European Food Safety Authority

ZOONOSES MONITORING

Finland

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

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

IN 2016

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 2016.

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.

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* 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 Populations

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`s Animal register (sheep, goats, pigs), Evira`s Bovine register (bovine inc. Bison Bison), Evira`s Poultry (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' AssociationFarmed deer, Provincial veterinary officesData 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 1.12.2016 (pigs, sheep, goat, bovine). Data on reindeers: Final data, 2015/2016, reindeer herding year: 1 June-31 May.

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.

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 seven years later the number is 72, so the number of animals in a typical bovine holding has increased notably.

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

Livestock production is concentrated in certain areas and, thus, there are large differencies 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 Mycobacterium tuberculosis complex (MTC) in animal - Deer - farmed - animal sample

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 the tests. Clinical suspect cases are investigated by pathological examination of suspect lymph nodes or lesions.

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 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

Epidemiological investigation will be started. The culling or slaughtering of the positive animals or herd in case of confirmed disease will be conducted.

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 including the origin of the positive animals

No cases of M. bovis were detected in farmed deer in 2016. No samples from farmed deer were sent to Finnish Food Safety Authority Evira for bacteriological examination.

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 Mycobacterium tuberculosis complex (MTC) in animal - Cattle (bovine animals) - animal sample

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Finland has been granted the officially 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 bulls are tested by intradermal tuberculin test within 28 days before entering the quarantine accommodation of a semen collection centre. The bulls are tested annually at the semen collection centre thereafter. Post mortem examination is performed on all slaughtered animals and samples are sent for examination if there is a suspicion of tuberculosis. Clinical suspect cases are investigated by pathological examination of suspect lymph nodes or lesions.

Frequency of the sampling

Continuous testing (annually) at the semen collection centre. In addition, samples are taken from all suspected cases.

Type of specimen taken

Lymph nodes or tuberculotic 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 tuberculotic 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 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. The animal health requirements of semen of domestic cattle are in the Decree No 1026/2013 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases

Epidemiological investigation will be started. The culling or slaughtering of the positive animals or herd in case of confirmed disease will be conducted.

Notification system in place

Mycobacterium tuberculosis complex -infection in cloven-hoofed animals is 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 cattle in 2016. 279 402 bovine animals were slaughtered and subject to a routine post mortem examination. Samples were collected from one suspicious animal during meat inspection and sent to the Finnish Food Safety Authority Evira for examination. The results were negative. A total of 266 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 favorable.

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 - animal sample

Monitoring system

Sampling strategy

All boars are tested individually within 30 days before entering the quarantine accommodation of a semen collection centres and again within 15 days before entering a semen collection centre. The boars are tested annually at the semen collection centre thereafter and at the time of slaughter. The herds of origin sending boars to the semen collection centre are tested annually. Herds belonging to the Finnish SPF (specific pathogen free) system for breeding herds and multiplying herds are monitored. Keepers of farmed wild boar take voluntarily samples from slaughtered farmed wild boar and all samples are tested. Hunted wild boars are sampled by voluntary hunters. The sampling of hunted wild boars was an active monitoring programme in 2014-2016. All suspected animals sampled due to abortion are tested also for brucellosis.

Frequency of the sampling

Continuous sampling at the semen collection centres and at wild boar farms. Continuous sampling of the herds of origin; 15 samples/herd/year. On suspicion due to abortion.

Type of specimen taken

Blood and/or tissue samples due to abortion.

Methods of sampling (description of sampling techniques)

Blood samples are taken from live animals at the semen collection centre or farm or from stunned animals at the slaughterhouse. Blood samples are collected for active and passive (suspect cases) surveillance. In suspect cases aborted fetuses, placental tissue and vaginal mucus are 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 (RBT) (serum) or iELISA (serum). Confirmation: RBT (serum) or CFT (serum) or iELISA (serum) or culture of tissue samples due to abortions.

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. The animal health requirements of semen of domestic swine are in the Decree No 1029/2013 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases

Epidemiological investigation will be started. The culling or slaughtering of the positive animals or herd in case of confirmed disease will be conducted.

