cloven-hoofed animals are immediately notifiable and classified as dangerous animal diseases according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

No cases of *M. bovis* were detected in cattle in 2014. 268729 bovine animals were slaughtered and subject to a routine post mortem examination. Samples were collected from five suspicious animals during meat inspection and sent to the Finnish Food Safety Authority Evira for examination. All results were negative. A total of 518 intradermal tuberculin tests were performed on AI bulls.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The relation between human cases of tuberculosis and Finnish cattle population seems to be close to zero.

2.2 BRUCELLOSIS

2.2.1 General evaluation of the national situation

2.2.1.1 Brucella - general evaluation

History of the disease and/or infection in the country

The last case of *Brucella abortus* in Finland was recorded in 1960. Ovine and caprine brucellosis or porcine brucellosis have never been detected. Finland is officially free from bovine, ovine and caprine brucellosis.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Brucellosis has no relevance to public health in Finland.

2.2.2 Brucella in animals

2.2.2.1 *B. suis* in animal - Pigs

Monitoring system

Sampling strategy

All boars are tested not more than 30 days before entering the quarantine accommodation of a semen collection center and in the quarantine accommodation before entering the semen collection center. The boars are tested annually at the semen collection center thereafter and at the time of slaughter. The herds of the origin sending boars to the semen collection center are tested annually. All suspected animals sampled due to abortion are tested also for brucellosis. Herds belonging to the Finnish SPF (specific pathogen free) system for breeding herds and multiplying herds were monitored.

Frequency of the sampling

Continuous sampling at semen collection centers. Periodical or continuous sampling of the SPF herds. On suspicion due to abortion.

Type of specimen taken

Blood and/or tissue samples

Methods of sampling (description of sampling techniques)

Blood samples are collected for prevalence studies and in suspect cases. In suspect cases aborted fetuses, placental tissue and vaginal mucus is collected from sows that have aborted. Also whole piglets with skeletal or joint problems should be sent for laboratory examination if possible.

Case definition

The animal is considered seropositive, if one of the confirmation tests is positive. The bacteriological investigation (culture): the animal is positive, if brucella bacteria is isolated.

Diagnostic/analytical methods used

Screening: Rose Bengal test (RB). Confirmation: RB or CF or ELISA or culture

Vaccination policy

Vaccination against brucellosis is prohibited in Finland.

Control program/mechanisms

The control program/strategies in place

The measures for control of *Brucella suis* are in the Animal Diseases Act No 441/2013 and in the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, serological testing of blood samples and microbiological testing in case of abortions, epidemiological investigation and movement restriction of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Notification system in place

Brucella suis is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

Altogether 2076 serological samples were tested for *Brucella suis* in 2014, all with negative results. In addition 13 animals from 6 herds were tested microbiologically and 61 animals from 7 farms were tested serologically due to abortions, all with negative results. In addition blood samples from 68 hunted wild boars and 54 farmed wild boars were tested serologically, all with negative results.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The relevance seems to be negligible.

2.2.2.2 B. abortus in animal - Cattle (bovine animals)

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of bovine herds according to Council Directive 64/432/EEC. The disease free status was established by Commission Decision 94/960/EC of 28 December 1994, confirmed by Commission Decision 2003/467/EC.

Monitoring system

Sampling strategy

1. Breeding animals; all AI-bulls are tested not more than 28 days before entering the quarantine accommodation of a semen collection center and in the quarantine accommodation before entering the semen collection center. The bulls are tested annually at the semen collection center thereafter. The herds of the origin sending bulls to the semen collection center are tested annually. 2. Dairy herds with increased number of abortions are targeted and the bulk milk samples are tested under surveillance program. 3. Suspicious animals due to abortions.

Frequency of the sampling

Continuous On suspicion

Type of specimen taken

Other: __blood, milk and/or tissue samples due to abortions__

Methods of sampling (description of sampling techniques)

Samples are taken from living animals at the semen collection center or at the farm.

Case definition

The animal is seropositive, if confirmation test is positive. The bacteriological investigation (culture): the animal is positive, if brucella bacteria is isolated.

Diagnostic/analytical methods used

Screening: RBT (serum), ELISA (milk). Confirmation: CFT (serum), culture

Vaccination policy

Vaccination against brucellosis is prohibited.

Control program/mechanisms

The control program/strategies in place

The measures for control of Brucellosis are in the Animal Diseases Act No 441/2013 and in the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, serological testing of blood samples and microbiological testing in case of abortions, epidemiological investigation and movement restriction of suspected animals and culling or slaughtering of the positive animals or herd in case of confirmed disease.

Notification system in place

Brucella abortus is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

No cases of brucellosis were recorded in 2014. 715 blood samples from AI bulls and 865 bulk milk samples from herds with increased number of abortions and from farms selling animals to AI were tested for brucellosis, all with negative results. In addition, 87 bacteriological examinations of animals from 87 farms and 71 blood samples of animals from 11 farms were tested by serological methods due to abortion or neonatal death; all also with negative results.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is no relevance to human cases.

2.2.2.3 B. melitensis in animal - Goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of caprine herds established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

1. Individual blood samples are collected from caprine herds according to the Council Directive 91/68/EEC, which provides for random checks to be carried out on goat holdings in order to maintain the officially brucellosis free status with regard to *B. melitensis*. 2. Suspicious animals due to abortion

Frequency of the sampling

1. Continuous 2. On suspicious

Type of specimen taken

Blood and/or tissue samples due to abortion

Methods of sampling (description of sampling techniques)

Blood samples are taken from living animals at the farm. In suspect cases aborted foetuses, placental tissue and vaginal mucus is collected from animals that have aborted.

Case definition

The animal is seropositive, if the confirmation test is positive. The bacteriological investigation (culture): the animal is positive, if brucella bacteria is isolated

Diagnostic/analytical methods used

Screening: Rose Bengal test, Confirmation: CF/culture

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

The measures for control of *Brucella melitensis* are in the Animal Diseases Act No 441/2013 and in the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, serological testing of blood samples and microbiological testing in case of abortions, epidemiological investigation and movement restriction of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.

Notification system in place

Brucella melitensis is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

In 2014 160 random blood samples from healthy animals from 9 farms were tested, all with negative results. Three clinical suspect cases from one farm were investigated bacteriologically due to abortion; all with negative results.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is no relevance to human cases.

2.2.2.4 B. melitensis in animal - Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Finland has been granted the officially brucellosis free status of ovine herds established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

1. Individual blood samples from ovine herds are taken according to Council Directive 91/68/EEC, which provides for random checks to be carried out on sheep and goat holdings in order to maintain the officially brucellosis free status with regard to *B. melitensis*. An official veterinarian takes the blood samples. 2. Suspicious animals due to abortion

Frequency of the sampling

1. Continuous 2. On suspicion

Type of specimen taken

Blood and/ or tissue samples

Methods of sampling (description of sampling techniques)

Blood samples are taken from living animals at the farm. In suspect cases aborted foetuses, placental tissue and vaginal mucus is collected from animals that have aborted

Case definition

The animal is seropositive, if the confirmation test is positive. The bacteriological investigation (culture): the animal is positive, if brucella bacteria is isolated

Diagnostic/analytical methods used

Screening: Rose Bengal test, Confirmation: CFT/culture

Vaccination policy

Vaccination is prohibited.

Control program/mechanisms

The control program/strategies in place

The measures for control of *Brucella Melitensis* are in the Animal Diseases Act No 441/2013 and in the Decree No 19/2013 of the Ministry of Agriculture and Forestry, including investigation of all suspected cases by the veterinary authorities, notification procedures and movement restrictions of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.

Measures in case of the positive findings or single cases

The investigation of all suspected cases by the veterinary authorities, serological testing of blood samples and microbiological testing in case of abortions, epidemiological investigation and movement restriction of suspected animals and culling or slaughtering of the positive herd in case of confirmed disease.

Notification system in place

Brucella melitensis is classified as an immediately notifiable and dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation

In 2014, 4156 random blood samples from healthy sheep from 110 farms were tested, all with negative results. In addition 25 samples from 11 farms in clinically suspect cases due to abortion was investigated bacteriologically, all with negative results.

National evaluation of the recent situation, the trends and sources of infection

The situation remains favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

There is no relevance to human cases.

3 INFORMATION ON SPECIFIC ZONOSSES AND ZONOTIC AGENTS

Zoonoses are diseases or infections, which are naturally transmissible directly or indirectly between animals and humans. Foodstuffs serve often as vehicles of zoonotic infections. Zoonotic agents cover viruses, bacteria, fungi, parasites or other biological entities that are likely to cause zoonoses.

3.1 SALMONELLOSIS

3.1.1 General evaluation of the national situation

3.1.1.1 Salmonella - general evaluation

History of the disease and/or infection in the country

The Finnish situation regarding Salmonella in feedingstuffs, animals and food of animal origin has been very favourable for years. Majority of human salmonellosis cases have been acquired abroad.

National evaluation of the recent situation, the trends and sources of infection

Recent actions taken to control the zoonoses

3.1.2 Salmonella in foodstuffs

3.1.2.1 Salmonella spp. in food - Meat from bovine animals

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The Finnish Salmonella Control Programme:- at slaughterhouses: together 3000 carcasses are sampled each year randomly from the cattle population. Sampling is carried out by food business operator under supervision of the official veterinarian.- at cutting plants: Sampling is compulsory for all cutting plants. Random sampling, frequency is depending on production capacity of the cutting plant. Sampling is carried out by food business operator under supervision of official veterinarian.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

At slaughterhouse: surface of carcass
At cutting plant: fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: 2 surface swab samples are taken from a carcass before chilling. A total area of 1400 cm² is swabbed. Sampling sites: the upper inner part of hind legs including the pelvic entrance and the cut surface area of the abdomen and the chest. Cutting plants: A sample consists of at least 25 grams of crushed meat taken from a cleaning tool of a conveyor belt, from tables or from similar point.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when *Salmonella* spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

ISO 6579:2002 or NMKL No 71:1999 or NMKL N:o 187:2007

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

After a positive salmonella result increased sampling is carried out at the slaughterhouse or at the cutting plant. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment.

Notification system in place

Laboratory has to notify the positive result to the competent authority and to the food business operator.

Results of the investigation

Salmonella spp. was not detected in carcass swab samples (3256 samples) or cutting plant samples (1688 samples) in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in domestic bovine meat is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic bovine meat is not considered to be an important source of human salmonellosis cases in Finland.

3.1.2.2 Salmonella spp. in food - Meat from broilers (Gallus gallus)

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

At slaughterhouses: carcasses are sampled according to the requirements of the Regulation 2073/2005. Cutting plants not connected to the slaughterhouses: meat batches are sampled according to the requirements of the Regulation 2073/2005.

At meat processing plant

Minced meat, meat preparations and meat products; according to the Regulation 2073/2005

Frequency of the sampling

At slaughterhouse and cutting plant

At slaughterhouses: at least one sampling session (neck skin of 15 birds) must be carried out each week. Small slaughterhouses (less than 150 000 birds slaughtered annually) may reduce sampling frequency. At cutting plants: according to the Regulation 2073/2005.

Type of specimen taken

At slaughterhouse and cutting plant

At slaughterhouse; neck skin
At cutting plant: fresh meat

At meat processing plant

According to the Regulation 2073/2005

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: neck skins from 15 poultry carcasses are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcass. The neck skin samples from three poultry carcasses from the same flock of origin shall be pooled before examination in order to form 5 x 25 g final samples. At cutting plants: five samples of at least 25 g of the same batch are collected and analysed separately.

Definition of positive finding

At slaughterhouse and cutting plant

Batch is considered to be positive when Salmonella spp is isolated from a sample

At meat processing plant

Batch is considered to be positive when Salmonella spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187/2007

Preventive measures in place

All flocks must be tested for Salmonella before slaughter. If the flock is Salmonella positive, meat must be heat treated in an approved establishment.

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses

In 2012, the sampling system at slaughterhouses and cutting plants was totally amended. Before 2012, the sampling was not compulsory at the slaughterhouses, and at the cutting plants samples taken were single crushed meat samples instead of batch based sampling. The reason for this amendment was the amendment of the Regulation 2073/2005. Earlier the Salmonella criterion for broiler meat was a process hygiene criterion, and crushed meat sampling at the cutting plants was assessed to be equivalent to the sampling of neck skin samples at the slaughterhouses. When a food safety criterion based on neck skin samples was introduced, the sampling of crushed meat was not any more considered to be equivalent. In 2012, also the data collection from the samplings by food business operators of batches of minced meat and meat preparations started at the central level.

Measures in case of the positive findings or single cases

The positive batch is rejected/withdrawn from the market. In addition, after a positive salmonella result increased sampling is carried out in the establishment. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment. The measures are the same for all Salmonella serovars.

Notification system in place

Laboratory has to notify the positive result to the competent authority and to the food business operator.

Results of the investigation

Salmonella spp. was not detected in domestic broiler meat in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in domestic broiler meat has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

3.1.2.3 Salmonella spp. in food - Meat from pig

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The Finnish Salmonella Control Programme:- at slaughterhouses: 3000 carcasses of fattening pigs and sows are sampled each year randomly from the populations. Sampling is carried out by food business operator under supervision of the official veterinarian.- at cutting plants: Sampling is compulsory for all cutting plants. Random sampling, frequency is depending on production capacity of the cutting plant. Sampling is carried out by food business operator under supervision of official veterinarian.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

At slaughterhouse: surface of carcass
At cutting plant: fresh meat

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: 3 surface swab samples are taken from a carcass before chilling. A total area of 1400 cm² is swabbed. Sampling sites: the upper inner part of hind legs including the pelvic entrance; the cut surface area of the abdomen and the chest; and the cheek. Cutting plants: A sample consists of at least 25 grams of crushed meat taken from a cleaning tool of a conveyer belt, from tables or from similar point.

Definition of positive finding

At slaughterhouse and cutting plant

Foodstuff is considered to be positive when Salmonella spp is isolated from a sample

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187:2007

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Measures in case of the positive findings or single cases

After a positive salmonella result increased sampling is carried out at the slaughterhouse or at the cutting plant. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment.

Notification system in place

Laboratory has to notify the positive result to the competent authority and to the food business operator.

Results of the investigation

Salmonella spp. was not detected in carcass swab samples (6398 samples) or cutting plant samples (1398) in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in domestic pig meat is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic pig meat is not considered to be an important source of human salmonellosis cases in Finland.

3.1.2.4 Salmonella spp. in food - Meat from turkey

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

At slaughterhouses: carcasses are sampled according to the requirements of the Regulation 2073/2005. Cutting plants not connected to the slaughterhouses: meat batches are sampled according to the requirements of the Regulation 2073/2005.

At meat processing plant

Minced meat, meat preparations and meat products; according to the Regulation 2073/2005

Frequency of the sampling

At slaughterhouse and cutting plant

At slaughterhouses: at least one sampling session (neck skin of 15 birds) must be carried out each week. Small slaughterhouses (less than 150 000 birds slaughtered annually) may reduce sampling frequency. At cutting plants: according to the Regulation 2073/2005.

Type of specimen taken

At slaughterhouse and cutting plant

At slaughterhouse; neck skin
At cutting plant: fresh meat

At meat processing plant

According to the Regulation 2073/2005

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughterhouse: neck skins from 15 poultry carcasses are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcass. The neck skin samples from three poultry carcasses from the same flock of origin shall be pooled before examination in order to form 5 x 25 g final samples. At cutting plants: five samples of at least 25 g of the same batch are collected and analysed separately.

Definition of positive finding

At slaughterhouse and cutting plant

Batch is considered to be positive when *Salmonella* spp is isolated from a sample.

At meat processing plant

Batch is considered to be positive when *Salmonella* spp is isolated from a sample.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

ISO 6579:2002 or NMKL No 71:1999 or NMKL No 187/2007

Preventive measures in place

All flocks must be tested for *Salmonella* before slaughter. If the flock is *Salmonella* positive, meat must be heat treated in an approved establishment.

Control program/mechanisms

The control program/strategies in place

The Finnish *Salmonella* Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses

In 2012, the sampling system at slaughterhouses and cutting plants was totally amended. Before 2012, the sampling was not compulsory at the slaughterhouses, and at the cutting plants samples taken were single crushed meat samples instead of batch based sampling. The reason for this amendment was the amendment of the Regulation 2073/2005. Earlier the *Salmonella* criterion for turkey meat was a process hygiene criterion, and crushed meat sampling at the cutting plants was assessed to be equivalent to the sampling of neck skin samples at the slaughterhouses. When a food safety criterion based on neck skin samples was introduced, the sampling of crushed meat was not any more considered to be equivalent. In 2012, also the data collection from the samplings by food business operators of batches of minced meat and meat preparations started at the central level.

Measures in case of the positive findings or single cases

The positive batch is rejected/withdrawn from the market. In addition, after a positive *salmonella* result increased sampling is carried out in the establishment. The origin of contamination must be traced back, if possible. Effective cleaning and disinfection of the premises and equipment. The measures are the same for all *Salmonella* serovars.

Notification system in place

Laboratory has to notify the positive results to the competent authority and to the food business operator.

Results of the investigation

Salmonella spp. was not detected in domestic turkey meat in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in domestic turkey meat has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic turkey meat is not considered to be an important source of human salmonellosis in Finland.

3.1.2.5 Salmonella in food - Survey - national survey

Monitoring system

Sampling strategy

Type of specimen taken

Methods of sampling (description of sampling techniques)

Definition of positive finding

Diagnostic/analytical methods used

Results of the investigation

3.1.3 Salmonella in animals

3.1.3.1 Salmonella spp. in animal - Cattle (bovine animals)

Monitoring system

Sampling strategy

The Finnish Salmonella Control Programme:- Together 3000 animals are sampled each year randomly from the cattle population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian.-All AI-bulls are sampled not more than one month before entering the quarantine accommodation of a semen collection center and in the quarantine accommodation before entering the semen collection center. The herds of origin of AI -bulls are sampled annually by the food business operator.- Bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, are sampled annually, sampling is carried out by the food business operator.- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at the farm by the official veterinarian.- After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before the restrictions are lifted.Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Frequency of the sampling

Animals at farm

- The herds of origin of AI -bulls are sampled annually. - Bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, are sampled annually (between July and November).