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 including the origin of the positive animals

No cases of brucellosis were recorded in swine in 2016. Altogether 2055 serological samples were tested for Brucella antibodies in 2016, all with negative results. Furthermore, 34 animals from 12 herds were tested microbiologically due to abortions and 162 animals were tested serologically due to the import, all with negative results. In addition, samples from 116 hunted wild boars sent to the Finnish Food Safety Authority Evira as a part of the national monitoring program for African Swine fever, were analyzed for presence of antibody for Brucella and/or presence of Brucella bacteria. One animal out of 116 was found positive by serology only, one by bacteriology only and four by both serology and bacteriology (Brucella sp. was isolated). Also blood samples from 51 farmed wild boars from 8 farms were tested serologically, all with negative results.

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

The situation in domestic swine remains favourable. Presence of B. suis bv. 2 in the wild boar population in Finland was determined in 2015 when the bacteria was isolated for the first time.

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) - animal sample

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

All bulls are tested within 28 days before entering the quarantine accommodation of a semen collection centres and again before entering a semen collection centre. The bulls are tested annually at the semen collection centre thereafter. The herds of origin sending bulls to the semen collection centre are tested annually. Dairy herds with increased number of abortions are targeted and the bulk milk samples are tested under surveillance program annually. All suspected animals sampled due to abortion are tested also for brucellosis.

Frequency of the sampling

Continuous sampling at the semen collection centres. Continuous (annually) sampling of the herds of origin; 15 samples/herd/year. Annually sampling at dairy herds. On suspicion due to abortion.

Type of specimen taken

Blood, milk and/or tissue samples due to abortions.

Methods of sampling (description of sampling techniques)

Samples are taken from live animals at the semen collection centre or farm. Blood and milk samples are collected for active and passive (suspect cases) surveillance. In suspect cases also aborted fetuses, placental tissue and vaginal mucus are collected from cows that have aborted.

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 of tissue samples due to abortions.

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. The animal health requirements of semen of domestic cattle are in the Decree No 1026/2013 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases

Epidemiological investigation will be started. The culling or slaughtering of the positive animals or herd in case of confirmed disease will be conducted.

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

539 blood samples from AI bulls and 810 bulk milk samples from herds with increased number of abortions and from farms selling animals to semen collection centres were tested for brucellosis, all with negative results. In addition, 105 bacteriological examinations of animals from 103 farms and 161 blood samples of animals from 30 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 - animal sample

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Finland has been granted the officially free status of brucellosis (Brucella melitensis) established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

At least 5 % of the sheep and goats over six months of age will be random sampled and tested annually. Individual blood samples are taken by an official veterinarian. All suspected animals sampled due to abortion are tested also for brucellosis.

Frequency of the sampling

Continuous sampling at the farms. On suspicion due to abortion.

Type of specimen taken

Blood and/or tissue samples due to abortion.

Methods of sampling (description of sampling techniques)

Blood samples are taken from live animals at the farm. In suspect cases also aborted fetuses, 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: RBT (serum), Confirmation: CFT (serum)/culture of tissue samples due to abortion.

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. The animal health requirements of semen of sheep and goats are in the Decree No 1032/2013 of the Ministry of Agriculture and Forestry.

Measures in case of the positive findings or single cases

Epidemiological investigation will be started. The culling or slaughtering of the positive herd in case of confirmed disease will be conducted.

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

No cases of brucellosis were recorded in 2016. In 2016, 41 random blood samples from healthy animals from 6 farms were tested, all with negative results. In addition two samples from one farm in clinically suspect cases due to abortion were investigated bacteriologically and 11 blood samples from two farms were tested by serological methods, 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 - animal sample

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Finland has been granted the officially free status of brucellosis (Brucella melitensis) established by Commission Decision 94/965/EC of 28 December 1994.

Monitoring system

Sampling strategy

Sampling is part of a permanent surveillance programme. The sampling covers the whole territory of Finland. All rams are tested within 28 days before entering the quarantine accommodation of a semen collection centres and again before entering a semen collection centre. The rams are tested annually at the semen collection centre thereafter. At least 5 % of the sheep and goats over six months of age will be random sampled and tested annually. Individual blood samples are taken by an official veterinarian. All suspected animals sampled due to abortion are tested also for brucellosis.