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at farm

Routine sampling: faeces Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples

Animals at slaughter (herd based approach)

Lymph nodes

Methods of sampling (description of sampling techniques)

Animals at farm

Sampling of herds of origin of AI bulls and holdings, which deliver raw milk: The number of faecal samples is dependent on the number of animals in the herd. In the herds with less than 40 animals all the animals are sampled. In the herds with 40-200 animals all the youngest 40 animals are sampled and from the rest animals every second is sampled. In the herds with over 200 animals all the youngest 40 animals are sampled, from the next youngest 160 animals every second is sampled and from the rest animals every fifth. Maximum of 20 samples may be pooled together. Sampling of suspected herds: Faecal sampling is carried out as described above. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella swab samples are also taken from the feed systems. Sampling of salmonella positive herds for lifting the restrictions: A faecal sample is collected from each animal. Maximum of 20 samples may be pooled together. In addition, 10-100 environmental swab samples are taken from different areas of the premises.

Animals at slaughter (herd based approach)

From each carcass five ileo-caecal lymph nodes are taken. Lymph nodes are divided into two equal parts. Lymph nodes parts from five animals are pooled together for analyse. If the sample is positive each of the five individually samples are analysed separately.

Case definition

Animals at farm

Herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Animals at slaughter (herd based approach)

Animal is positive if Salmonella spp. has been isolated from a sample.

Diagnostic/analytical methods used

Animals at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Animals at slaughter (herd based approach)

ISO 6579:2002 or NMKL No 71:1999 or ISO 6579:2002 / Amendment 1:2007

Vaccination policy

Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Biosecurity and production hygiene measures at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses

National Decree on Salmonella control of cattle was amended in 2011 and in 2014. In 2011 the sensitivity was improved in samplings of suspected herds and of positive herds before restrictions are lifted. The number of faecal samples was increased and environmental samples were added to the sampling protocol. A compulsory control programme for all bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumers, started in the beginning of 2014 (National Decree on Salmonella control of cattle 1030/2013). The herds are sampled annually, sampling is carried out by the business operator.

Measures in case of the positive findings or single cases

At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian. At farm: Official restrictions: no trade of live animals except to slaughterhouse (meat is heat treated), milk is allowed to deliver only to an approved establishment for pasteurization. Sanitation and eradication is carried out according to the holding specific plan. Restrictions are lifted after herd has been negative in two consecutive sampling sessions with interval of 3-4 weeks. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs are analysed for Salmonella.

Notification system in place

The laboratory has to notify the positive result to the competent authority and to the food business operator.

Results of the investigation

Lymph node sampling at slaughterhouses: four animals were positive (0,12 %), the serovar in all cases was S. Typhimurium. Herds: salmonella was detected in nine herds (2 x S. Eastbourne, 5 x S. Typhimurium, 1 x S. Enteritidis and 1 x S. Typhimurium and S. Enteritidis found in the same herd.)

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in cattle has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Cattle is not considered to be an important source of human salmonellosis cases in Finland.

3.1.3.2 Salmonella spp. in animal - Gallus gallus (fowl) - broilers

Monitoring system

Sampling strategy

Broiler flocks

The Finnish Salmonella Control Programme: All broiler flocks are sampled at the holdings within three weeks before slaughter. Sampling is carried out by the official veterinarian once a year at each holding otherwise the sampling is carried out by the food business operator. In addition, the flock is sampled by the official veterinarian every time when there is a reason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling

Broiler flocks: Before slaughter at farm

Within three weeks before slaughter

Type of specimen taken

Broiler flocks: Before slaughter at farm

Samples taken by the food business operator; two pairs of socks/boot swabs
Samples taken by the official veterinarian; one pair of socks/boot swabs and one dust sample

Methods of sampling (description of sampling techniques)

Broiler flocks: Before slaughter at farm

Sampling by the food business operator: two pairs of socks/boot swabs samples are taken. Both pairs are analysed separately. Sampling by the official veterinarian: one pair of socks/boot swabs and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2012.

Case definition

Broiler flocks: Before slaughter at farm

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Broiler flocks

Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Broiler flocks

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs. 90% of flocks are treated with a competitive exclusion product as day-old chicks.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

The Finnish Salmonella Control Programme, approved by Commission Decision 2008/815/EC

Recent actions taken to control the zoonoses

Salmonella control programme for broiler flocks was amended from the beginning of the year 2010. Two pairs of socks/boot swabs or one pair of socks/boot swabs and one dust sample are taken instead of five pairs of socks/boot swabs.

Measures in case of the positive findings or single cases

Broiler flocks: Before slaughter at farm

In case of positive finding the flock is destructed or slaughtered and meat heat treated. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all salmonella serovars.

Notification system in place

The laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

Results of the investigation

Salmonella was not detected in broiler flocks in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation has been very favourable in broiler flocks for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic broiler meat is not considered to be an important source of human salmonellosis cases in Finland.

3.1.3.3 Salmonella spp. in animal - Pigs

Monitoring system

Sampling strategy

Breeding herds

The Finnish Salmonella Control Programme: - All nucleus and multiplier herds are sampled at the holding once a year by the operators.- Together 3000 sows are sampled each year randomly from the sow population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian.- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian.- After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before the restrictions are lifted. Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Multiplying herds

Fattening herds

The Finnish Salmonella Control Programme:- Together 3000 fattening pigs are sampled each year randomly from the population at the slaughterhouses. Sampling is carried out by the food business operator under supervision of the official veterinarian.- Suspected herds (clinical symptoms or positive finding at slaughterhouse or other suspicion) are sampled at the holding by the official veterinarian.- After a Salmonella finding herds are sampled several times by the operator during the sanitation and eradication process and at least twice by the official veterinarian before the restrictions are lifted. Note! All sampling at slaughterhouses has an animal based approach, not herd based.

Frequency of the sampling

Breeding herds

At slaughterhouses: sampling distributed evenly throughout the year. At holdings: nucleus and multiplier herds once a year

Fattening herds at slaughterhouse (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Breeding herds

At holding: Routine sampling: faeces Suspect sampling and sampling before restrictions are lifted: faeces and environmental swab samples
At slaughterhouse: lymph nodes

Fattening herds at farm

Faeces and environmental swab samples

Fattening herds at slaughterhouse (herd based approach)

Lymph nodes

Methods of sampling (description of sampling techniques)

Breeding herds

At holding: Routine sampling of nucleus and multiplier herds: Sows: One composite sample is taken from every 100 sows or part of 100 sows. However, the maximum number of composite samples is ten. Samples are preferably taken from sows with piglets. Faecal samples of maximum of 20 animals may be pooled to one composite sample. Growers, young breeding animals or weaned piglets (if present): Two faecal samples are taken from a group of 10-15 animals. Maximum of 20 samples may be pooled to one composite sample. The number of composite samples is dependent on the number of sows at the holding. Maximum number of composite samples is 15. Suspected herds: Adult animals: Faecal sample is taken from every second sow with piglets. From other adult animals one composite sample is taken from every 100 animals or part of 100 animals. Faecal samples of maximum of 20 animals may be pooled to one composite sample. Young animals: Two faecal samples are taken from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella swab samples are also taken from the feed systems. Sampling of salmonella positive herds for lifting the restrictions: Adult animals: Faecal sample is collected from every animal. Maximum of 20 samples may be pooled. Young animals: Two faecal samples are collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 10-100 environmental swab samples are taken from different areas of the premises. Slaughterhouse: From each carcass five ileo-caecal lymph nodes are taken. Lymph nodes are divided into two equal parts. Lymph nodes parts from five animals are pooled together for analyse. If the sample is positive each of the five individually samples are analysed separately.

Fattening herds at farm

Suspected herds: One faecal sample is collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 5-50 environmental swab samples are taken from different areas of the premises. If there is a suspicion that feedstuffs are contaminated with Salmonella swab samples are also taken from the feed systems. Sampling of salmonella positive herds for releasing the restrictions: Two faecal samples are collected from each group of 10-15 animals. Maximum of 20 samples may be pooled. In addition, 10-100 environmental swab samples are taken from different areas of the premises.

Fattening herds at slaughterhouse (herd based approach)

From each carcass five ileo-caecal lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph nodes parts from five animals are pooled together for analyse. If the sample is positive each of the five individually samples are analysed separately.

Case definition

Breeding herds

Herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Multiplying herds

Fattening herds at farm

Herd is positive if Salmonella spp. has been isolated from one or more faecal or environmental samples.

Fattening herds at slaughterhouse (herd based approach)

Animal is positive if Salmonella spp. has been isolated from a sample.

Diagnostic/analytical methods used

Breeding herds

Bacteriological method: ISO 6579:2002/Amd 1:2007

Fattening herds at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Fattening herds at slaughterhouse (herd based approach)

ISO 6579:2002 or NMKL No 71:1999 or ISO 6579:2002 / Amendment 1:2007

Vaccination policy

Breeding herds

Vaccination against salmonella is not allowed in Finland.

Fattening herds

Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Breeding herds

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Fattening herds

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

Breeding herds

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Fattening herds

The Finnish Salmonella Control Programme, approved by Commission Decision 94/968/EC of 28 December 1994.

Recent actions taken to control the zoonoses

National Decree on Salmonella control of pigs was amended in 2011. The sensitivity was improved in samplings of suspected herds and of positive herds before restrictions are lifted. The number of faecal samples was increased and environmental samples were added to the sampling protocol. A new National Decree on Salmonella control of pigs came into force from the beginning of 2014, but the program was not changed.

Measures in case of the positive findings or single cases

At slaughterhouse: If a positive lymph node sample is detected in the slaughterhouse, the herd of origin is sampled by the official veterinarian. At farm: Official restrictions: no trade of live animals except to slaughterhouse (meat is heat treated). Sanitation and eradication is carried out according to the holding specific plan. Restrictions are released after herd has been negative in two consecutive sampling sessions with 3-4 weeks intervals. Epidemiological investigation is carried out by the official veterinarian. Contact herds are sampled. Feedingstuffs are analysed for Salmonella.

Notification system in place

Laboratory has to notify the positive result to the competent authority and to the food business operator.

Results of the investigation

Lymph node sampling at slaughterhouses: one fattening pig (0,03%) was positive. The serovar was S. Infantis. Herds: Salmonella was detected in one herd (S. Bovismorbificans, S. Mbandaka and S. Stockholm found in the same herd, S. Mbandaka found also in 2013).

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in pigs has been very favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Pigs are not considered to be an important source of human salmonellosis cases in Finland.

3.1.3.4 Salmonella spp. in animal - Gallus gallus (fowl) - laying hens

Monitoring system

Sampling strategy

Laying hens flocks

The Finnish Salmonella Control Programme: Day-old chicks are sampled at the holding after arrival by the food business operator. Rearing flocks are sampled at the holding two weeks before laying period by the food business operator. Production flocks are sampled at the holdings every 15 weeks by the food business operator. Sampling is carried out by the official veterinarian once a year at each rearing and laying holding. In addition, the flock is sampled by the official veterinarian every time when there is a reason to suspect that the flock is positive for *Salmonella* spp. There are specific national rules also for farms which deliver only small amount of eggs directly to the final consumers. At these farms, the flocks are sampled once or twice a year by the operator and every second or third year by the official veterinarian.

Frequency of the sampling

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

Every flock is sampled two weeks before laying period

Laying hens: Production period

Every 15 weeks

Type of specimen taken

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Rearing period

faeces or sock samples / boot swabs

Laying hens: Production period

faeces or sock samples / boot swabs, dust

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

Five internal lining papers are collected from delivery baskets and pooled together. If papers are not used five swab samples are taken.

Laying hens: Rearing period

Two pairs of boot swabs/sock samples are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one.

Laying hens: Production period

Two pairs of boot swabs/sock samples are taken and pooled to one. In cage flocks: two samples of 150 g of naturally mixed faeces are collected and pooled to one. In official sampling also a dust sample (250 ml, 100 g) or a dust swab sample is taken. The sampling is in accordance with the Annex of Commission Regulation (EU) No 517/2011.

Case definition

Laying hens: Day-old chicks

Flock is considered to be positive if *Salmonella* spp. is isolated from any sample.

Laying hens: Rearing period

Flock is considered to be positive if *Salmonella* spp. is isolated from any sample.

Laying hens: Production period

Flock is considered to be positive if *Salmonella* spp. is isolated from any sample.

Diagnostic/analytical methods used

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Laying hens: Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Laying hens flocks

Vaccination against *Salmonella* is not allowed in Finland.

Other preventive measures than vaccination in place

Laying hens flocks

Strict biosecurity and production hygiene at holdings. *Salmonella* control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

Recent actions taken to control the zoonoses

Measures in case of the positive findings or single cases

Laying hens flocks

In case of positive finding the flock is destructed or slaughtered and meat heat treated. Eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

Notification system in place

The laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

Results of the investigation

Salmonella was not detected in commercial flocks of adult laying hens. S. Typhimurium was detected in one backyard holding delivering eggs only directly to the final consumers.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation has been very favourable in flocks of laying hens for years. Usually 0-3 positive flocks have been detected yearly. S. Typhimurium has been the most common serovar.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Flocks of laying hens or eggs are not considered to be important source of human salmonellosis cases in Finland.

3.1.3.5 Salmonella spp. in animal - Gallus gallus (fowl) - breeding flocks, unspecified

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

The Finnish Salmonella Control Programme: Day-old chicks are sampled by the food business operator after arrived to the holding. Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian at each holding. Adult breeding flocks - egg production line: Flocks are sampled every third week at the holdings by the food business operator and twice during the production cycle by the official veterinarians. Adult breeding flocks - broiler production line: Flocks are sampled every second week at the holdings by the food business operator and twice during the production cycle by the official veterinarian. In addition, a rearing and adult flock is always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Every flock is sampled at age of four weeks and two weeks before moving to laying unit

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Egg production line: Every flock is sampled at the holding every third week
Broiler production line: Every flock is sampled at the holding every second week

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings of delivery boxes

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Socks/ boot swabs
In cage flocks: faeces

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Socks/boot swabs and dust sample
In cage flocks: faeces and dust sample

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings are collected from ten delivery boxes. Five papers are pooled together. If papers are not used swab samples from ten delivery boxes are taken. Five swab samples are pooled together.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Two pairs of socks/ boot swabs samples are taken. Both pairs are analysed separately.
In cage flocks; 2 x 150 g faeces. Both samples are analysed separately.

Breeding flocks: Production period

One pair of socks/boot swabs samples and one dust sample collected by swab are taken. Both samples are analysed separately.
In cage flocks: two samples of 150 g faeces are taken instead of boot swabs. Both samples are analysed separately.
The sampling is in accordance with the Annex of Commission Regulation (EU) No 200/2010.

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Flock is considered to be positive when *Salmonella* spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Flock is considered to be positive when *Salmonella* spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Flock is considered to be positive when *Salmonella* spp. is isolated from any sample.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Vaccination against Salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Strict biosecurity and production hygiene at holdings. Salmonella control of feedstuffs.

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

The Finnish Salmonella Control Programme, approved by Commission Decision 2007/849/EC.

Recent actions taken to control the zoonoses

Salmonella control programme for breeding flocks was amended in the beginning of the year 2010 for adult flocks of broiler production line and in 2012 for adult flocks of egg production line. Earlier the adult breeding flocks were sampled at the hatcheries, now at the holdings. The sampling method at the holdings is amended. One pair of socks/boot swabs and one swab dust sample are taken instead of five pairs of socks/boot swabs.

Measures in case of the positive findings or single cases

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Positive flock is destructed or slaughtered and meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

Notification system in place

The laboratory has to notify positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

Results of the investigation

Salmonella was not detected in Gallus gallus breeding flocks in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation has been very favourable in Gallus Gallus breeding flocks for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Breeding flocks are not considered to be an important source of human salmonellosis cases in Finland.

3.1.3.6 Salmonella spp. in Turkeys - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

The Finnish Salmonella Control Programme: Day-old chicks are sampled by the food business operator after arrived to the holding. Rearing flocks are sampled at the holding by the food business operator at four weeks old and two weeks before moving to laying unit or phase. Once a year samples are taken by the official veterinarian at each holding. Adult breeding flocks are sampled at the holding every second week by the food business operator. Once a year samples are taken by the official veterinarian at each holding. In addition, the rearing and adult breeding flock are always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Meat production flocks

The Finnish Salmonella Control Programme: All meat production flocks are sampled at the holding within three weeks before slaughter. The sampling result is valid for three weeks except for small producers the result is valid for six weeks. At each holding sampling is carried out by the official veterinarian once a year, otherwise sampling is carried out by the food business operator. In addition, the flock is always sampled by the official veterinarian if there is any reason to suspect that the flock is positive for Salmonella spp.

Frequency of the sampling

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Every flock is sampled

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Every flock is sampled at age of 4 weeks and 2 weeks before moving to the laying unit

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Every flock is sampled at the holding every second week.

Meat production flocks: Before slaughter at farm

Every flock is sampled within three weeks before slaughter

Type of specimen taken

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings of delivery boxes

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Socks/ boot swabs

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

One pair of socks/boot swabs and one dust sample

Meat production flocks: Before slaughter at farm

Samples taken by the food business operator; two pairs of socks/boot swabs
Samples taken by the official veterinarian; one pair of socks/boot swabs and one dust sample

Methods of sampling (description of sampling techniques)

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Internal linings are collected from ten delivery boxes. Five papers are pooled together. If papers are not used swab samples from ten delivery boxes are taken. Five swab samples are pooled together.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Two pairs of socks/ boot swabs samples are taken. Both pairs are analysed separately.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

One pair of socks/boot swabs samples and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No1190/2012

Meat production flocks: Before slaughter at farm

Sampling by the food business operator: two pairs of socks/boot swabs samples are taken. Both pairs are analysed separately. Sampling by the official veterinarian: one pair of socks/boot swabs and one dust sample collected by swab are taken. Both samples are analysed separately. The sampling is in accordance with the Annex of Commission Regulation (EU) No1190/2012.

Case definition

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Meat production flocks: Before slaughter at farm

Flock is considered to be positive when Salmonella spp. is isolated from any sample.

Diagnostic/analytical methods used

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Day-old chicks

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Rearing period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Breeding flocks (separate elite, grand parent and parent flocks when necessary): Production period

Bacteriological method: ISO 6579:2002/Amd 1:2007

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002/Amd 1:2007

Vaccination policy

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Vaccination against salmonella is not allowed in Finland.

Meat production flocks

Vaccination against salmonella is not allowed in Finland.

Other preventive measures than vaccination in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

Strict biosecurity and production hygiene in holdings. Competitive exclusion. Feedstuff control.

Meat production flocks

Strict biosecurity and production hygiene in holdings. Competitive exclusion. Feedstuff control.

Control program/mechanisms

The control program/strategies in place

Breeding flocks (separate elite, grand parent and parent flocks when necessary)

The Finnish Salmonella Control Programme, approved by Commission Decision 2009/771/EC.

Meat production flocks

The Finnish Salmonella Control Programme, approved by Commission Decision 2009/771/EC.

Recent actions taken to control the zoonoses

Salmonella control programme for breeding and meat production flocks of turkeys was amended from the beginning of the year 2010. Earlier the adult breeding flocks were sampled every second week at the hatcheries, now at the holdings. One pair of socks/boot swabs and one swab dust sample are taken instead of five pairs of socks/boot swabs. For meat production flocks two pairs of socks/boot swabs or one pair of socks/boot swabs and one dust sample are taken instead of five pairs of socks/boot swabs.

Measures in case of the positive findings or single cases

In case of positive finding the flock is destructed or slaughtered and meat heat treated. Hatching eggs are destructed or heat treated. All the other flocks at the holding are sampled by the official veterinarian. The holding is cleaned and disinfected, official environmental samples are taken, negative results are required before restocking. Official epidemiological investigation is carried out. Feedingstuffs are analysed for Salmonella. The measures are the same for all Salmonella serovars.

Notification system in place

Laboratory has to notify the positive result to the competent authority and to the food business operator. Salmonella has been notifiable since 1995.

Results of the investigation

Salmonella spp. was not detected in breeding or fattening flocks of turkeys in 2014.

National evaluation of the recent situation, the trends and sources of infection

Salmonella situation in turkey flocks has been favourable for years.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Domestic turkey meat is not considered to be an important source of human salmonellosis cases in Finland.

3.1.4 Salmonella in feedingstuffs

3.1.4.1 Salmonella spp. in feed

History of the disease and/or infection in the country

In Finland, animal feed has been controlled for Salmonella on the basis of animal feed legislation for more than 50 years. Control of imported feeds and domestic manufacturing as well as requirement for heat treatment of manufactured compound feeds has efficiently limited and prevented the spread of Salmonella from factories to farms. The strict liability principle in the animal feed legislation and the indemnity liability have contributed to the willingness of feedmills to develop their operations towards eliminating risks of Salmonella. The feed industry has also accepted its responsibility for the safety of the national food chain by developing its own quality control systems. Salmonella outbreaks originating from feed are rare on Finnish livestock farms. In 1995, the feed-borne *S. Infantis* outbreak was discovered on cattle farms. During the outbreak, approximately 0,7 % of Finnish cattle farms were infected. In the spring of 2009, the feed-borne *S. Tennessee* outbreak spread to poultry and pig farms. Approximately 4 % of Finnish laying hen holdings and about 2 % of Finnish pig holdings were infected. Imported feed materials of plant origin are considered particularly risky in terms of Salmonella. During the last years, an average of 370 million kilograms of feed materials of plant origin - mainly soya and rapeseed meals - have been imported into Finland annually. Until 2012 official salmonella control samples were taken from feeds of plant origin from both the feeds imported from the internal market and third countries. On average almost 6 % of the imported feed lots were found to be contaminated by Salmonella. The most common serotypes in feed materials of plant origin were *S. Tennessee*, *S. Agona*, *S. Senftenberg* and *S. Mbandaka*. During the last ten years, Salmonella findings have been relatively rare in feed materials and compound feeds manufactured in Finland. Salmonella has been found four times in feed materials of plant origin. In feed materials of animal origin, Salmonella was found in two samples of meat-and-bone meal in 2005 and in one sample in 2010. Compound feeds that have been salmonella-positive have been almost without exception compound feeds intended for fur animals. Salmonella has not been found in samples taken in connection with the manufacturing of pet food. The most common Salmonellas isolated from the control samples of domestic feed materials and compound feeds have been *S. Typhimurium*, *S. Agona* and *S. Poona*. In the 2009 Salmonella outbreak, compound feeds were contaminated with *S. Tennessee*. The majority of salmonella tests for feed on the market have been carried out on pet food and sunflower seeds intended for outdoor birds. During the last ten years in samples taken from dried pig ears and from other similar products intended for dogs, an average of 4 % have been found to be contaminated by salmonella. The contaminated feed has been manufactured outside Finland. From 2005 to 2014 the most common serotypes isolated from dried pig ears and other corresponding products have been *S. Derby*, *S. Typhimurium*, *S. Agona* and *S. Anatum*.

Additional information

Finnish Food Safety Authority Evira carries out the official inspections of feeds during manufacturing, marketing, distribution and import. The decree of the Ministry of Agriculture and Forestry on the pursuit of activities in the animal feed sector (No 548/2012) includes demands about sampling for salmonella testing by official control and by feed business operators. According to the Finnish Feed Act (No 86/2008), the feed operator is obligated to pay compensation for damages caused by salmonella-contaminated feeds. All feed business operators must cooperate with Evira when salmonella bacterium is found in feeds, feed materials or manufacturing processes.

- Import from EU or third countries: For the official salmonella control of feeds imported from third countries, samples are taken from high-risk feeds of plant origin in accordance with the annual risk-based control plan of Evira. Salmonella analyses are carried out in Evira or in the laboratories approved by Evira. Feed sampling for salmonella analysis in connection with imports from EU changed since the beginning of 2013. A feed business operator that imports high-risk feeds of plant origin from the internal market for feeding food-producing animals, fur animals or pets shall take samples of the arriving feed batches or lots in accordance with operator's risk-based own quality control plan. For the official salmonella control samples of high-risk feeds of plant origin from the internal market are taken in random inspections. Custom is responsible for the documentary checks and carrying out the import quarantine restrictions on feeds of plant origin from third countries. Feeds of animal origin from third countries are imported via designated BIPs, where they are submitted for veterinary border inspection. The border control veterinarians carry out official controls of feeds of animal origin from third countries to verify compliance with aspects of Feedingstuffs Act in accordance with Regulation (EC) 882/2004.

- Marketing control: Evira provides the inspectors of Employment and Economic Development Centres with a sampling programme for the whole year in which the types of operators, the number of visits, the types of feed and the number of samples to be taken are specified.

- Control of domestic production: Regulation (EC) No 1831/2003 of the European Parliament and of the Council laying down requirements for feed hygiene describes general rules on feed hygiene, conditions and arrangements ensuring traceability of feed and conditions for registration and approval of establishments. The sampling of production is risk-based and targeted to specified feeds. The amount of production, the type of operator, the hygienic risk and the feed materials used have an impact on the amount so samples taken annually from the production.

- Measures in case of positive findings: When salmonella is found in import or market control, a prohibition concerning the lot, from which the sample was taken, is immediately issued. If salmonella is found in domestic feed production, the production line is stopped and disinfected. Evira may upon request grant a permission to decontaminate the lot of feed material containing salmonella. The decontamination must be carried out according to instructions of Evira. After decontamination, Evira will resample the lot and if the lot is verified to be free from salmonella, Evira gives a permission to use the lot as feed. In market control, the shop, where the salmonella was found, is contacted. The importer or the representative is also immediately informed, and the shop and the importer or representative are responsible for withdrawal of the product from market according to instructions of Evira.

- Sampling: Sampling for official control is carried out according to Evira's written directions which are based on the Commission Regulation (EU) No 691/2013 of July 2013 laying down the methods of sampling and analysis for the official control of f

3.2 CAMPYLOBACTERIOSIS

3.2.1 General evaluation of the national situation

3.2.1.1 Thermophilic *Campylobacter* spp., unspecified - general evaluation

History of the disease and/or infection in the country

The annual number of human cases has shown a rising overall trend from 1995 to 2008. After 2008 the number of reported human campylobacteriosis cases has been around 4000 per year but increased in 2014 up to 4887 cases. Since 1998 campylobacters have been more commonly reported cause of enteritis than salmonella. All Finnish broiler slaughterhouses have voluntarily monitored the prevalence of campylobacter in broilers at slaughter as a part of the own-check programme since the 1990's. From 1999 to 2002 the flock prevalence was on average 7.9% between June and September and 1.1% during the other months.

National evaluation of the recent situation, the trends and sources of infection

Thermophilic campylobacters, especially *Campylobacter jejuni*, are the most common bacterial cause of human enteric infections in Finland. A strong seasonal variation is typical for the incidence of campylobacteriosis, which is consistently highest in July. A high percentage of human campylobacter infections reported in Finland originate from travel abroad. However, the proportion of domestically acquired infections peaks in the summer season. The prevalence of campylobacters in broiler slaughter batches peaks in July-August. Since the implementation of a national campylobacter monitoring programme for broilers in 2004, the average prevalence of campylobacters in broiler slaughter batches has been on average 5.8% during June-October and 1.2% during the rest of the year.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

In late summer thermophilic campylobacters are detected in 20 to 30% of retail poultry meat of domestic origin. Poultry meat is considered as a source of campylobacters in a small proportion of the sporadic cases. Contaminated drinking water has caused six large outbreaks in the years 1999 - 2007. Unpasteurized milk, imported turkey meat, chicken and strawberries have been suspected as sources of few small outbreaks. In 2012, consumption of raw milk caused a campylobacteriosis outbreak, and in another farm outbreak raw milk or contact with cattle was suspected as the origin of infection. In a wide raw-milk mediated outbreak in 2014, *Campylobacter jejuni* was one of the causative agents.

Recent actions taken to control the zoonoses

The Finnish campylobacter monitoring programme for broilers was introduced in June 2004. All broiler slaughter batches between June and October are sampled and examined for thermophilic campylobacters. Between January and May, and in November and December random samples are taken according to a specific sampling plan. based on an expected prevalence of 1%, confidence level of 99% and accuracy of 1%.

3.2.2 Campylobacter in foodstuffs

3.2.2.1 Thermophilic Campylobacter spp., unspecified in food - Meat from broilers (*Gallus gallus*)

Monitoring system

Sampling strategy

At retail

A survey on Campylobacter in packed fresh Finnish retail broiler meat was carried out during June-August 2014 using convenience sampling.

Frequency of the sampling

At retail

Retail broiler meat was sampled weekly from mid-June to August 2014.

Type of specimen taken

At retail

Fresh Finnish broiler meat was taken as samples.

Methods of sampling (description of sampling techniques)

At retail

Packages of fresh Finnish broiler meat representing different packing batches were taken from retail stores. In the laboratory 25 grams of strips of meat was taken for examination.

Definition of positive finding

At retail

Confirmed isolate of *Campylobacter jejuni* or *C. coli* isolated from the sample.

Diagnostic/analytical methods used

At retail

NMKL 119:2007 (modified: enrichment in Bolton broth 24 h) was used for detection and ISO 10272-2:2006 was used in quantification of campylobacters. Maldi-ToF was used for confirmation of species.

Control program/mechanisms

The control program/strategies in place

There is no control program for broiler meat in Finland. Control program for campylobacters in broilers at slaughter - sampling of caeca - was implemented in 2004.

Results of the investigation

Campylobacter was detected in 14 of 51 broiler meat samples. Campylobacter jejuni was isolated in 13 samples and C. coli in one sample. C. lari was isolated from one sample in addition to C. jejuni. In nine campylobacter-positive samples the concentration of campylobacters was <0,5 cfu/g. In the rest of the positive samples the concentration varied from 0.5 cfu/g to 38 cfu/g.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The results of the survey are consistent with the low prevalence of campylobacters in broiler slaughter batches. In addition, they support the results of the the Baseline survey on Campylobacter in Finnish broiler carcasses in 2008, where the concentrations of Campylobacter on carcasses were low. Despite of low prevalence in broilers, the incidence of human cases is high. The number of human cases peaks in July, while most of the campylobacter positive samples in the survey were detected in August.

3.2.2.2 Thermophilic Campylobacter spp., unspecified in food - Meat from bovine animals - Retail

Monitoring system

Sampling strategy

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Definition of positive finding

Diagnostic/analytical methods used

Results of the investigation

3.2.2.3 Thermophilic Campylobacter spp., unspecified in food - Meat from pig - Retail

Monitoring system

Sampling strategy

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Definition of positive finding

Diagnostic/analytical methods used

Results of the investigation

3.2.2.4 Thermophilic *Campylobacter* spp., unspecified in food - Meat from turkey - Retail

Monitoring system

Sampling strategy

A survey on *Campylobacter* in packed fresh Finnish retail meat was carried out during June-August 2014 using convenience sampling.

Frequency of the sampling

Retail samples of turkey meat were examined weekly from mid-June to August 2014.

Type of specimen taken

Fresh Finnish turkey meat was taken as samples.

Methods of sampling (description of sampling techniques)

Packages of fresh Finnish turkey meat representing different packing batches were taken from retail stores. In the laboratory 25 grams of strips of meat were taken for examination.

Definition of positive finding

Confirmed isolate of *Campylobacter jejuni* or *C. coli* isolated from the sample.

Diagnostic/analytical methods used

NMKL 119:2007 (modified: enrichment in Bolton broth 24 h) was used for detection and ISO 10272-2:2006 was used in quantification of *Campylobacter*s. Maldi-Tof was used for species identification.

Results of the investigation

Campylobacter was detected in 10 of 45 turkey meat samples. Nine isolates were *Campylobacter jejuni* and one *C. coli*. In two *Campylobacter*-positive samples the concentration of *Campylobacter*s was 0.5 cfu/g and in the rest of positive samples <0.5 cfu/g.

3.2.3 *Campylobacter* in animals

3.2.3.1 Thermophilic *Campylobacter* spp., unspecified in animal - *Gallus gallus* (fowl)

Monitoring system

Sampling strategy

A compulsory monitoring programme for broilers was introduced in June 2004. From June to October, when the prevalence is known to be highest, all broiler slaughter batches are sampled at slaughter. From January to May and from November to December, when the prevalence has consistently been low, random sampling of slaughter batches is performed according to a particular sampling scheme. Since 2008 the number of batches sampled is calculated with the following criteria: expected prevalence 1 %, accuracy 1 %, confidence level 95%.

Frequency of the sampling

At slaughter

Other: All broiler slaughter batches between June and October; random sampling (expected prevalence 1%, accuracy 1%, confidence level 95%) between January and May, and in November and December.

Type of specimen taken

At slaughter

Caecum samples

Methods of sampling (description of sampling techniques)

At slaughter

Intact caeca from ten birds are taken. Caecal contents are pooled into one sample in the laboratory.

Case definition

At slaughter

A case is defined as a slaughter batch, from which confirmed isolate of *Campylobacter jejuni* or *C. coli* is detected.

Diagnostic/analytical methods used

At slaughter

NMKL No 119 with modifications (direct culture without enrichment)

Vaccination policy

There is no vaccination against campylobacter in Finland.

Other preventive measures than vaccination in place

Strict biosecurity measures and production hygiene in holdings.

Control program/mechanisms

The control program/strategies in place

The Finnish campylobacter monitoring programme was introduced in June 2004. It is compulsory for all broiler slaughterhouses.

Measures in case of the positive findings or single cases

If campylobacters are detected in two consecutive growing batches from the same holding, all the flocks from the holding will be slaughtered at the end of the day until slaughter batches from two consecutive growing batches are negative. Special attention to the production hygiene in the holding will be paid in cooperation with the local municipal veterinarian.

Notification system in place

All positive flocks in the monitoring programme are reported to the authorities.

Results of the investigation

A total of 1507 slaughter batches were examined for thermophilic campylobacters between June and October 2014 in the monitoring programme. Campylobacters were detected in 91 (6.0%) of these slaughter batches. Campylobacter jejuni was detected in 85 slaughter batches, C. coli in 5 batches and C. lari in 1 batch. In January-May and November-December, the samples were taken from 341 slaughter batches in total. Thermophilic campylobacters (C. jejuni) were detected in 6 (1.8%) of these slaughter batches.

National evaluation of the recent situation, the trends and sources of infection

The prevalence of campylobacter in Finnish broiler slaughter batches has been consistently low. Since the implementation of a national campylobacter monitoring programme for broilers in 2004, the average prevalence of campylobacters in broiler slaughter batches has been on average 5.8% during June-October and 1.2% during the rest of the year.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Consumption of poultry meat is considered as a source of campylobacter in part of the sporadic domestic human cases during the seasonal peak in summer.

3.3 LISTERIOSIS

3.3.1 General evaluation of the national situation

3.3.1.1 Listeria - general evaluation

History of the disease and/or infection in the country

National evaluation of the recent situation, the trends and sources of infection

3.3.2 Listeria in foodstuffs

3.3.2.1 L. monocytogenes in food

Monitoring system

Sampling strategy

National survey 2012-2014. Samples were taken randomly by local authorities at retail. Samples of Finnish versus foreign products were taken in the same proportion as they were available at retail.

Frequency of the sampling

At retail

Type of specimen taken

At retail

Sliced ready-to-eat meat products.

Methods of sampling (description of sampling techniques)

At retail

Single packages were taken as samples.

Definition of positive finding

At retail

Listeria monocytogenes detected in 25 g. For quantitative analysis the limit of quantification was 10 cfu/g.

Diagnostic/analytical methods used

At retail

Qualitative analysis: ISO 11290-1:1996, Amd 1:2004, modified or NMKL 136:2010, 5th ed. Quantitative analysis: ISO 11290-2:1998, Amd 1:2004, modified

Preventive measures in place

Control program/mechanisms

Recent actions taken to control the zoonoses

Measures in case of the positive findings

Positive findings were reported to the competent control authorities for the producer of the product.

Notification system in place

Results of the investigation

Altogether 793 samples were analysed for Listeria monocytogenes. Ten of the samples were detected to be positive. In 9 out of 9 samples positive for Listeria monocytogenes, the concentration was less than 100 cfu/g (for one sample that was positive in qualitative analysis no quantitative analysis was performed). 4 of the 10 samples positive for L. monocytogenes originated from products produced in another country than Finland.