Frequency of the sampling

Continuous sampling at the semen collection centre and farms. On suspicion due to abortion.

Type of specimen taken

Blood and/ or tissue samples due to abortion.

Methods of sampling (description of sampling techniques)

Blood samples are taken from live animals at the semen collection centre and farms. In suspect cases also aborted fetuses, 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: RBT (serum), Confirmation: CFT (serum)/culture of tissue samples due to abortion.

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

Epidemiological investigation will be started. The culling or slaughtering of the positive herd in case of confirmed disease will be conducted.

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

No cases of brucellosis were recorded in 2016. 4093 random blood samples from healthy sheep from 105 farms and 8 samples from one semen collection centre were tested, all with negative results. The goal for sampling in order to maintain the officially brucellosis free status was achieved. In addition 8 samples from one semen collection center and 162 blood samples from two farms due to the export were tested by serological methods, 13 samples from 6 farms in clinically suspect cases due to abortion was investigated bacteriologically and 40 blood samples from two farms were tested by serological methods, 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 ZOONOSES AND ZOONOTIC 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.

3.1.2 Salmonella in foodstuffs

3.1.2.1 Salmonella in food - Cheeses made from cows' milk - hard - made from pasteurised milk - food sample - Survey - national survey

Monitoring system

Sampling strategy

National survey 2015-2016. Samples were taken randomly by local food control authorities at retail. Samples of products of Finnish and foreign origin were taken in the same proportion as they were available at retail.

Type of specimen taken

At retail

Sliced ready-to-eat cheeses.

Methods of sampling (description of sampling techniques)

At retail

Single packages were taken as samples. Single retail packages or at least 100 g of cheese from sealed, industrial kitchen sized packages were taken as samples.

Definition of positive finding

At retail

Salmonella spp. detected in 25 g.

Diagnostic/analytical methods used

At retail

ISO 6579:2002/ Amendment 1:2007, Annex D or NMKL N:o 187/2007

Results of the investigation

Altogether 403 samples were analysed for Salmonella. None of the samples was detected to be positive.

3.1.2.2 Salmonella in food - Meat from bovine animals - food sample

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 offcial 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 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 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 slaughterhouse carcass swab samples (3141 samples). One sample out of 1717 bovine meat samples (0.06%) in cutting plants was positive in 2016. The detected salmonella was serotype S. Enteritidis.

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.

3.1.2.3 Salmonella in food - Meat from broilers (Gallus gallus) - food sample

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

At slaughterhouses: carcases 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.

At meat processing plant

Minced meat, meat peparations and meat products; 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 carcases are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcase. The neck skin samples from three poultry carcases 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 assesed 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 2016.

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.

3.1.2.4 Salmonella in food - Meat from pig - food sample

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 offcial 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 (6397 samples) or cutting plant samples (1399) in 2016.

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.

3.1.2.5 Salmonella in food - Meat from turkey - food sample

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

At slaughterhouses: carcases 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 peparations 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 carcases are sampled at random during each sampling session. A piece of approximately 10 g from neck skin shall be obtained from each poultry carcase. The neck skin samples from three poultry carcases 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 assesed 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 2016.

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.

3.1.3 Salmonella in animals

3.1.3.1 Salmonella in animal - Cattle (bovine animals) - animal sample

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 animals (AI-bulls and heifers) 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 and heifers 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 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

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 be delivered 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 %) and the serovars were S. Typhimurium and S. Enteritidis. Herds: Salmonella was detected in 7 herds (4 x S. Typhimurium, 1 x S. Enteritidis, 1 x S. Hessarek and 1 x S. Derby and S. Konstanz 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 in animal - Gallus gallus (fowl) - broilers - animal sample

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. There are also specific national rules for farms which deliver only small amount of broiler meat to the final consumer or to local retail establishments directly supplying the final consumer. At these farms, the flocks are sampled 1-4 times a year by the operator and every second or third year by the official veterinarian.

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 detected in one broiler flock (0.03 %) in 2016. The serovar was S. Tennessee.

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 in animal - Pigs - animal sample

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.

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 maximun 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. Maximun number of composite samples is 15. Suspected herds: Adult animals: Feacal 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: Feacal 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 lymphnodes are taken. Lymph nodes are divided into two equal parts. Lymph nodes parts from five animals are pooled together for analysis. If the sample is positive each of the five individual 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 analysis. If the sample is positive each of the five individual 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.

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: Two breeding pigs (0.06 %) were positive. The serovar was S. Mbandaka in both cases. Herds: Salmonella was detected in three herds. The serovars were S. Typhimurium, S. Mbandaka and S. Derby, which was detected from the same holding as in 2015.

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 in Gallus gallus (fowl) - laying hens - breeding flocks for egg production and flocks of laying hens

Monitoring system

Sampling strategy

Laying hens flocks

Day-old chicks are sampled at the holding after arrived 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

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

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 detected in one (0.1%) commercial flock of adult laying hens. The serotype was S. Typhimurium. In addition, S. Enteritidis 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 in animal - Gallus gallus (fowl) - breeding flocks, unspecified - animal sample

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 swabsIn cage flocks: faeces

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

Socks/boot swabs and dust sampleIn 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 detected in two (2.9 %) day-old chick parent flocks of broiler breeding line. The serotype was S. Typhimurium. Both day-old chick flocks originated from another EU country and samples were taken immediately after arrival to the holding in Finland. In addition, S. Typhimurium was detected in one parent flock of egg production line.

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 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 arrival to the holding. Rearing flocks are sampled at the holding by the food business opearator 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 and once during the production cycle by the official veterinarian. 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. There are also specific national rules for farms which deliver only small amount of turkey meat to the final consumer or to local retail establishments directly supplying the final consumer. At these farms, the flocks are sampled 1-4 times a year by the operator and every second or third year by the official veterinarian.

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

Breeding flocks

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.

Meat Production flocks

In case of positive finding the flock is destructed or slaughtered and meat 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 bussines operator. Salmonella has been notifiable since 1995.

Results of the investigation

Salmonella was detected in one (0.36 %) fattening flock of turkeys. The detected serotype was S. Poona. Salmonella spp. was not detected in breeding flocks of turkeys in 2016.

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 in feed - All feedingstuffs - feed sample

Monitoring system

Sampling strategy

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

Frequency of the sampling

Domestic feed material of plant origin

Sampling of domestic feed materials of plant origin was risk-based and targeted to specified feeds. The number of samples taken was based on the amount of production, type of operation, hygienic risk and type of feed material.

Domestic feed material of animal origin

Sampling of domestic feed materials of animal origin was risk-based and targeted to specified feeds. The number of samples taken was based on the amount of production, type of operation, hygienic risk and type of feed material.

Imported feed material of plant origin

For the official salmonella control of feeds imported from third countries, samples were taken from high-risk feeds of plant origin. For the official salmonella control samples of high-risk feeds of plant origin from the internal market were taken in random inspections. (See also Additional information.)

Imported feed material of animal origin

For the official salmonella control of imported feed material of animal origin was taken from one lot of fish meal. (See also Additional information.)

Process control in feed mills

Process control (environmental samples) in feed mills is part of operator's own control, which is not reported here.

Compound feedingstuffs

Sampling of compound feeds was risk-based and targeted to specified feeds. The number of samples taken was based on the amount of production, type of operation, hygienic risk and type of feed materials used.

Type of specimen taken

Domestic feed material of plant origin

Samples of domestic feed materials of plant origin taken originated from cereal grains, oilseeds and from tubers and roots.

Domestic feed material of animal origin

Samples of domestic feed material of animal origin were taken from meat and bone meal, offal and from feed material of land animal origin and marine animal origin used as pet food.

Imported feed material of plant origin

Samples of imported feed material of plant origin were taken from feed material of cereal grain origin and feed material of oilseed origin.

Imported feed material of animal origin

Sample of imported feed material of animal origin taken originated from marine animals (fish meal).

Compound feedingstuffs

Samples of compound feedingstuffs were taken both from domestic compound feedingstuffs and imported compound feedingstuffs.