National evaluation of the recent situation, the trends and sources of infection

Relevance of the findings in foodstuffs to human cases (as a source of human infection)

3.3.3 Listeria in animals

3.3.3.1 L. monocytogenes in animal - All animals

Monitoring system

Sampling strategy

Case definition

Diagnostic/analytical methods used

Notification system in place

Results of the investigation

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

3.4 E. COLI INFECTIONS

3.4.1 General evaluation of the national situation

3.4.1.1 Verotoxigenic E. coli (VTEC) - general evaluation

History of the disease and/or infection in the country

In 1996, an enhanced microbiological surveillance of VTEC infections was initialized in Finland and since then the reporting has been mandatory. The enhanced surveillance of bloody diarrhoea caused by VTEC resulted in 8 microbiologically confirmed cases. The first Finnish outbreak caused by VTEC serotype O157 occurred in 1997. The outbreak was associated with swimming in a shallow lake in western Finland. A total of 14 microbiologically confirmed cases including two deaths were detected. The annual incidence of VTEC infections among humans rose from 0.06 (1990) to 1.0 (1997). Since then the incidence has been 0.4/100.000 inhabitants or lower in the 2000's. About 70-80% of VTEC infections are considered domestically acquired. Since the beginning of the surveillance in 1996, VTEC O157 caused the majority of the domestically acquired VTEC infections in Finland each year. Most human cases are sporadic or family-related infections. Of them, some have been associated with consumption of unpasteurized milk or contact with a cattle farm. Prevalence studies in slaughter cattle were performed in 1997 and 2003. The prevalence of VTEC O157 in cattle faeces was 1.3% in 1997. In the latter study the prevalence of VTEC O157 in cattle faeces was 0.4% and in carcass surface samples 0.07%. The prevalence of VTEC non-O157 serotypes in cattle faeces was 30% and in carcass samples 11%. A compulsory control programme for all bovine slaughterhouses started in January 2004 for serotype O157. The total number of bovines sampled in a year is calculated with the following criteria: expected prevalence 1 %, accuracy 0.5 %, confidence level 95 %. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year.

National evaluation of the recent situation, the trends and sources of infection

The number of human infections caused by VTEC has been quite stable during the 90s and the first decade of the 21st century although under-reporting might have existed. However, since 2009 an emerging trend of VTEC infections has been observed, and in 2013 a new record was established as almost 100 VTEC infections were reported. The annual incidence rate rose into 1.8 per 100.000 inhabitants in 2013. This increase was partly due to changes in the VTEC diagnostics in Finland. Non-O157 serotypes have increased partly due to the development of laboratory methods. Cattle contact and agriturism remains a risk factor for the infection, especially of young children.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

The figures of VTEC cases are relatively low but the disease caused can be severe and lead to death which makes VTEC an important zoonotic pathogen. Cattle seem to be the major reservoir of VTEC. Same PFGE subtypes are detected among strains isolated from human infections and cattle which could indicate that cattle might be a common source of human infections in Finland. More information is needed on the potential control strategies especially on farms and at slaughter level. In 2014, two brothers and an unrelated female contracted sorbitol-negative VTEC O157 and these cases were all connected to consumption of unpasteurized milk from two separate cattle farms 20 km apart. In the farm level trace back sampling, VTEC O157 was isolated from both of the farms. The three human isolates and all isolates from the two farms had indistinguishable PFGE genotypes, suggesting one or both of the farms as a source of the infection. All isolates carried the virulence genes *vtx1*, *vtx2*, *eae* and *hlyA*. In addition, one human case with sorbitol-positive VTEC O157 and one case each of VTEC O26, O103 and O157 led to the trace back sampling on the farm level. These VTEC types could not be isolated from the samples taken and the origin of these infections remained unknown.

Recent actions taken to control the zoonoses

In 2014 discussions were started on how to renew the VTEC control program.

3.4.2 Escherichia coli, pathogenic in foodstuffs

3.4.2.1 Escherichia coli, pathogenic in food - Surveillance

Monitoring system

Sampling strategy

Type of specimen taken

Methods of sampling (description of sampling techniques)

Definition of positive finding

Diagnostic/analytical methods used

Measures in case of the positive findings or single cases

Results of the investigation

Relevance of the findings in foodstuffs to human cases (as a source of human infection)

3.4.3 Escherichia coli, pathogenic in animals

3.4.3.1 Verotoxigenic E. coli (VTEC) in animal - Cattle (bovine animals)

Monitoring system

Sampling strategy

A compulsory control programme for all bovine slaughterhouses started in January 2004 for serotype O157. Samples are taken from slaughtered bovines by the industry. The total number of bovines sampled in a year is calculated with the following criteria: expected prevalence 1 %, accuracy 0,5 %, confidence level 95 %. The total number is divided between the different slaughterhouses depending on their slaughter capacity. The sampling is evenly distributed throughout the year. Note! Sampling at slaughter has an animal based approach, not herd based.

Frequency of the sampling

Animals at slaughter (herd based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Animals at farm

Faeces

Animals at slaughter (herd based approach)

Faeces

Methods of sampling (description of sampling techniques)

Animals at farm

If possible, 50 g of faeces is taken from the rectum and placed in a plastic container and cooled to a temperature of 4 (+/-2)C. The sample is sent to Evira laboratory for analysis.

Animals at slaughter (herd based approach)

50 g of faeces is taken from the rectum and placed in a plastic container and cooled to a temperature of 4 (+/-2)C. The sample is sent to an approved local laboratory for analysis. If VTEC is isolated at the local laboratory, the isolate is sent for confirmation and further typing to Evira.

Case definition

Animals at farm

Animal/herd is considered to be positive when VTEC O157 strain with the capacity of producing shigatoxin (stx I and/or stx II) and adhesion genes (eae) or an other VTEC-strain which has been connected to human cases is isolated from a sample.

Animals at slaughter (herd based approach)

An animal is considered to be positive when VTEC O157 strain with the capacity of producing shigatoxin (stx I and/or stx II) and adhesion genes (eae) is isolated from a sample.

Diagnostic/analytical methods used

Animals at farm

VTEC O157 was isolated according to ISO 16654:2001. Other VTEC were analysed using PCR based method detecting O serogroup specific genes, or the stx1, stx2 and eae genes.

Other preventive measures than vaccination in place

Evira has published a guideline for the prevention of VTEC on farms and in slaughterhouses.

Control program/mechanisms

The control program/strategies in place

A compulsory control/monitoring programme for bovine slaughterhouses started in 2004. In addition it is compulsory to sample all bovine holdings which are suspected to have a connection to human VTEC cases. Sampling is carried out by the official municipal veterinarian. In 2003, common guidelines were established by the authorities and by the industry. The guidelines were updated in 2006 and partly in 2014. They give recommendations of how to prevent spreading of VTEC in bovine holdings and slaughterhouses. According to the recommendations a special risk management plan is planned by the official municipal veterinarian and health care veterinarian for the holding where VTEC is detected in animals. The purpose of the plan is to minimize the spreading of the infection to other animals in the holding, to neighbouring holdings and to people.

Recent actions taken to control the zoonoses

In 2014 discussions were started on how to renew the VTEC control program. Since the beginning of 2014 bovine holdings, which deliver over 2500 kg/year raw milk directly to the final consumer have to take samples for VTEC once a year from cattle and minimum once a year from raw milk. Sampling is carried out by the food business operator. Due to insufficient information of samples taken, results are not yet reported in 2014.

Measures in case of the positive findings or single cases

In case of a positive finding at the slaughterhouse the herd of origin is sampled by the official municipal veterinarian. In case of positive findings at the holding the risk management plan is launched (see above). If the farmer does not follow the plan, the animals from the holding are slaughtered at the end of the working day with special attention to slaughter hygiene. Milk is allowed to be delivered only to establishments for pasteurization. The access of visitors to the farm is restricted (especially children).

Notification system in place

National reference laboratory Evira notifies all the positive results to the competent authorities.

Results of the investigation

The amount of positive findings in slaughtered animals has been increasing during the last few years. In 2014 40 out of 1545 samples (2.59 %) from slaughtered cattle were detected to be positive for VTEC O157.

National evaluation of the recent situation, the trends and sources of infection

VTEC is regarded as an important zoonotic pathogen causing severe disease. Ruminants, particularly healthy cattle, are a major reservoir for human infections caused by VTEC O157. Most human infections are sporadic and the sources remain unknown. Farm-associated small outbreaks have occurred in Finland. The first Finnish outbreak in 1997 was associated with swimming in a lake. In 2001, imported minced meat used in kebab was verified as source of a small outbreak. In 2012, unpasteurized milk and animal contact was associated with an outbreak caused by VTEC O157. The number of reported human infections has been relatively constant during the 90s and the first decade of the 21st century but an increasing trend has been observed since 2009. The incidence peaked in 2013 as an increase by one third was observed. In 2014, the annual incidence decreased again into 1.2/100.000 inhabitants. Small VTEC cluster was associated with consumption of unpasteurized milk. One nationwide outbreak caused by sorbitol-positive, non-motile variant of VTEC O157 (10 microbiologically confirmed cases) was detected but the source remained unknown.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

Cattle seems to be the major reservoir of VTEC. Same PFGE subtypes are detected among strains isolated from human infections and cattle which could indicate that cattle might be a common source of human infections in Finland.

3.5 YERSINIOSIS

3.5.1 General evaluation of the national situation

3.5.1.1 Yersinia - general evaluation

History of the disease and/or infection in the country

National evaluation of the recent situation, the trends and sources of infection

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

3.6 TRICHINELLOSIS

3.6.1 General evaluation of the national situation

3.6.1.1 Trichinella - general evaluation

History of the disease and/or infection in the country

In Finland, domestic pork examination for *Trichinella* was initiated during the 1860s. In 1923, meat inspection including *Trichinella* examination of swine carcasses became mandatory in municipalities with more than 4000 inhabitants, and later in the entire country. Three cases of human trichinellosis originating from imported pork were diagnosed around 1890. The last autochthonous human cases (three) originated from eating bear meat in 1977. The first diagnosis in domestic swine was made in 1954. There were very few pig cases until 1981 when the number of *Trichinella* positive pigs started to increase reaching even over one hundred of infected swine a year. In the 2000's, however, the number of diagnosed cases in pigs decreased again to a couple of animals a year, and in 2005-2009 no cases were found. In 2010, only one positive pig was found. Since 2011, no positive pigs have been found. The infection was known in the brown bear and other wildlife during the 1950s, but since the 1980s trichinellosis has been found to be prevalent among wild carnivores especially in the southern part of the country, where all the four European species (*Trichinella spiralis*, *T. nativa*, *T. britovi* and *T. pseudospiralis*) have been reported. The raccoon dog *Nyctereutes procyonoides* has been recognised as the central host species harbouring all four *Trichinella* species.

National evaluation of the recent situation, the trends and sources of infection

It appears that the *Trichinella* situation in Finland has been changing with decreasing incidence in swine. However, no sign of decrease in incidence in wildlife has been seen. The apparent change in swine may be due to the pig production becoming more intensive with bigger and modern industrialized units. In wildlife, a big proportion of infections are caused by *T. nativa*, the arctic species, which does not readily infect swine. Analysis of *Trichinella* species in wildlife in 2014 revealed a marked decrease in the occurrence of *T. spiralis*, the most important species in swine. In an earlier Finnish study (material from 1999-2005), the proportion of *T. spiralis* was 12.8% in infected wildlife but in 2014 it was only 0.7%. *T. nativa* infected 80% and 93% of *Trichinella* positive wildlife in 1999-2005 and 2014, respectively. If this finding reflects a true change in *Trichinella* species distribution in nature it would mean decreased infection pressure on domestic swine.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Until now (2014) meat inspection of swine is mandatory to all commercial pork production. Hunters need to be continuously informed about the risks of eating not tested, undercooked bear, badger, lynx, wild boar or other carnivore or omnivore meat.

Recent actions taken to control the zoonoses

The *Trichinella* species present in Finland have been identified and the study on the epidemiology of different *Trichinella* species will continue. Understanding the epidemiology of the various *Trichinella* species will help in controlling of the risk .

3.6.2 Trichinella in animals

3.6.2.1 Trichinella in animal - Solipeds, domestic - horses

Monitoring system

Sampling strategy

Every single slaughtered horse is examined for trichinella at meat inspection.

Frequency of the sampling

Trichinella examination is mandatory for horses at meat inspection. All slaughtered horses are introduced to official meat inspection.

Type of specimen taken

Muscle sample of 10 grams from tongue, masseters or diaphragm.

Methods of sampling (description of sampling techniques)

Sampling and analysing is done according to 2075/2005 EU.

Case definition

Positive result from examination according to 2075/2005 EU.

Diagnostic/analytical methods used

Methods in use are the magnetic stirrer method for pooled sample digestion and mechanically assisted pooled sample digestion method, accordant with regulation 2075/2005.

Control program/mechanisms

The control program/strategies in place

Trichinella examination at meat inspection is mandatory.

Notification system in place

Positive result in Trichinella examination at meat inspection has to be notified and confirmed at National Reference Laboratory in Evira. The trichinella testing has been included in meat inspection of horses since 1990.

Results of the investigation including the origin of the positive animals

Equine trichinellosis has never been found in Finland.

3.6.2.2 Trichinella in animal - Pigs

Monitoring system

Sampling strategy

General

Every single pig is examined for trichinellosis at obligatory, official meat inspection in slaughterhouse. The sampling is 100%.

Frequency of the sampling

General

All pigs are sampled at meat inspection.

Type of specimen taken

General

The sample for trichinella test from pigs is taken primarily from diaphragm muscle and secondarily from tongue, masseter or abdominal muscles.

Methods of sampling (description of sampling techniques)

General

Muscle sample is taken according to 2075/2005 at meat inspection.

Case definition

General

Positive case is a pig from which the trichinella test (2075/2005) is positive i.e. trichinella larva has been detected at test from a pooled muscle sample and/or a single sample. All positive results have to be sent to national reference laboratory Evira for confirmation and identification of the species.

Diagnostic/analytical methods used

General

Diagnostic methods used are in accordance with 2075/2005. In Finland the methods used are the magnetic stirrer method with pooled samples and mechanically assisted pooled sample digestion method (Stomacher).

Officially recognised regions with negligible Trichinella risk

No

Number of officially recognised Trichinella-free holdings

None in 2014.

Categories of holdings officially recognised Trichinella-free

None in 2014.

Control program/mechanisms

Recent actions taken to control the zoonoses

No recent action has been taken. Current routine meat inspection eliminates infected carcasses from human consumption.

Measures in case of the positive findings or single cases

If a pig is found infected with *Trichinella*, the carcass will be destroyed. The competent authority will investigate the farm of origin, source and possible spread of infection and decide about further action.

Results of the investigation including description of the positive cases and the verification of the *Trichinella* species

No *Trichinella* infections were found in pigs in 2014.

Results of the investigation including description of the positive cases and the verification of the *Trichinella* species

Fattening pigs raised under controlled housing conditions in integrated production system

Fattening pigs not raised under controlled housing conditions in integrated production system

No *Trichinella* infections were found in fattening pigs in 2014.

Breeding sows and boars

No *Trichinella* infections were found in breeding sows and boars in 2014.

National evaluation of the recent situation, the trends and sources of infection

It appears that *Trichinella* infection incidence and prevalence in swine in Finland is negligible in spite of its persisting abundance in wildlife. This may be caused by the change in swine husbandry, which has become more industrialized. Therefore, small family farms with old pighouses have disappeared.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

The risk of obtaining trichinellosis from pig meat is negligible.

Additional information

Finland has prepared implementation of the possibility provided in Article 3 paragraph 3 b of Regulation (EC) No 2075/2005 to cease testing for *Trichinella* of pigs originating in holdings or compartments applying controlled housing condition. Finnish Food Safety Authority Evira is the competent authority that officially recognizes holdings and compartments applying controlled housing conditions. System for official recognition of controlled housing conditions was ready by the end of year 2014. It is presumable that at least at the beginning recognition of controlled housing conditions includes only some individual holdings (no holdings or compartments recongized during year 2014).

3.7 ECHINOCOCCOSIS

3.7.1 General evaluation of the national situation

3.7.1.1 Echinococcus - general evaluation

History of the disease and/or infection in the country

Echinococcus granulosus was endemic in reindeer husbandry (reindeer -reindeer herding dog -cycle) but disappeared because of control action by authorities, and because of the changes in reindeer husbandry rendering herding dogs redundant. In the early 1990's, echinococcosis started to re-emerge, then in the southeastern part of the Finnish reindeer husbandry area. The cycle involves reindeer, elk (moose) and wolves. Hitherto, no other definitive hosts have been identified. *Echinococcus multilocularis* has never been diagnosed in Finland. The rodent scientists at Finnish Forest Research Institute (METLA) perform long-term surveys twice a year at least on 50 locations to detect fluctuations of small mammal populations. Longest data sets cover more than 50 years. All animals are dissected, and their gross parasitological conditions checked. In addition, other researchers send liver samples from small mammals if they find something suspicious (usually Taenid cysts) to the METLA rodent scientists. In the METLA survey in 2014, about 1450 small mammals were studied. Generally, small mammals are sampled from high-density habitat patches, preferred by foxes as hunting grounds. Species include bank vole *Myodes glareolus* (whole Finland), red and grey-sided voles *M. rutilus* and *M. rufocanus* (Lapland), field vole *Microtus agrestis* (whole Finland), sibling vole *M. rossiaemeridionalis* (south-central Finland), root vole *M. oeconomus* (Lapland), Norway lemming *Lemmus lemmus* (Lapland) and water vole *Arvicola amphibius*. Also common shrews *Sorex araneus* (whole Finland), masked shrews *S. caecutiens* (Northern Finland) and pygmy shrews *S. minutus* were studied.