Methods of sampling (description of sampling techniques)

Domestic feed material of plant origin

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples are dependend on the size of the feed lot and the type of analyses (substances analysed).

Domestic feed material of animal origin

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples are dependend on the size of the feed lot and the type of analyses (substances analysed).

Imported feed material of plant origin

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples are dependend on the size of the feed lot and the type of analyses (substances analysed).

Imported feed material of animal origin

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples are dependend on the size of the feed lot and the type of analyses (substances analysed).

Compound feedingstuffs

An aggregate sample taken from the inspected feed lot consists of incremental samples. The size of aggregate sample and the number of incremental samples are dependend on the size of the feed lot and the type of analyses (substances analysed).

Definition of positive finding

Domestic feed material of plant origin

Confirmed isolate of Salmonella spp. isolated from the sample.

Domestic feed material of animal origin

Confirmed isolate of Salmonella spp. isolated from the sample.

Imported feed material of plant origin

Confirmed isolate of Salmonella spp. isolated from the sample.

Imported feed material of animal origin

Confirmed isolate of Salmonella spp. isolated from the sample.

Compound feedingstuffs

Confirmed isolate of Salmonella spp. isolated from the sample.

Diagnostic/analytical methods used

Domestic feed material of plant origin

In Evira salmonella is analysed mainly as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are qPCR, ISO 6579:2002, NMKL No 71:1999 and NMKL No 187:2007. Serotyping is performed when salmonella is detected in a sample.

Domestic feed material of animal origin

In Evira salmonella is analysed mainly as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are qPCR, ISO 6579:2002, NMKL No 71:1999 and NMKL No 187:2007. Serotyping is performed when salmonella is detected in a sample.

Imported feed material of plant origin

In Evira salmonella is analysed mainly as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are qPCR, ISO 6579:2002, NMKL No 71:1999 and NMKL No 187:2007. Serotyping is performed when salmonella is detected in a sample.

Imported feed material of animal origin

In Evira salmonella is analysed mainly as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are qPCR, ISO 6579:2002, NMKL No 71:1999 and NMKL No 187:2007. Serotyping is performed when salmonella is detected in a sample.

Compound feedingstuffs

In Evira salmonella is analysed mainly as described in the ISO 6579:2002 with some minor modifications. Analysis methods used in approved laboratories are qPCR, ISO 6579:2002, NMKL No 71:1999 and NMKL No 187:2007. Serotyping is performed when salmonella is detected in a sample.

Preventive measures in place

Obligatory heat treatment in feed mills of compound feeds for pigs, poultry and cattle. If salmonella is found in imported feed materials, they will be treated chemically before taken into use.

Control program/mechanisms

The control program/strategies in place

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.

Recent actions taken to control the zoonoses

See preventive measures.

Measures in case of the positive findings

Domestic feed material of plant origin

Salmonella spp. was not detected in domestic feed material of plant origin.

Domestic feed material of animal origin

Salmonella spp. was not detected in domestic feed material of animal origin.

Imported feed material of plant origin

Prohibition of taking into use and placing on the market concerning the lots, from which the samples were taken, were immediately issued. Evira granted upon requests permission to decontaminate the lots of feed materials containing salmonella. The decontamination must be carried out according to instructions of Evira. After decontaminations, Evira resampled the lots, and all of them were verified to be free from salmonella, after which Evira gave permission to use the lots as feed.

Imported feed material of animal origin

Salmonella spp. was not detected in imported feed material of animal origin.

Compound feedingstuffs

Compound feed for fur animal: The ban was not imposed because the feed and its raw materials had already been eaten. The operator was asked to identify and investigate risk material in the future more effectively. Tallowballs for wild birds: Feed was ordered to be withdrawn from the market immediately.

Notification system in place

Feed operators have to inform Evira immediately of salmonella suspicions or findings. Evira notifies operators via e-mail and EU via RASFF.

Results of the investigation

In the official control salmonella was detected in six imported lots of rapeseed meal, in one lot of compound feedingstuff for fur animals manufactured in Finland and in one market surveillance sample of feed intended for wild birds. Feed originating salmonella outbreaks in animals or in food were not detected in 2016.

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

During the last few years imported feed materials of plant origin have been the most risky in terms of Salmonella. Instead, salmonella findings have been relatively rare in feed materials and compound feeds manufactured in Finland. 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 manufacturing of pet food.

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

Salmonella outbreaks originating from feed have been very rare on Finnish livestock farms. The latest ones happened in 1995 and 2009. In 1995, the feed-borne Salmonella Infantis outbreak was discovered on cattle farms and in 2009, the feed-borne Salmonella Tennessee outbreak spread to poultry and pig farms.

Additional information

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. 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.

3.2 CAMPYLOBACTERIOSIS

3.2.1 General evaluation of the national situation

3.2.1.1 Campylobacter - 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. Since 2008 the annual number of reported human campylobacteriosis cases has varied between 3954 and 4935, and was 4637 in 2016. 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 5.6% during June-October and 2.1% 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. Consumption of raw milk caused a campylobacteriosis outbreak in 2012 and 2015, and in another farm outbreak in 2012 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 programme for broilers was introduced in 2004. The program consist of compulsory monitoring of broiler slaughter batches, interventions at slaughter and voluntary measures at the holdings.

3.2.2 Campylobacter in animals

3.2.2.1 Campylobacter in animal - Gallus gallus (fowl) - broilers - animal sample - caecum

Monitoring system

Sampling strategy

Compulsory active monitoring of broiler slaughter batches, since 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.

Frequency of the sampling

At slaughter

Census sampling of all broiler slaughter batches between June and October; random sampling (expected prevalence 1%, accuracy 1%, confidence level 95%, since 2008) of broiler slaughter batches between January and May, and between 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

In 2016, a total of 1618 slaughter batches were sampled between June and October, thermophilic campylobacters (C. jejuni) were detected in 75 (4,6 %) of these slaughter batches. Between January-May and November-December, in total, 330 slaughter batches were sampled, thermophilic campylobacters (C. jejuni) were detected in 5 (1,5%) 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 5.6% during June-October and 2.1% 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 L. monocytogenes - general evaluation

History of the disease and/or infection in the country

Since 1995 a total of 18-70 human listeriosis cases have been recorded annually.

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

The annual incidence in humans has been 0,2 -1,2 per 100 000. The actual source of infection is usually not identified but most cases are believed to be food-borne. Cold-smoked and gravad fishery products are considered to be risk foodstuffs. Food business operators monitor L. monocytogenes according to the Regulation 2073/2005, supplemented by sampling done by the municipal food control authorities. Moreover, national surveys on L. monocytogenes in food are carried out.

3.3.2 Listeria in foodstuffs

3.3.2.1 L. monocytogenes in food - Cheeses made from cows' milk - hard - made from pasteurised milk - food sample - Survey - national survey

Monitoring system

Sampling strategy

National survey 2015-2016. Samples were taken randomly by local food control authorities at retail. Samples of products of Finnish and foreign origin were taken in the same proportion as they were available at retail.

Type of specimen taken

At retail

Sliced, packed, ready-to-eat cheeses

Methods of sampling (description of sampling techniques)

At retail

Single packages were taken as samples. Single retail packages or at least 100 g of cheese from sealed, industrial kitchen sized 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 11290-1:2014 or NMKL 136:2010, 5th ed. Quantitative analysis: ISO 11290-2:2014 Qualitative and quantitative analyses of L. monocytogenes were done according to Commission Regulation 2073(2005).

Results of the investigation

Altogether 403 samples were analysed for Listeria monocytogenes. None of the samples was detected to be positive.

3.4 YERSINIOSIS

3.4.1 General evaluation of the national situation

3.4.1.1 Yersinia - general evaluation

History of the disease and/or infection in the country

The number of reported cases of human yersiniosis has been between 400 -600 per year, most of which are caused by Yersinia enterocolitica.

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

Most of the reported human cases are presumed to be of domestic origin. The number of cases is higher than the number of domestic salmonella infections. A decreasing trend in number of cases caused by Yersinia enterocolitica has been detected.

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

In Finland the most common bio/serotype is 4/O:3, which is found in human cases as well as in pigs and pork. Pathogenic Y. enterocolitica biotypes have also been detected in faeces of cats and dogs in Finland.