National evaluation of the recent situation, the trends and sources of infection

The low endemic *E. granulosus* strain in Finland has been described as G10 (Fennoscandian cervid strain) which is nowadays considered to belong to the species *E. canadensis*. Known intermediate hosts in Finland are moose *Alces alces*, semi-domesticated reindeer *Rangifer tarandus* and wild forest reindeer *Rangifer tarandus fennicus* while the wolf *Canis lupus* is the only definitive host in the wild. It can be assumed that if the wolf population in Finland grows and expands its distribution, the parasite will benefit. New intermediate hosts may be identified in new biotopes. So far the zoonotic infection risk is characterized as very low, but if dogs get infected, the situation may change. Therefore, active surveillance is needed. Surveillance is also needed for *E. multilocularis*, which is known to occur in neighbouring Estonia and was diagnosed in southern Sweden in 2010.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Human infection risk from wildlife (wolf faeces) is regarded as very low. In any case, not much can be done to reduce the prevalence in wildlife. However, it is recommended to treat hunting dogs with anticestodal drugs both prior to and after hunting season. Moreover, it is recommended that cervid offals (especially lungs) are not given to dogs or that offals are only fed to dogs after thorough cooking.

3.7.2 *Echinococcus* in animals

3.7.2.1 *Echinococcus* spp., unspecified in animal

Monitoring system

Sampling strategy

- Mandatory meat inspection covers all known potential intermediate hosts slaughtered. In post mortem inspection, lungs are palpated and incised to discover hydatid cysts. The cysts are sent to Evira for confirmation. - METLA performs long-term surveys of small mammal populations (see text in general evaluation chapter) - Evira performs surveillance of possible definitive hosts (foxes, wolves, raccoon dogs)

Frequency of the sampling

Continuous sampling

Type of specimen taken

Definitive hosts: Faeces and intestine. Intermediate hosts: lungs, liver.

Methods of sampling (description of sampling techniques)

Definitive hosts: In connection of post mortem examination, a piece of rectum containing faeces is taken for sample. Intestine is saved in freezer for possible confirmation of infection. Samples are frozen in -80 degrees for a week to inactivate possible *Echinococcus* eggs. Intermediate hosts: lungs are inspected during meat inspection, voles are dissected and livers inspected.

Case definition

Definitive host: Adult worms found in intestine (*E. granulosus*) or faeces/rectal contents positive by specific PCR (*E. multilocularis*). Intermediate host: positive protoscolex finding in microscopic examination of cyst fluid or typical histology of cysts.

Diagnostic/analytical methods used

Definitive hosts: Sedimentation and counting method or PCR for the detection of *E. multilocularis* egg DNA in faeces. Intermediate hosts: microscopy of cyst fluid, histology, PCR

Other preventive measures than vaccination in place

Imported dogs must be treated against echinococcosis 1-5 days before entering Finland. Alternatively, dogs can be treated regularly every 28 days. Dogs must have a microchip for identification and a pet passport in which treatments are marked.

Control program/mechanisms

The control program/strategies in place

Mandatory official meat inspection.

Measures in case of the positive findings or single cases

Organs with cystic echinococcosis are condemned in meat inspection.

Notification system in place

Echinococcosis is a notifiable disease in all animals.

Results of the investigation

In 2014, hydatid cysts of *Echinococcus granulosus* (*E. canadensis*) were found in five slaughtered reindeer (*Rangifer tarandus*). Two wolves out of 15 examined were found positive for *Echinococcus granulosus* (*E. canadensis*). No echinococcus infections were found in foxes or raccoon dogs.

National evaluation of the recent situation, the trends and sources of infection

Echinococcus granulosus (*E. canadensis*) persists in the wolves and cervids of eastern Finland. The geographical distribution has apparently not changed during the last decades.

3.8 RABIES

3.8.1 General evaluation of the national situation

3.8.1.1 Lyssavirus (rabies) - general evaluation

History of the disease and/or infection in the country

Rabies was common in the Finnish dog population at the beginning of the 20th century but the disease was eradicated from the country by vaccinating local dog populations during the 1950's. In April 1988, a local spot of essentially sylvatic rabies was discovered in south-eastern Finland. Between April 1988 and February 1989 a total of 66 virologically verified cases were recorded within a geographical area of 1 700 km². As a first measure the local dog population in the area, some 8 000 animals, were vaccinated against rabies at the expense of the state. At the same time it was also highly recommended to vaccinate all the other dogs. In co-operation with the WHO surveillance centre in Tbingen, Germany, a field campaign of oral vaccination of raccoon dogs and foxes was started in September 1988. During four distribution operations, the last one in the autumn 1990, a total of 200 000 Tbingen baits were distributed. In accordance with the WHO standards, Finland was declared rabies free in March 1991 after two years with no cases of rabies. Rabies in bats was suspected for the first time in 1985 when a bat researcher died. He had handled bats in several countries during the previous year and it could not be concluded where the researcher had become infected. Despite an epidemiological study in bats 1986 and subsequent rabies surveillance, bat rabies was not detected until 2009. The European Bat Lyssavirus-2 (EBLV-2) was isolated from the bat.

National evaluation of the recent situation, the trends and sources of infection

Finland is rabies-free country since 1991, except two import cases (a horse from Estonia in 2003 and a dog from India in 2007) and rabies in bats, but those cases do not affect to the rabies-free status of Finland. However, the infection pressure in wild carnivores species in Russia is high and it poses a continuous risk for the reintroduction of the disease. The present control of wildlife rabies appears successful and important. Rabies in bats and the import of animals from endemic areas, however, remains a risk, which can be reduced by increasing public awareness of the disease.

Relevance of the findings in animals, feedingstuffs and foodstuffs to human cases (as a source of infection)

Two cases of EBLV-2 infection in humans have been confirmed, one in Finland and one in the UK, both were bat researchers. However, the health risk to the general public, which has little contact with bats, is low. As no sylvatic rabies cases were detected, the risk for humans is very low at this moment. Currently the infection pressure in wild carnivores species in Russia is, however, high and it poses a continuous risk for the reintroduction of the disease. There might be a risk for the introduction of rabies through imported animals which could also pose a risk for humans.

Recent actions taken to control the zoonoses

Rabies bait vaccination campaigns for wildlife have been continued along the south eastern border against Russia. Since 2004 distribution is carried out biannually, in spring and in autumn. Since 2014, the campaign is carried out once per year in the autumn. Continuous surveillance and monitoring for rabies is carried out by Evira in Finland. Dogs that are used in hunting, guide dogs, sniffer dogs, and dogs that are used by the police, the frontier guard and the army must be vaccinated against rabies.

Suggestions to the European Union for the actions to be taken

Oral vaccination campaigns and control program should be continued annually.

3.8.2 Lyssavirus (rabies) in animals

3.8.2.1 Lyssavirus (rabies) in animal - Dogs

Monitoring system

Sampling strategy

The monitoring of rabies in pets is based on the detection of clinical signs, background information, and laboratory testing.

Frequency of the sampling

On suspicion

Type of specimen taken

brains

Methods of sampling (description of sampling techniques)

Thalamus, pons and medulla

Case definition

When the cell culture (and/or RT-PCR test) is positive.

Diagnostic/analytical methods used

FAT, cell culture (and RT-PCR, sequencing)

Vaccination policy

Vaccination against rabies is recommended for all dogs and cats. Dogs that are used in hunting, guide dogs, sniffer dogs, and dogs that are used by the police, the frontier guard and the army must be vaccinated against rabies (Decree No 724/2014, 16.9.2014). Dogs, cats and ferrets entering Finland shall be vaccinated against rabies in accordance with the Regulation (EC) No 998/2003 (576/2013 starting 29.12.2014) of the European Parliament and of the Council.

Other preventive measures than vaccination in place

Infected animals will be destroyed.

Control program/mechanisms

The control program/strategies in place

The measures for control of rabies are in the Animal Diseases Act No 441/2013 and in the Decree No 724/2014 of the Ministry of Agriculture and Forestry (16.9.2014) including investigation of all suspected cases by the veterinary authorities, notification procedures and vaccination. In case of suspicion the animal must be isolated for two weeks or killed and sent to Evira for laboratory analysis.

Measures in case of the positive findings or single cases

Epidemiological investigation and information campaigns will be started. Infected animals will be destroyed and measures taken to prevent further cases.

Notification system in place

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is a notifiable diseases in all animals and classified as a dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry (2.12.2013).

Results of the investigation

In 2014, 28 dogs were investigated, all with negative results.

National evaluation of the recent situation, the trends and sources of infection

Indigenous rabies has not been detected in dogs since 1988. Illegal import of pet animals could pose a risk for the introduction of rabies.

3.8.2.2 Rabies virus (RABV) in animal - Wild animals

Monitoring system

Sampling strategy

Sampling is a part of permanent monitoring scheme. Wild animals that are found dead in the nature and suspected animals are sent to the Finnish Food Safety Authority Evira for examination free of charge. The tests carried out include an examination for rabies. Samples are sent by local veterinarians, hunters etc. The efficacy of rabies oral vaccination campaigns are evaluated by measuring the antibody response and bait uptake after vaccination in small carnivores, which are sent to Evira from the vaccination area.

Frequency of the sampling

Random, about 500 animals per year.

Type of specimen taken

brains, blood, teeth / bone of the jaw

Methods of sampling (description of sampling techniques)

Case definition

Samples are considered positive if the cell culture (and/or RT-PCR) test is positive.

Diagnostic/analytical methods used

FAT. Cell culture (and RT-PCR) if the animal has bitten a human or other animal or is suspected.

Vaccination policy

An annual programme for the immunisation of wild carnivores is carried out since 1989 in the south eastern border area. In 2011, 80 000 bait vaccines were distributed aeriaily in April-May and 180 000 vaccines in September-October over a 20-40 km wide and 450 km long zone along the south eastern border against Russia. In 2012 and 2013, 180 000 baits were delivered in the spring and 180 000 baits in the autumn. 2014 the campaign was carried out once in a year, in the autumn.

Control program/mechanisms

The control program/strategies in place

The measures for control of rabies are in the Animal Diseases Act No 441/2013 and in the Decree No 724/2014 of the Ministry of Agriculture and Forestry (16.9.2014) including post mortem examination of wildlife found dead in the nature and investigations of all suspected cases in Evira.

Recent actions taken to control the zoonoses

Measures in case of the positive findings or single cases

Epidemiological investigation and information campaigns will be started. Infected animals will be destroyed and measures taken to prevent further cases.

Notification system in place

According to the Finnish legislation rabies has been notifiable and controlled since 1922 (Act 338/22, 29 Dec 1922). Rabies is a notifiable disease in all animals and classified as a dangerous animal disease according to Decree No 843/2013 of the Ministry of Agriculture and Forestry (2.12.2013).

Results of the investigation

In 2014 a total of 607 wild animals were examined for rabies, rabies was not detected in these samples.

National evaluation of the recent situation, the trends and sources of infection

No indigenous sylvatic rabies cases (genotype 1) have been found after February 1989. The infection pressure in wild carnivores in Russia is however high and it poses a risk for the reintroduction of the disease.

Additional information

Bat rabies surveillance: passive surveillance is ongoing. In 2014, 14 bats were examined for lyssaviruses, all with negative results. In Finland, one EBLV-2 positive Daubenton's bat has been detected in 2009.

3.9 STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) INFECTION

3.9.1 Staphylococcus in animals

3.9.1.1 Staphylococcus in animal

Monitoring system

Sampling strategy

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Diagnostic/analytical methods used

Vaccination policy

Other preventive measures than vaccination in place

Control program/mechanisms

The control program/strategies in place

Measures in case of the positive findings or single cases

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

3.10 Q-FEVER

3.10.1 General evaluation of the national situation

3.10.1.1 Coxiella (Q-fever) - general evaluation

History of the disease and/or infection in the country

No domestic human cases have ever been detected in Finland. Testing of farm animals for Q-fever has taken place earlier only in connection with export. Related to export, *C. burnetii* antibodies were found in Finland for the first time, in 2008, in bovine animals at one dairy farm. No clinical cases were detected at this farm. After that surveys have been conducted to study the prevalence of *C. burnetii* antibodies in dairy cattle, as well as in the goat and sheep population. There has never been reported suspicion for Q-fever in animals based on disease symptoms. After 2008 passive surveillance has been in place by testing of sheep, goats and bovine animals due to abortion.

National evaluation of the recent situation, the trends and sources of infection

The relevance seems to be negligible both to humans and animals.

3.10.2 Coxiella (Q-fever) in animals

3.10.2.1 *C. burnetii* in animal

Monitoring system

Sampling strategy

1. Clinical suspicion due to abortions: bovine, sheep and goats
2. Export purposes

Frequency of the sampling

1. and 2. Continuous;

Type of specimen taken

serum

Methods of sampling (description of sampling techniques)

1. and 2. Samples are taken from living animals at farm;

Case definition

The animal is seropositive if ELISA test is positive

Diagnostic/analytical methods used

ELISA-test
Detection of the agent by PCR

Control program/mechanisms

The control program/strategies in place

Q-fever is immediately notifiable animal disease according to Decree No 1010/2013 of the Ministry of Agriculture and Forestry.

Notification system in place

Immediately notifiable since 1995.

Results of the investigation

During year 2014 71 cattle from 11 farms and 3 goats from 1 farm were tested due to abortion, all animals with negative results. Two cattle from two AI farms were tested due to export, all with negative results.

National evaluation of the recent situation, the trends and sources of infection

There is low prevalence (0,2% in 2010) of Q-fever antibodies in bulk milk of dairy cattle, and Q-fever antibodies have never been detected in sheep and goats. In 2011 a survey for antibodies in sheep and goats was conducted. Around 6,6% of all the sheep and 16,7% of all goat herds in Finland was included in the survey and all tested samples were negative.

Additional information

3.11 WEST NILE VIRUS INFECTIONS

3.11.1 West Nile Virus in animals

3.11.1.1 West Nile Virus in animal

Monitoring system

Sampling strategy

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Case definition

Diagnostic/analytical methods used

Notification system in place

Results of the investigation

Additional information

3.12 ESCHERICHIA COLI, NON-PATHOGENIC

3.12.1 General evaluation of the national situation

3.12.1.1 Escherichia coli, non-pathogenic - general evaluation

History of the disease and/or infection in the country

National evaluation of the recent situation, the trends and sources of infection

3.13 TOXOPLASMA

3.13.1 General evaluation of the national situation

3.13.1.1 Toxoplasma - general evaluation

History of the disease and/or infection in the country

From 30 to 50 human cases have been reported yearly.

National evaluation of the recent situation, the trends and sources of infection

Toxoplasma gondii is endemic in Finland, although the prevalence seems to be lower than in central Europe.

Additional information

Toxoplasma gondii can cause a severe disease in children whose mother has been infected during pregnancy. Also immunocompromised persons, like AIDS patients, may develop a severe disease. Screening of pregnant women is currently not done in Finland.

3.13.2 Toxoplasma in animals

3.13.2.1 T. gondii in animal

Monitoring system

Sampling strategy

The occurrence of toxoplasmosis is based on diagnosis at necropsy on animals sent to the Finnish Food Safety Authority Evira for determination of cause of death and/or illness. There is no active monitoring programme at present.

Type of specimen taken

Organs/tissues: brain, muscle, heart, liver, lung, kidneys, spleen, adrenal glands, thyroid glands, placenta.

Case definition

Laboratory diagnosis is based on demonstration of typical cysts in tissues examined histologically during routine necropsy, when necessary other methods are used for confirmation (immunohistochemistry, PCR).

Diagnostic/analytical methods used

Laboratory diagnosis is based on demonstration of typical cysts in tissues examined histologically during routine necropsy, when necessary other methods are used for confirmation (immunohistochemistry, PCR).

Measures in case of the positive findings or single cases

None

Notification system in place

Toxoplasma gondii is classified as a monthly reported animal disease in pigs, sheep, goats, dogs, cats and ferrets.

4 ANTIMICROBIAL RESISTANCE INFORMATION ON SPECIFIC ZONOSSES AND ZOO NOTIC AGENTS

4.1 SALMONELLOSIS

4.1.1 Salmonella in foodstuffs

4.1.1.1 Antimicrobial resistance in Salmonella Meat from bovine animals

Description of sampling designs

Samples were taken as a part of the National Control Programme, and in HACCP/owns check.

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in bovine animals.

Type of specimen taken

Details of the sampling are described in the text Salmonella spp. in bovine meat and products thereof.

Methods of sampling (description of sampling techniques)

Details of the sampling are described in the text Salmonella spp. in bovine meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

See Salmonella spp. in bovine meat and products thereof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

See Salmonella spp. in bovine meat and products thereof.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. bovine meat and products thereof.

Results of the investigation

No isolates of domestic origin were obtained.

National evaluation of the recent situation, the trends and sources of infection

The antimicrobial resistance situation of Salmonella in foodstuff derived from domestically raised cattle is very favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

4.1.1.2 Antimicrobial resistance in Salmonella Meat from pig

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in pig meat and products thereof.

Type of specimen taken

See Salmonella spp. in pig meat and products thereof.

Methods of sampling (description of sampling techniques)

See Salmonella spp. in pig meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

See Salmonella spp. in pig meat and products thereof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using Escherichia coli ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

See *Salmonella* spp. in pig meat and products thereof.

Control program/mechanisms

The control program/strategies in place

See *Salmonella* spp. in pig meat and products thereof.

Results of the investigation

No isolates of domestic origin were obtained.

National evaluation of the recent situation, the trends and sources of infection

The antimicrobial resistance situation of *Salmonella* in foodstuff derived from domestically raised pigs is very favourable.

4.1.1.3 Antimicrobial resistance in *Salmonella* Meat from poultry, unspecified

Sampling strategy used in monitoring

Frequency of the sampling

See *Salmonella* spp. in broiler meat and products thereof.

Type of specimen taken

See *Salmonella* spp. in broiler meat and products thereof.

Methods of sampling (description of sampling techniques)

See *Salmonella* spp. in broiler meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

See *Salmonella* spp. in pig meat and products thereof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

See *Salmonella* spp. in pig meat and products thereof.

Control program/mechanisms

The control program/strategies in place

See *Salmonella* spp. in pig meat and products thereof.

Results of the investigation

No salmonella isolates of domestic foodstuff origin were isolated.

National evaluation of the recent situation, the trends and sources of infection

The situation in domestic poultry meat production continues to be very favourable.

4.1.2 Salmonella in animals

4.1.2.1 Antimicrobial resistance in Salmonella Cattle (bovine animals)

Description of sampling designs

Samples originate from the Finnish Salmonella Control Programme.

Sampling strategy used in monitoring

Frequency of the sampling

See *Salmonella* spp. in bovine animals.

Type of specimen taken

Details of the sampling are described in the text *Salmonella* spp. in bovine animals.

Methods of sampling (description of sampling techniques)

Methods of the sampling are described in the text *Salmonella* spp. in bovine animals.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the text *Salmonella* spp. in bovine animals.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

See *Salmonella* spp. in bovine animals.

Control program/mechanisms

The control program/strategies in place

See *Salmonella* spp. in bovine animals.

Results of the investigation

Altogether, 14 bovine salmonella isolates were obtained; ten were of serotype *S. Typhimurium*, two were *S. Enteritidis* and two *S. Eastbourne*. Resistance was not common among bovine salmonella. Two *S. Typhimurium* isolates were multi-resistant. Three isolates (two *S. Enteritidis*, one *S. Eastbourne*) had a colistin MIC value above ECOFF but this might be due to methodological issues or the MIC value is dependent on the serovar.

National evaluation of the recent situation, the trends and sources of infection

The overall resistance situation continues to be favourable.

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

4.1.2.2 Antimicrobial resistance in *Salmonella* Pigs

Description of sampling designs

Samples originate from the Finnish *Salmonella* Control Programme.

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in pigs.

Type of specimen taken

Details of the sampling are described in the text Salmonella spp in pigs.

Methods of sampling (description of sampling techniques)

Methods of the sampling are described in the text Salmonella spp in pigs.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the text Salmonella spp in pigs.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using Escherichia coli ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

See Salmonella spp. in pigs.

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in pigs.

Results of the investigation

Altogether, three bovine salmonella isolates were tested for resistance; one Salmonella Bovismorbificans, one Salmonella Stockholm and one Salmonella Infantis. All isolates were fully sensitive to the antimicrobials tested.

National evaluation of the recent situation, the trends and sources of infection

The overall salmonella situation and antimicrobial resistance in pigs is very favourable.

4.1.2.3 Antimicrobial resistance in Salmonella Poultry, unspecified

Description of sampling designs

Samples originate from the Finnish Salmonella Control Programme.

Sampling strategy used in monitoring

Frequency of the sampling

See Salmonella spp. in Gallus gallus - flocks of laying hens.

Type of specimen taken

Details of the sampling are described in the text Gallus gallus - flocks of laying hens.

Methods of sampling (description of sampling techniques)

Details of the sampling are described in the text Gallus gallus - flocks of laying hens.

Procedures for the selection of isolates for antimicrobial testing

One isolate per epidemiological unit is included in the antimicrobial susceptibility testing.

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Details of the laboratory methodology are described in the text Salmonella spp in Gallus gallus.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using Escherichia coli ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Control program/mechanisms

The control program/strategies in place

See Salmonella spp. in Gallus gallus.

Results of the investigation

Only one *S. Typhimurium* was isolated from Gallus gallus and it was fully susceptible to the antimicrobials tested.

National evaluation of the recent situation, the trends and sources of infection

The overall antimicrobial resistance situation in salmonella isolates from poultry continues to be very favourable.

4.2 CAMPYLOBACTERIOSIS

4.2.1 Campylobacter in animals

4.2.1.1 Antimicrobial resistance in Campylobacter jejuni and coli in Cattle (bovine animals)

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Recent actions taken to control the zoonoses

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

4.2.1.2 Antimicrobial resistance in Campylobacter jejuni and coli in Pigs

Sampling strategy used in monitoring

Frequency of the sampling

Laboratory methodology used for identification of the microbial isolates

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Recent actions taken to control the zoonoses

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

Relevance of the findings in animals to findings in foodstuffs and to human cases (as a source of infection)

4.2.1.3 Antimicrobial resistance in *Campylobacter jejuni* and *coli* in Poultry, unspecified

Description of sampling designs

Sample originate from a national *Campylobacter* Control Programme. For details, see Thermophilic *Campylobacter* in *Gallus gallus*.

Sampling strategy used in monitoring

Frequency of the sampling

1 Jun - 31 Oct every production batch is sampled; 1 Nov - 31 May the frequency is set annually pending on production volume. Details of the sampling are described in 'Thermophilic *Campylobacter* in *Gallus gallus*'.

Laboratory methodology used for identification of the microbial isolates

Modified standard NMKL 119:2007

Type of specimen taken

10 intact caeca per batch, taken at slaughterhouse

Methods of sampling (description of sampling techniques)

Caeca are delivered refrigerated to the laboratory and the caecal contents are pooled into one sample in the laboratory.

Procedures for the selection of isolates for antimicrobial testing

All isolates were tested for antimicrobial susceptibility (one per epidemiological unit). Susceptibility results were obtained for 88 *C. jejuni* and 5 *C. coli* isolates.

Methods used for collecting data

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI using *Campylobacter jejuni* ATCC 33560 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

According to the MAF Act 10/EEO/2007

Measures in case of the positive findings or single cases

If *Campylobacter* are detected repeatedly, official inspection of the facilities and revision of the management procedures. Batches from positive farms are slaughtered at the end of day. No specific measures for detection of antimicrobial resistance.

Results of the investigation

Resistance to ciprofloxacin, nalidixic acid and tetracycline has increased among *C. jejuni* from broilers compared to the previous years. Ciprofloxacin and nalidixic acid resistance was detected in 25% and tetracycline resistance in 17% of the *C. jejuni* isolates.

National evaluation of the recent situation, the trends and sources of infection

A clear increasing trends in resistance to ciprofloxacin, nalidixic acid and tetracycline were observed among *C. jejuni* from broilers. Observed resistance traits in 2014 cannot be explained by the antimicrobial usage in broilers since antimicrobial treatment is rarely needed in Finland.

4.3 ESCHERICHIA COLI , NON-PATHOGENIC

4.3.1 Escherichia coli, non-pathogenic in animals

4.3.1.1 Antimicrobial resistance in E.coli, non-pathogenic, unspecified Cattle (bovine animals)

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Recent actions taken to control the zoonoses

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

4.3.1.2 Antimicrobial resistance in E.coli, non-pathogenic, unspecified Gallus gallus (fowl)

Sampling strategy used in monitoring

Frequency of the sampling

The number of randomly taken samples from each slaughterhouse was proportional to the annual slaughter throughput. The collected samples were evenly distributed between February and December in 2014. The slaughterhouses accounted 99% of the total number of slaughtered animals in Finland.

Type of specimen taken

Caecum samples (n=356) from healthy animals.

Methods of sampling (description of sampling techniques)

Intact caeca from one animal per flock is taken. The samples were taken aseptically and transported refrigerated to the laboratory within 2 days. In addition to isolation of indicator *E. coli*, the same samples were also screened for the presence of ESBL/AmpC producing *E. coli*.

Procedures for the selection of isolates for antimicrobial testing

Altogether, 175 indicator *E. coli* isolates were randomly selected for susceptibility testing. One *E. coli* isolate per epidemiological unit was included. Also, all isolates from the specific monitoring of ESBL/AmpC producing *E. coli* were further tested for antimicrobial susceptibility.

Methods used for collecting data

The susceptibility testing was done in Evira, the national reference laboratory.

Laboratory methodology used for identification of the microbial isolates

Caecal content was directly spread on Brilliance *E. coli*/coliform selective agar plates (Oxoid) and incubated overnight at 37C. Typical colonies were selected for susceptibility testing. In the specific monitoring of ESBL/AmpC producing *E. coli*, 1 g of caecal content was diluted in 10 ml of buffered peptone water (BPW) with 1 mg/l cefotaxime. Subsequently, 10 l of the BPW broth was spread on MacConkey agar plates (Becton, Dickinson & Company) containing 1 mg/l cefotaxime and incubated overnight at 37C. Typical lactose fermenting pink colonies were picked and presumptive *E. coli* isolates were confirmed with Maldi-Tof.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The susceptibility testing was performed according to CLSI standards using *Escherichia coli* ATCC 25922 as a quality control strain. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Preventive measures in place

No preventive measures are applied to indicator bacteria from healthy animals.

Results of the investigation

The antimicrobial resistance levels in indicator *E. coli* in broilers varied from rare to low. Only tetracycline resistance was moderate (11%). Although no ESBL/AmpC *E. coli* was detected among the randomly selected indicator *E. coli*, the prevalence of these bacteria was 7% in the specific monitoring carried out from the same samples.

National evaluation of the recent situation, the trends and sources of infection

The resistance among indicator *E. coli* from broilers has been favourable previously and the same trend continues.

4.3.1.3 Antimicrobial resistance in E.coli, non-pathogenic, unspecified Pigs

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

4.4 ENTEROCOCCUS, NON-PATHOGENIC

4.4.1 Enterococcus, non-pathogenic in animals

4.4.1.1 Antimicrobial resistance in E. faecalis Cattle (bovine animals)

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Recent actions taken to control the zoonoses

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

4.4.1.2 Antimicrobial resistance in *E. faecium* Cattle (bovine animals)

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Recent actions taken to control the zoonoses

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

4.4.1.3 Antimicrobial resistance in *Enterococcus* spp., unspecified *Gallus gallus* (fowl)

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

4.4.1.4 Antimicrobial resistance in *Enterococcus* spp., unspecified Pigs

Sampling strategy used in monitoring

Frequency of the sampling

Type of specimen taken

Methods of sampling (description of sampling techniques)

Procedures for the selection of isolates for antimicrobial testing

Methods used for collecting data

Laboratory methodology used for identification of the microbial isolates

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Cut-off values used in testing

Preventive measures in place

Results of the investigation

National evaluation of the recent situation, the trends and sources of infection

5 FOODBORNE OUTBREAKS

Foodborne outbreaks are incidences of two or more human cases of the same disease or infection where the cases are linked or are probably linked to the same food source. Situation, in which the observed human cases exceed the expected number of cases and where a same food source is suspected, is also indicative of a foodborne outbreak.

5.1 Outbreaks

5.1.1 Foodborne outbreaks

System in place for identification, epidemiological investigations and reporting of foodborne outbreaks

Systematic collection of information about foodborne outbreaks in Finland began in 1975. The local food control and health officials are responsible for investigating and reporting foodborne outbreaks in their area. Collection of information takes place on the basis of the Food Act (23/2006), the Health Protection Act (763/1994), the Communicable Disease Act (583/86), the Decree (1365/2011) concerning the follow-up and reporting of food- and waterborne outbreaks and the Communicable Diseases Decree (786/86). Physicians have to notify all cases of communicable diseases to the National Institute for Health and Welfare (THL). The data is recorded in the National Infectious Diseases Register in Finland. The local municipal outbreak investigation group has to notify THL in case an outbreak is suspected. The local municipal outbreak investigation groups are responsible for the investigation of every suspected food- and waterborne outbreak in their area and for its reporting to the Finnish Food Safety Authority Evira. The notification and final investigation reports are submitted by an electronic reporting system, which provides the data simultaneously to all relevant authorities involved in or supporting the outbreak investigation, e.g. the National Supervisory Authority for Welfare and Health (Valvira) which is the central coordinating authority in waterborne outbreaks. The system also stores the data in the National Food Poisoning Register (NFPR). The system has been in use since the beginning of 2010. Evira evaluates each final municipal report in co-operation with THL in order to classify the outbreaks based on the strength of evidence. The data is recorded in the National Food Poisoning Register and a national summary report on outbreaks is published by Evira every third year. There were no major differences in the reporting activity at the national level in 2014 compared to previous years. By the introduction of the electronic reporting system, the pick lists used for the collection of data into the National Food Poisoning Register have been harmonized with data collection on EU level by EFSA.

Description of the types of outbreaks covered by the reporting:

All general domestic food- and waterborne outbreaks must be reported in Finland. Illness of more than two persons with similar symptoms from a single source is considered a cluster and a suspected outbreak. Sporadic cases and infections acquired abroad are not included in the NFPR, whereas they are included in the infectious disease register. Family outbreaks are reported if commercial foodstuffs are suspected of being the source of illness or several persons are at risk. Obligatory reporting includes definite communicable diseases and traditional foodborne agents such as those causing intoxications. Foodborne outbreaks caused by chemical agents other than toxins and biological amines produced by microorganisms are included in the national register though they are not reported to EFSA.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

In 2014, the municipal food control authorities notified 41 food- and waterborne outbreaks, of which 35 were associated with food and six with drinking water. The total number of outbreaks was almost the same as in year 2013. Since 2001, the annual number of reported outbreaks has fluctuated between 32 and 58 with a few year intervals. The lowest number so far, 32 outbreaks, was recorded in 2007. Most of the reported outbreaks are foodborne (85 % in 2014). The number of human cases follows the number of outbreaks usually varying from about 800 to 2000 disease cases annually. Usually about 50 % of the reported outbreaks have been medium size when evaluated by number of cases per outbreak (11-100 persons infected). A few large waterborne outbreaks with a very large number of human cases have been reported. E.g. due to contaminated drinking water, a total of >8000 persons became ill in an outbreak in 2007. In 2014, no large outbreaks (over 100 persons infected) were reported.

Relevance of the different causative agents, food categories and the agent/food category combinations

During the last ten years the most common reported causative agent has been norovirus. In 2014 norovirus caused 8 (23%) foodborne outbreaks. With 12 cases out of a total of over 1000 cases, Finland was part of the European Hepatitis A outbreak associated with mixed berries. *Yersinia pseudotuberculosis* caused a medium sized outbreak with 55 cases via unpasteurized milk. Classic food poisoning bacteria like *Bacillus cereus* (2), *Campylobacter jejuni* (1) and *Clostridium perfringens* (1) from different sources caused 4 foodborne outbreaks. Histamine caused one foodborne outbreak. In 20 (57 %) of the foodborne outbreaks the causative agent remained unknown. In most of these cases however, the investigations showed descriptive epidemiological association between eating a certain food or meal and becoming ill. The most common vehicle (57%) reported in 2014 was a buffet meal where no specific food item was determined as the cause of the outbreak. The investigations revealed a specific food to be the vehicle in only 12 (34 %) outbreaks. Of these, the most common vehicles (3; 9 %) were fruit, berries and juices and other products thereof. If all categories of meat and products thereof were counted together, they would have been more common (4; 11 %).

Relevance of the different type of places of food production and preparation in outbreaks

In 19 (54 %) outbreaks 2014, the place of exposure was a restaurant. In 11 (31 %) outbreaks the place of origin of problem was in a restaurant.

Evaluation of the severity and clinical picture of the human cases

Altogether 978 persons were reported to fall ill in food- and waterborne outbreaks in 2014. The number of patients afflicted by food poisoning was 690 persons (71 %), while 288 persons (29 %) were infected through contaminated drinking water. According to the reports, 21 persons were hospitalized in seven outbreaks. The HAV outbreak (10/12) had the highest number of cases admitted to hospital.

Descriptions of single outbreaks of special interest

In March 2014, a *Yersinia pseudotuberculosis* (YP) outbreak was noticed by a municipal authority in Southern Finland. Epidemiological, microbiological and trace-back investigations were conducted to identify the source of the outbreak. Between February and April 2014, 55 YP cases (45 with a positive stool culture and 10 seropositive cases) from 48 households were notified to NIDR (the National Infectious Diseases Register in Finland). Illness was strongly associated with the consumption of raw milk from a single producer. The odds ratio of illness increased with the amount of raw milk consumed and previously healthy adults became infected by consuming raw milk. Identical YP strains were identified from cases stool samples, raw milk sampled from a cases refrigerator and from the milk filter at the farm. The raw milk originated from a single producer, who fulfilled the requirements by law for raw milk production. The producer voluntarily recalled the raw milk and stopped its production.

Control measures or other actions taken to improve the situation

In general, all food- and waterborne outbreaks are investigated by local food control and health officials. In widespread outbreaks, the central administration is in charge of coordinating the investigations. An investigation comprises an epidemiological investigation, detection of contributing factors, sampling and revision of the in-house control system. Information received about foodborne outbreaks, contributory factors and causative agents are analyzed and actively used in the education and training of food control officials and food business operators. Since January 2005, all food handlers whose work entails special risks related to food hygiene or who handle unpacked, perishable foodstuffs have to demonstrate their proficiency either by obtaining a hygiene proficiency certificate or a certificate of vocational qualification. Independent Proficiency Examiners accredited by the Finnish Food Safety Authority Evira organize hygiene proficiency examinations in different parts of the country. Information and recommendations about identified causative agents, risk foods or raw material are given to entrepreneurs, producers and consumers. The Finnish Salmonella control program has successfully ensured salmonella free foodstuffs on the market and only a small number of human salmonellosis infections are domestically acquired. Other control programs have been established and other measures taken in order to control outbreaks caused by the most important zoonoses. The prevailing national system for monitoring and surveillance of zoonoses covers *Campylobacter*, *Listeria* and the EHEC bacterium in production animals or foodstuffs. The Finnish Strategy on Zoonoses was revised in 2013, highlighting *Campylobacter*, *Yersinia*, *Listeria*, the EHEC bacterium and norovirus as the main foodborne agents that the key actions are targeted on. The network-like Finnish Zoonosis Centre between the national organizations; the Finnish Food Safety Authority Evira and the National Institute for Health and Welfare, have ensured the collaborative efforts of both the veterinary and the health sector for monitoring and prevention of diseases transmitted between animals and people, since 2007.

Suggestions to the European Union for the actions to be taken

Possible measures or legal proposals on foodborne viruses.

ANIMAL POPULATION TABLES

Table Susceptible animal population

Animal species	Category of animals	Population			
		holding	animal	slaughter animal (heads)	herd/flock
Cattle (bovine animals)	Cattle (bovine animals) - calves (under 1 year) - veal calves	11,600	306,975		
	Cattle (bovine animals) - dairy cows and heifers	8,084	282,905		
	Cattle (bovine animals) - meat production animals (not specified)	3,702	291,732		
	Cattle (bovine animals) - mixed herds	2,245	25,786		
	Cattle (bovine animals) (not specified)	13,289	907,398	268,729	
Deer	Deer - farmed (not specified)	13	167		
	Deer - wild (not specified)			178	
Ducks	Ducks (not specified)	461	2,667	15,095	
Gallus gallus (fowl)	Gallus gallus (fowl) - broilers (not specified)	278	10,950,314	64,662,195	3,467
	Gallus gallus (fowl) - laying hens (not specified)	1,147	4,149,052	28,489	1,203
	Gallus gallus (fowl) - parent breeding flocks, unspecified (not specified)			543,964	
	Gallus gallus (fowl) (not specified)	1,425	12,579,000	65,239,785	5,031
Geese	Geese (not specified)	188	378	5,433	
Goats	Goats (not specified)	880	6,399	206	
Moose	Moose - wild			167	
Mouflons	Mouflons - wild			7	
Pheasants	Pheasants (not specified)	254	90,855		
Pigs	Pigs - breeding animals (not specified)	811	124,210	42,037	
	Pigs - fattening pigs (not specified)	1,299	1,098,390	2,023,223	
	Pigs (not specified)	1,488	1,222,600	2,065,260	
Reindeers	Reindeers (not specified)	4,464	186,776	60,181	
Sheep	Sheep (not specified)	3,478	135,338	48,737	
Solipeds, domestic	Solipeds, domestic - horses	16,000	74,600	1,805	
Turkeys	Turkeys (not specified)	341	179,702	803,785	344
Wild boars	Wild boars - farmed	155	550	401	

DISEASE STATUS TABLES

Table Ovine or Caprine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals positive in microbiological testing under investigations of suspect cases	Number of animals tested by microbiology under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of animals serologically tested under investigations of suspect cases	Number of infected herds tested under surveillance	Number of animals tested under surveillance	Number of herds tested under surveillance	Total number of animals
Suomi / Finland	4,358	0	4,358	0	27	0	0	3	0	4,316	119	141,737

Table Bovine brucellosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals positive in microbiological testing under investigations of suspect cases	Number of animals tested by microbiology under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of animals serologically tested under investigations of suspect cases	Number of abortions due to Brucella abortus	Number of isolations of Brucella infections	Number of notified abortions whatever cause	Number of infected herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of herds tested under surveillance by bulk milk	Number of infected herds tested under surveillance	Number of animals tested under surveillance	Number of herds tested under surveillance	Total number of animals
Suomi / Finland	12,970	0	12,970	0	87	0	0	71	0	0	98	0	865	865	0	715	9	910,599

DISEASE STATUS TABLES

Table Tuberculosis in farmed deer

Region	Total number of herds	Number of infected herds	Number of animals detected positive in bacteriological examination	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Total number of animals	Number of herds with status free
Suomi / Finland	21	0	0	1	167	21

Table Bovine tuberculosis in countries and regions that do not receive Community co-financing for eradication programme

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of animals detected positive in bacteriological examination	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of tuberculin tests carried out before the introduction into the herds	Number of animals tested with tuberculin routine testing	Interval between routine tuberculin tests	Total number of animals
Suomi / Finland	12,970	0	12,970	0	5	0	0	0	910,599

PREVALENCE TABLES

Table BRUCELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Dogs - pet animals - Unspecified - Unknown - animal sample - blood - Unspecified - Official sampling - Selective sampling	animal	29	0	Brucella - B. canis	0
Dogs - pet animals - Unspecified - Unknown - animal sample (not specified) - Clinical investigations - Official sampling - Suspect sampling	animal	10	1	Brucella - B. canis	1
Pigs - unspecified - Farm (not specified) - Unknown - animal sample - foetus/stillbirth - Clinical investigations - Official sampling - Suspect sampling	animal	13	0	Brucella - Brucella spp., unspecified	0
Pigs - Unspecified - Unknown - animal sample - blood - Surveillance - Official sampling - Selective sampling	animal	2076	0	Brucella	0
Reindeers - semi-domesticated - Unspecified - Finland - animal sample - blood - Unspecified - Official sampling - Not specified	animal	91	0	Brucella	0
Seals - wild - Unspecified - Finland - animal sample (not specified) - Unspecified - Official sampling - Suspect sampling	animal	3	1	Brucella - Brucella spp., unspecified	1
Wild boars - farmed - Slaughterhouse - Finland - animal sample - blood - Monitoring - Official sampling - Convenient sampling	animal	54	0	Brucella	0
Wild boars - wild - Hunting - Unknown - animal sample - blood - Monitoring - Official sampling - Convenient sampling	animal	68	0	Brucella	0

Table CAMPYLOBACTER in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Census	slaughter batch	1507	91	Campylobacter - C. coli	5
				Campylobacter - C. jejuni	85
				Campylobacter - C. lari	1
Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Objective sampling	slaughter batch	341	6	Campylobacter - C. jejuni	6

Table CAMPYLOBACTER in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - fresh - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	batch	25	Gram	51	14	Campylobacter - C. coli	1
						Campylobacter - C. jejuni	13
						Campylobacter - C. lari	1
Meat from turkey - fresh - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	batch	25	Gram	45	10	Campylobacter - C. coli	1
						Campylobacter - C. jejuni	9

Table COXI ELLA (Q-FEVER) in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	N of clinical affected herds	Zoonoses	N of units positive
Cattle (bovine animals) - Farm (not specified) - Finland - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	71	0	0	Coxiella (Q-fever)	0
Cattle (bovine animals) - Farm (not specified) - Finland - animal sample - blood - Unspecified - Official sampling - Not specified	animal	2	0	0	Coxiella (Q-fever)	0
Goats - Farm (not specified) - Finland - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	3	0	0	Coxiella (Q-fever)	0

Table ECHINOCOCCUS in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	26872 9	0	Echinococcus - Echinococcus spp., unspecified	0
Deer - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	178	0	Echinococcus - Echinococcus spp., unspecified	0
Foxes - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	animal	265	0	Echinococcus - E. multilocularis	0
Goats - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	206	0	Echinococcus - Echinococcus spp., unspecified	0
Moose - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	167	0	Echinococcus - Echinococcus spp., unspecified	0
Mouflons - wild - Game handling establishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	7	0	Echinococcus - Echinococcus spp., unspecified	0
Pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	20652 60	0	Echinococcus - Echinococcus spp., unspecified	0
Raccoon dogs - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	animal	270	0	Echinococcus - E. multilocularis	0
Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	60181	5	Echinococcus - E. granulosus	10
Sheep - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	48737	0	Echinococcus - Echinococcus spp., unspecified	0
Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	1805	0	Echinococcus - Echinococcus spp., unspecified	0
Voles - wild - Natural habitat - Finland - animal sample (not specified) - Survey - Official sampling - Objective sampling	animal	1450	0	Echinococcus - E. multilocularis	0
Wolves - wild - Natural habitat - Finland - animal sample (not specified) - Monitoring - Official sampling - Convenient sampling	animal	1	0	Echinococcus - E. granulosus	0
		2	0	Echinococcus - E. granulosus	0
		1	1	Echinococcus - E. granulosus	1
		8	1	Echinococcus - E. granulosus	1
		15	2	Echinococcus - E. granulosus	2

Table ESCHERICHIA COLI , PATHOGENIC in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cattle (bovine animals) - unspecified - Farm (not specified) - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	6	2	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC non-O157	0
				Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157	2
				Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx1 positive vtx2 positive	2
Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Objective sampling	animal	1545	40	Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157	40
				Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx1 positive	2
				Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx1 positive vtx2 positive	37
				Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157 - eae positive vtx2 positive	1

Table LISTERIA in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
Meat from other animal species or not specified - meat products - Retail - European Union - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	single	10	Gram	48	4	>100	Listeria - L. monocytogenes	13	0
						<= 100	Listeria - L. monocytogenes	13	2
Meat from other animal species or not specified - meat products - Retail - European Union - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	single	25	Gram	48	4	detection	Listeria - L. monocytogenes	48	4
Meat from other animal species or not specified - meat products - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	single	10	Gram	745	6	>100	Listeria - L. monocytogenes	173	0
						<= 100	Listeria - L. monocytogenes	173	0
Meat from other animal species or not specified - meat products - Retail - Finland - food sample - meat - Survey - national survey - Official sampling - Convenient sampling	single	25	Gram	745	6	detection	Listeria - L. monocytogenes	745	6

Table LYSSAVIRUS (RABIES) in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Badgers - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	14	0	Lyssavirus (rabies)	0
Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	14	0	Lyssavirus (rabies)	0
Bears - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	3	0	Lyssavirus (rabies)	0
Cats - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	14	0	Lyssavirus (rabies)	0
Dogs - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	28	0	Lyssavirus (rabies)	0
Ferrets - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Lyssavirus (rabies)	0
Foxes - wild - Hunting - Finland - animal sample - brain - Monitoring - Official sampling - Convenient sampling	animal	153	0	Lyssavirus (rabies)	0
Foxes - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	11	0	Lyssavirus (rabies)	0
Lynx - wild - Hunting - Finland - animal sample - brain - Monitoring - Official sampling - Convenient sampling	animal	15	0	Lyssavirus (rabies)	0
Lynx - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	26	0	Lyssavirus (rabies)	0
Marten - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	6	0	Lyssavirus (rabies)	0
Minks - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	13	0	Lyssavirus (rabies)	0
Other carnivores - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	2	0	Lyssavirus (rabies)	0
Otter - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	14	0	Lyssavirus (rabies)	0
Otter - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	19	0	Lyssavirus (rabies)	0
Polecats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	7	0	Lyssavirus (rabies)	0
Raccoon dogs - wild - Hunting - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	289	0	Lyssavirus (rabies)	0
Raccoon dogs - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	12	0	Lyssavirus (rabies)	0
Sheep - Farm (not specified) - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Lyssavirus (rabies)	0
Solipeds, domestic - horses - Farm (not specified) - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	2	0	Lyssavirus (rabies)	0
Squirrels - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Lyssavirus (rabies)	0
Wolverine - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Convenient sampling	animal	2	0	Lyssavirus (rabies)	0
Wolves - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Convenient sampling	animal	6	0	Lyssavirus (rabies)	0

Table SALMONELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Cattle (bovine animals) - breeding bulls - Farm (not specified) - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	156	0	Salmonella	0
Cattle (bovine animals) - unspecified - Farm (not specified) - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		NA	64	9	Salmonella - S. Eastbourne	2
						Salmonella - S. Enteritidis - RDNC	2
						Salmonella - S. Typhimurium - DT 1	2
						Salmonella - S. Typhimurium - DT 120	1
						Salmonella - S. Typhimurium - DT 41	1
						Salmonella - S. Typhimurium - DT U302	1
						Salmonella - S. Typhimurium - RDNC	1
Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		NA	3225	4	Salmonella - S. Typhimurium - DT 41	4
Gallus gallus (fowl) - broilers - Farm (not specified) - Finland - - Control and eradication programmes - Industry sampling - Not specified	herd/flock	2973	N	2973	0	Salmonella	0
Gallus gallus (fowl) - broilers - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	3467	Y	3467	0	Salmonella	0
Gallus gallus (fowl) - broilers - Farm (not specified) - Finland - - Control and eradication programmes - Official sampling - Not specified	herd/flock	494	N	494	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for broiler production line - Farm (not specified) - European Union - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	2	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for broiler production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	4	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for broiler production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	11	Y	11	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - Farm (not specified) - European Union - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	1	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	2	Y	2	0	Salmonella	0
Gallus gallus (fowl) - grandparent breeding flocks for egg production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	1	0	Salmonella	0
Gallus gallus (fowl) - laying hens - Farm (not specified) - Finland - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	185	0	Salmonella	0
Gallus gallus (fowl) - laying hens - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	715	Y	715	0	Salmonella	0
Gallus gallus (fowl) - laying hens - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	74	N	74	1	Salmonella - S. Typhimurium - RDNC	1
Gallus gallus (fowl) - laying hens - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	229	0	Salmonella	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - European Union - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	75	0	Salmonella	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	94	0	Salmonella	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	130	Y	130	0	Salmonella	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - European Union - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	12	0	Salmonella	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	21	Y	21	0	Salmonella	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	8	0	Salmonella	0
Pigs - breeding animals - Farm (not specified) - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	60	0	Salmonella	0
Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		NA	3113	0	Salmonella	0
Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		NA	3128	1	Salmonella - S. Infantis	1
Pigs - unspecified - Farm (not specified) - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		NA	36	1	Salmonella - S. Bovismorbificans	1
						Salmonella - S. Mbandaka	1
						Salmonella - S. Stockholm	1
Pigs - unspecified - Farm (not specified) - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		NA	208	0	Salmonella	0
Turkeys - fattening flocks - Farm (not specified) - Finland - - Control and eradication programmes - Industry sampling - Not specified	herd/flock		NA	267	0	Salmonella	0
Turkeys - fattening flocks - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	324	Y	324	0	Salmonella	0
Turkeys - fattening flocks - Farm (not specified) - Finland - - Control and eradication programmes - Official sampling - Not specified	herd/flock		NA	57	0	Salmonella	0
Turkeys - parent breeding flocks - Farm (not specified) - European Union - - Control and eradication programmes - Industry sampling - Census	herd/flock		NA	5	0	Salmonella	0
Turkeys - parent breeding flocks - Farm (not specified) - Finland - - Control and eradication programmes - Industry sampling - Census	herd/flock	7	N	7	0	Salmonella	0
Turkeys - parent breeding flocks - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7	Y	7	0	Salmonella	0
Turkeys - parent breeding flocks - Farm (not specified) - Finland - - Control and eradication programmes - Official and industry sampling - Census	herd/flock		NA	8	0	Salmonella	0
Turkeys - parent breeding flocks - Farm (not specified) - Finland - - Control and eradication programmes - Official sampling - Census	herd/flock	7	N	7	0	Salmonella	0

Table SALMONELLA in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from bovine animals - carcass - Slaughterhouse - Finland - food sample - carcass swabs - Control and eradication programmes - Industry sampling - Objective sampling	single	1400	Square centimetre	3256	0	Salmonella	0
Meat from bovine animals - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single	25	Gram	1688	0	Salmonella	0
Meat from broilers (Gallus gallus) - carcass - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch	25	Gram	183	0	Salmonella	0
Meat from broilers (Gallus gallus) - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch	25	Gram	3	0	Salmonella	0
Meat from broilers (Gallus gallus) - meat preparation - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch	25	Gram	30	0	Salmonella	0
Meat from broilers (Gallus gallus) - minced meat - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch	25	Gram	64	0	Salmonella	0
Meat from pig - carcass - Slaughterhouse - Finland - food sample - carcass swabs - Control and eradication programmes - Industry sampling - Objective sampling	single	1400	Square centimetre	6398	0	Salmonella	0
Meat from pig - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single	25	Gram	1398	0	Salmonella	0
Meat from turkey - carcass - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch	25	Gram	62	0	Salmonella	0
Meat from turkey - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch	25	Gram	13	0	Salmonella	0
Meat from turkey - meat preparation - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch	25	Gram	20	0	Salmonella	0
Meat from turkey - minced meat - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch	25	Gram	9	0	Salmonella	0

Table SALMONELLA in feed

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Compound feedingstuffs for cattle - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	118	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for cattle - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for fish - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for fur animal - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	48	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for horses - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for horses - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	11	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for pigs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	86	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	60	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for poultry (non specified) - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for reindeers - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for sheep - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs for sheep - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs, not specified - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Compound feedingstuffs, not specified - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - barley derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - maize derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	11	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - oat derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - oat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	5	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - oat derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	24	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	14	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Feed material of cereal grain origin - other cereal grain derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	9	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - other cereal grain derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - wheat derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of cereal grain origin - wheat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	137	1	Salmonella - S. Bredeney	1
Feed material of land animal origin - animal fat - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - blood meal - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - dairy products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	27	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - meat and bone meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of land animal origin - offal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	13	0	Salmonella - Salmonella spp., unspecified	0
Feed material of marine animal origin - fish meal - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of marine animal origin - other fish products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - groundnut derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - groundnut derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - linseed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - linseed derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - other oil seeds derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	52	1	Salmonella - S. Mbandaka	1
Feed material of oil seed or fruit origin - rape seed derived - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	3	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - rape seed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	15	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - soya (bean) derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	24	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - soya (bean) derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	7	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - sunflower seed derived - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	4	0	Salmonella - Salmonella spp., unspecified	0
Feed material of oil seed or fruit origin - sunflower seed derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	24	1	Salmonella - S. Umbilo	1
Other feed material - forages and roughages - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	6	0	Salmonella - Salmonella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Other feed material - miscellaneous - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	15	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - other plants - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - other seeds and fruits - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	34	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - tubers, roots and similar products - Border inspection activities - Finland - feed sample - Surveillance - Official sampling - Selective sampling	batch	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - tubers, roots and similar products - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - tubers, roots and similar products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	19	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - tubers, roots and similar products - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	1	0	Salmonella - Salmonella spp., unspecified	0
Other feed material - yeast - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	2	0	Salmonella - Salmonella spp., unspecified	0
Pet food - final product - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	50	0	Salmonella - Salmonella spp., unspecified	0
Pet food - final product - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	44	4	Salmonella - S. Infantis	1
						Salmonella - S. Lexington	1
						Salmonella - S. Meleagridis	1
						Salmonella - S. Rissen	1
						Salmonella - S. Senftenberg	1
						Salmonella - S. Typhimurium	1
	65	0	Salmonella - Salmonella spp., unspecified	0			
Premixtures - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single	25	Gram	18	0	Salmonella - Salmonella spp., unspecified	0

Table TOXOPLASMA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Cats - Unspecified - Finland - animal sample (not specified) - Clinical investigations - Official sampling - Suspect sampling	animal	217	4	Toxoplasma - T. gondii	4
Dogs - Unspecified - Finland - animal sample (not specified) - Clinical investigations - Official sampling - Suspect sampling	animal	712	0	Toxoplasma - T. gondii	0
Goats - Farm (not specified) - Finland - animal sample (not specified) - Clinical investigations - Official sampling - Suspect sampling	animal	11	0	Toxoplasma - T. gondii	0
Hares - wild - Natural habitat - Finland - animal sample (not specified) - Monitoring - passive - Official sampling - Convenient sampling	animal	75	11	Toxoplasma - T. gondii	11
Sheep - Farm (not specified) - Finland - animal sample (not specified) - Clinical investigations - Official sampling - Suspect sampling	animal	133	2	Toxoplasma - T. gondii	2

Table TRICHINELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Badgers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	13	3	Trichinella - T. nativa	3
Bears - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	10	0	Trichinella - Trichinella spp., unspecified	0
Bears - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	4	0	Trichinella - Trichinella spp., unspecified	0
Bears - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	33	0	Trichinella - Trichinella spp., unspecified	0
Bears - wild - Unspecified - Finland - animal sample - organ/tissue - Surveillance - Not applicable - Not specified	animal	2	2	Trichinella - T. nativa	2
Beavers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	2	0	Trichinella - Trichinella spp., unspecified	0
Eagle - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	18	0	Trichinella - Trichinella spp., unspecified	0
Falcons - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	4	0	Trichinella - Trichinella spp., unspecified	0
Foxes - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	190	67	Trichinella - T. britovi	8
				Trichinella - T. nativa	63
				Trichinella - T. pseudospiralis	3
Lynx - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	171	68	Trichinella - T. britovi	1
				Trichinella - T. nativa	64
				Trichinella - T. pseudospiralis	2
				Trichinella - Trichinella spp., unspecified	2
Marten - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	6	1	Trichinella - T. nativa	1
Minks - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	15	1	Trichinella - T. nativa	1
Otter - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	38	1	Trichinella - T. nativa	1
Owls - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	3	1	Trichinella - T. pseudospiralis	1
Pigs - breeding animals - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	42037	0	Trichinella - Trichinella spp., unspecified	0
Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	20232 23	0	Trichinella - Trichinella spp., unspecified	0
Polecats - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	7	0	Trichinella - Trichinella spp., unspecified	0
Raccoon dogs - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	315	138	Trichinella - T. britovi	10
				Trichinella - T. nativa	127
				Trichinella - T. pseudospiralis	6
				Trichinella - T. spiralis	2
				Trichinella - Trichinella spp., unspecified	2
Seals - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	5	0	Trichinella - Trichinella spp., unspecified	0
Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	1805	0	Trichinella - Trichinella spp., unspecified	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	401	0	Trichinella - Trichinella spp., unspecified	0
Wild boars - farmed - Unspecified - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	1	0	Trichinella - Trichinella spp., unspecified	0
Wild boars - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	19	1	Trichinella - T. nativa	1
Wild boars - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	1	0	Trichinella - Trichinella spp., unspecified	0
Wild boars - wild - Unspecified - Finland - animal sample - organ/tissue - Surveillance - Not applicable - Not specified	animal	1	1	Trichinella - T. britovi	1
Wolverine - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	3	1	Trichinella - T. nativa	1
Wolves - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	16	7	Trichinella - T. britovi	2
				Trichinella - T. nativa	5

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

Causative agent	Food vehicle	Outbreak strenght		Strong				Weak			
		N outbreaks	N human cases	N		N outbreaks	N human cases	N			
				hospitalized	N deaths			hospitalized	N deaths		
Bacillus - B. cereus	Mixed food	1	31	0	0						
	Sheep meat and products thereof	1	24	0	0						
Calicivirus - norovirus (Norwalk-like virus)	Buffet meals	2	87	0	0	3	88	1	0		
	Tap water, including well water					1	76	0	0		
	Fruit, berries and juices and other products thereof	1	12	0	0	1	6	0	0		
	Crustaceans, shellfish, molluscs and products thereof	1	10	0	0						
Campylobacter - C. jejuni	Tap water, including well water	1	96	0	0						
	Broiler meat (Gallus gallus) and products thereof	1	22	0	0						
Clostridium - C. perfringens	Other or mixed red meat and products thereof	1	67	0	0						
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O103	Tap water, including well water	1	9	1	0						
Hepatitis virus - Hepatitis A virus	Fruit, berries and juices and other products thereof	1	12	10	0						
Histamine	Fish and fish products	1	23	2	0						
Unknown	Buffet meals					15	215	2	0		
	Mixed food					1	12	0	0		
	Tap water, including well water	3	107	0	0						
	Broiler meat (Gallus gallus) and products thereof					1	6	0	0		
	Unknown					3	20	1	0		
Yersinia - Y. pseudotuberculosis	Milk	1	55	4	0						

Strong Foodborne Outbreaks: detailed data

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Bacillus - B. cereus	406	General	Mixed food	Macaroni and minced meat casserole	Analytical epidemiological evidence; Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Temporary mass catering (fairs or festivals)	Temporary mass catering (fairs or festivals)	Unknown	Storage time/temperature abuse		1	31	0	0
	440	General	Sheep meat and products thereof	Lamb roast beef	Analytical epidemiological evidence; Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Canteen or workplace catering	Canteen or workplace catering	Unknown	Inadequate chilling, Storage time/temperature abuse		1	24	0	0

Calicivirus - norovirus (Norwalk-like virus)	337	Household / domestic kitchen	Crustaceans, shellfish, molluscs and products thereof	Oysters	Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Household	Farm	France	Unprocessed contaminated ingredient, Inadequate heat treatment	1	10	0	0
	386	General	Buffet meals		Descriptive epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	1	69	0	0
	423	General	Fruit, berries and juices and other products thereof	Blackberry curd	Analytical epidemiological evidence; Descriptive epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Netherlands	Unprocessed contaminated ingredient, Inadequate heat treatment	1	12	0	0
	435	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	1	18	0	0
Campylobacter - C. jejuni	421	General	Broiler meat (Gallus gallus) and products thereof	Corn chicken	Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	France	Cross-contamination, Inadequate heat treatment	1	22	0	0
	430	General	Tap water, including well water	Tap water	Descriptive epidemiological evidence	Household	Water distribution system	Finland	Untreated drinking water	1	96	0	0
Clostridium - C. perfringens	431	General	Other or mixed red meat and products thereof	Elk (moose) stew	Analytical epidemiological evidence; Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Finland	Inadequate chilling, Storage time/temperature abuse, Inadequate heat treatment	1	67	0	0

Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O103	434	Household / domestic kitchen	Tap water, including well water	Well water	Descriptive epidemiological evidence	Household	Water source	Finland	Untreated drinking water	There were also other causative agents Enteropathogenic E. coli (EPEC) and Escherichia coli, pathogenic - Enterotoxigenic E. coli (ETEC), but these codes were not applicable for "fboOtherAgents".	1	9	1	0
Hepatitis virus - Hepatitis A virus	HAV	General	Fruit, berries and juices and other products thereof	Berry mix cake	Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Processing plant	Unknown	Unprocessed contaminated ingredient, Inadequate heat treatment	This is a HAV outbreak associated with same berry mix buttermilk cake as in Norway. The patient strains were identical to those in the large European outbreak. http://www.efsa.europa.eu/en/efsajournal/pub/3821.htm	1	12	10	0
Histamine	350	General	Fish and fish products	Oilfish/Escolar	Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Viet Nam	Unknown		1	23	2	0
Unknown	369	General	Tap water, including well water	Well water	Descriptive epidemiological evidence	Camp or picnic	Water source	Finland	Untreated drinking water		1	14	0	0
	443	General	Tap water, including well water	Tap water	Descriptive epidemiological evidence	Household	Water distribution system	Finland	Water treatment failure		1	60	0	0

Unknown	446	General	Tap water, including well water	Tap water	Analytical epidemiological evidence; Descriptive epidemiological evidence	Household	Water distribution system	Finland	Untreated drinking water	1	33	0	0
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Yersinia - Y. pseudotuberculosis	428	General	Milk	Unpasteurized milk	Analytical epidemiological evidence; Descriptive epidemiological evidence; Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Household	Farm	Finland	Unprocessed contaminated ingredient, Inadequate heat treatment	In March 2014, a Yersinia pseudotuberculosis (YP) outbreak was noticed by a municipal authority in Southern Finland. Epidemiological, microbiological and trace-back investigations were conducted to identify the source of the outbreak. Between February and April 2014, 55 YP cases (45 with a positive stool culture and 10 seropositive cases) from 48 households were notified to NIDR (the National Infectious Diseases Register in Finland). Illness was strongly associated with the consumption of raw milk from a single producer. The odds ratio of illness increased with the amount of raw milk consumed and previously healthy adults became infected by consuming raw milk. Identical YP strains were identified from cases' stool samples, raw milk sampled from a case's refrigerator and from the milk	1	55	4	0
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Weak Foodborne Outbreaks: detailed data

Causative agent	FBO nat. code	Outbreak type	More food vehicle info		Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases		N deaths
			Food vehicle	vehicle info								N hosp.		
Calicivirus - norovirus (Norwalk-like virus)	360	General	Buffet meals		Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Infected food handler		1	41	1	0
	365	General	Buffet meals		Descriptive epidemiological evidence	Others	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler		1	32	0	0
	366	General	Fruit, berries and juices and other products thereof	Melon	Descriptive epidemiological evidence	Others	Others	Unknown	Infected food handler		1	6	0	0
	378	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	15	0	0
	403	General	Tap water, including well water	Well water	Descriptive epidemiological evidence	Others	Water source	Finland	Untreated drinking water		1	76	0	0
Unknown	359	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	10	0	0
	364	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	11	0	0
	372	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse, Inadequate chilling		1	35	0	0
	377	General	Unknown		Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Unknown		1	6	0	0
	387	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	71	2	0
	395	General	Buffet meals		Descriptive epidemiological evidence	Canteen or workplace catering	Canteen or workplace catering	Unknown	Unknown		1	5	0	0
	398	General	Unknown		Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school) (not specified)	Residential institution (nursing home or prison or boarding school)	Unknown	Unknown		1	7	1	0

Causative agent	FBO nat. code	Outbreak type	More food vehicle info		Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle factors	Contributory factors	Comment	N outbreaks	N human cases		N deaths
			Food vehicle	vehicle info								N hosp.	N deaths	
Unknown	404	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown		1	4	0	0
	409	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown		1	12	0	0
	410	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse, Other contributory factor		1	8	0	0
	411	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	5	0	0
	418	General	Buffet meals		Descriptive epidemiological evidence	Household	Unknown	Unknown	Unknown		1	8	0	0
	419	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	6	0	0
	424	General	Unknown		Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown		1	7	0	0
	426	General	Mixed food	Lasagna	Descriptive epidemiological evidence	Catering on aircraft or ship or train	Catering on aircraft or ship or train	Finland	Storage time/temperature abuse		1	12	0	0
	436	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	7	0	0
	437	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	20	0	0
	439	General	Buffet meals		Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown		1	5	0	0
442	General	Buffet meals		Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown		1	8	0	0	
447	General	Broiler meat (Gallus gallus) and products thereof	Chicken salad	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Inadequate chilling, Storage time/temperature abuse		1	6	0	0	

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter - C. coli in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Micromethod dilution (in microtiter plate) (not specified)

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
ECOFF	2	4	0.5	8	16	2
Lowest limit	0.12	0.25	0.12	1	1	0.5
Highest limit	16	16	16	128	64	64
N of tested isolates	5	5	5	5	5	5
N of resistant isolates	0	1	2	1	2	0
MIC						
<=0.12			2			
0.25	1		1			
<=0.5						5
0.5	3					
<=1				4		
1	1					
2		1				
4		3			2	
8			1			
16			1		1	
>16		1				
64					1	
>64					1	
128				1		

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Micromethod dilution (in microtiter plate) (not specified)

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
ECOFF	2	4	0.5	4	16	1
Lowest limit	0.12	0.25	0.12	1	1	0.5
Highest limit	16	16	16	128	64	64
N of tested isolates	5	5	5	5	5	5
N of resistant isolates	0	0	0	0	0	0
MIC						
<=0.12	2		5			
0.25	3					
<=0.5						5
0.5		2				
<=1				5		
1		3				
2					2	
4					3	

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Micromethod dilution (in microtiter plate) (not specified)

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
ECOFF	2	4	0.5	4	16	1
Lowest limit	0.12	0.25	0.12	1	1	0.5
Highest limit	16	16	16	128	64	64
N of tested isolates	83	83	83	83	83	83
N of resistant isolates	0	0	22	0	22	15
MIC						
<=0.12	5		53			
<=0.25		2				
0.25	43		7			
<=0.5						68
0.5	33	6	1			
<=1				83		
1	2	60				
2		10			11	
4		5	2		41	
8			3		9	
16			4			
>16			13			
32					1	
64						3
>64					21	12

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella - S. Bovismorbificans in Pigs - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication

Sampler: Official sampling

Sampling Strategy: Suspect sampling

programmes

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.015						1								
<=0.03			1											
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=2													1	
<=4											1			
<=8		1												
8								1						
16												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Eastbourne in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N of resistant isolates	0	0	0	0	0	0	0	0	0	1	0	0	0	0
MIC														
<=0.015						2								
<=0.03			2											
<=0.25				2			2							2
<=0.5	1				2									
<=1									2	1				
1	1													
<=2														
<=4											2			2
4								1		1				
<=8		2										2		
8								1						

Table Antimicrobial susceptibility testing of Salmonella - S. Enteritidis - RDNC in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N of resistant isolates	0	0	0	0	0	2	0	0	0	2	2	0	0	0
MIC														
<=0.03			2											
<=0.25				2			2							
0.25						2								
<=0.5	2				2									
0.5														2
<=1									1					
<=2													2	
2									1					
4								2		2				
<=8		2												
32												1		
128												1		
>128											2			

Table Antimicrobial susceptibility testing of Salmonella - S. Infantis in Pigs - fattening pigs (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							
<=0.5	1				1									
0.5														1
<=1									1	1				
<=2													1	
<=4											1			
<=8		1												
8								1						
32												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Stockholm in Pigs - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							
<=0.5	1				1									
0.5														1
<=1									1	1				
<=2													1	
<=4											1			
4								1						
<=8		1												
32												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT 1 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: environmental sample (not specified)

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015						1								
<=0.03			1											
<=0.25				1			1							1
<=0.5	1				1									
<=2													1	
2									1	1				
<=4											1			
4								1						
<=8		1										1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT 1 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=2													1	
<=4											1			
<=8		1										1		
8								1						

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT 120 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	1	0	0	0	0	0	0	1	0	0	1	1	0
<=0.015						1								
<=0.03			1											
<=0.25				1										1
<=0.5	1				1									
0.5							1							
2										1				
<=4											1			
4								1						
>64									1				1	
>128		1												
>1024												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT 41 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Objective sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.015						1								
<=0.03			1											
<=0.25				1			1							1
<=0.5					1									
<=1									1					
1	1													
<=2													1	
2										1				
<=4											1			
4								1						
<=8		1										1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT 41 in Cattle (bovine animals) - unspecified

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	4	4	4	4	4	4	4	4	4	4	4	4	4	4
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015						4								
<=0.03			4											
<=0.25				4			3							4
<=0.5					4									
0.5							1							
<=1									4	2				
1	4													
<=2								2					4	
2										2				
<=4											3			
4								2						
<=8		4										2		
8											1			
32												2		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - DT U302 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	1	1	0	0	0	0	0	0	1	0	0	1	1	0
MIC														
<=0.03			1											
0.06						1								
<=0.25				1										
<=0.5					1									
0.5							1							1
<=1										1				
<=4											1			
16								1						
32	1													
>64									1				1	
>128		1												
>1024												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - RDNC in Gallus gallus (fowl) - laying hens (not specified)

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official and industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015						1								
<=0.03			1											
<=0.25				1										
<=0.5	1				1									
0.5							1							1
<=2													1	
2									1	1				
<=4											1			
4								1						
<=8		1										1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium - RDNC in Cattle (bovine animals) - unspecified

Sampling Stage: Farm (not specified)

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes
Programme Code: AMR MON

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Analytical Method: Dilution - sensititre

Country of Origin: Finland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.12	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5					1									
<=1									1	1				
1	1													
<=2														
<=4											1		1	
<=8		1										1		
8								1						

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of OriginFinland

AM substance	Carbapenems - Ertapenem	Carbapenems - Imipenem	Carbapenems - Meropenem	Cephalosporins - Cefepime	Cephalosporins - Cefotaxime	Cephalosporins - Cefoxitin	Cephalosporins - Ceftazidime	Cephalosporins + β lactamase inhibitores - Cefotaxime + Clavulanic acid	Cephalosporins + β lactamase inhibitores - Ceftazidime + Clavulanic acid	Penicillins - Temocillin
ESBL genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
AMPC genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
CARBAPENEM genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
Cefotaxime synergy test	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
Ceftazidime synergy test	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
ECOFF	0.06	0.5	0.125	0.125	0.25	8	0.5	0.25	0.5	32
Lowest limit	0.015	0.12	0.03	0.06	0.25	0.5	0.25	0.06	0.12	0.5
Highest limit	2	16	16	32	64	64	128	64	128	128
N of tested isolates	25	25	25	25	25	25	25	25	25	25
N of resistant isolates	1	0	0	20	25	11	24	11	11	0
MIC										
<=0.015	19									
<=0.03			21							
0.03	1									
<=0.06				2				7		
0.06	4		4					7		
<=0.12		12							6	
0.12	1			3					6	
0.25		9		6					2	
0.5		4					1			
1							6	1		
2					1		6		5	5
4				6	3	13	6	6	3	9
8				6	6	1	2	4	1	11
16				2	2	3	4		2	
32					6	2				
64					7	3				
>64						3				

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of OriginFinland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.06	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	25	25	25	25	25	25	25	25	25	25	25	25	25	25
N of resistant isolates	0	0	0	25	24	13	0	0	25	0	13	10	13	4
MIC														
<=0.015						11								
<=0.03			25											
0.03						1								
0.12						1								
<=0.25							18							13
0.25						10								
<=0.5	9				1									
0.5						2	7							6
<=1										23				
1	12				6									2
<=2								7					9	
2	4			1	8					2			1	
<=4											12			
4				3	3			8					2	
>4				21										
<=8		23										5		
8					3			7						
>8					4									
16		2						3				10		
>32														4
64									3		2			
>64									22				13	
128											4			
>128											7			
>1024													10	

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic - E.coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of OriginFinland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.06	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	175	175	175	175	175	175	175	175	175	175	175	175	175	175
N of resistant isolates	1	0	0	0	0	8	0	0	8	0	8	12	19	9
MIC														
<=0.015						157								
<=0.03			172											
0.03						10								
0.06			3											
<=0.25				175			136							79
0.25						8								
<=0.5	88				175									
0.5							32							70
<=1									4	161				
1	79						7							17
<=2								5					150	
2	7								84	14				
<=4											166			
4	1							52	74				6	1
<=8		172										161		
8								91	5		1			
16		3						27				2		
>32														8
64											2		3	
>64									8				16	
128											2			
>128											4			
>1024												12		

OTHER ANTIMICROBIAL RESISTANCE TABLES