3.5 TRICHINELLOSIS

3.5.1 General evaluation of the national situation

3.5.1.1 Trichinella - general evaluation

History of the disease and/or infection in the country

In Finland, domestic pork testing for Trichinella was initiated during the 1860s. In 1923, meat inspection including Trichinella testing 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

Nowadays the Trichinella incidence in swine in Finland is low. However, no sign of decrease in incidence in wildlife has been seen. The apparent change in swine during past decades 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. In 2016 the number of hunted and Trichinella tested wild boars has increased due to the possible threat of African swine fever (ASF). In addition, Evira has used new sources to receive information on Trichinella testing in approved laboratories.

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

Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions (one holding in 2016). 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 .

3.5.2 Trichinella in animals

3.5.2.1 Trichinella in animal - Solipeds, domestic - horses - animal sample

Monitoring system

Sampling strategy

Every single slaughtered horse is tested for Trichinella at meat inspection.

Frequency of the sampling

Trichinella testing 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 2015/1375 EU.

Case definition

Positive result from testing according to 2015/1375 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 2015/1375.

Control program/mechanisms

The control program/strategies in place

Trichinella testing at meat inspection is mandatory.

Notification system in place

Positive result in Trichinella testing 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.

3.5.2.2 Trichinella in animal - Pigs - animal sample

Number of officially recognised Trichinella-free holdings

During the year 2016, one holding was recognized officially as a holding applying controlled housing conditions according to regulation 2015/1375.

Categories of holdings officially recognised Trichinella-free

None in 2016.

Officially recognised regions with negligible Trichinella risk

No

Monitoring system

Sampling strategy

General

Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions according to regulation 2015/1375 (one holding in 2016). In 2016, in total 736 pigs originating from officially recognized controlled housing conditions were not examined for trichinellosis. All other pigs are examined for trichinellosis at obligatory, official meat inspection in slaughterhouse.

Frequency of the sampling

General

Trichinella testing is mandatory to all commercial pork production except for swine originating from officially recognized controlled housing conditions according to regulation 2015/1375 (one holding in 2016). In 2016, in total 736 pigs originating from officially recognized controlled housing conditions were not examined for trichinellosis. All other pigs are examined for trichinellosis 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 2015/1375 at meat inspection.

Case definition

General

Positive case is a pig from which the Trichinella test (2015/1375) 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 2015/1375. In Finland the methods used are the magnetic stirrer method with pooled samples and mechanically assisted pooled sample digestion method (Stomacher).

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.

Notification system in place

No Trichinella infections were found in pigs in 2016.

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

No Trichinella infections were found in fattening pigs in 2016.

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

No Trichinella infections were found in breeding sows and boars in 2016.

Breeding sows and boars

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. In addition, the infection pressure caused by wildlife toward pigs has probably decreased because of the changes in distribution of Trichinella species prevalent in wildlife.

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

The risk of obtaining trichinellosis from pig meat is negligible.

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

Finland implemented the possibility provided in Article 3 paragraph 3 b of Regulation (EU) No 2015/1375 to cease testing for Trichinella of pigs originating in holdings or compartments applying controlled housing conditions. 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. During year 2016, one holding has been officially recognized for controlled housing conditions.

3.6 ECHINOCOCCOSIS

3.6.1 General evaluation of the national situation

3.6.1.1 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 Natural Resources Institute Finland (LUKE) 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 LUKE rodent scientists. In the LUKE survey in 2016, about 1857 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 in 2015 an autochthonous case of cystic echinococcosis caused by E. Canadensis G10 was diagnosed in a child living in the endemic area. This was the first case of its kind in more than 50 years. The infection was most probably transmitted from a dog. Active surveillance is needed as well as information and education of the general public. 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.

3.6.2 Echinococcus in animals

3.6.2.1 Echinococcus in animal - All animals - animal sample

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. - LUKE 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: Faeces/rectal contents positive by specific PCR or adult worms found in intestine. Intermediate host: positive protoscolex finding in microscopic examination of cyst fluid or typical histology of cysts.

Diagnostic/analytical methods used

Definitive hosts: Species-specific PCR for the detection of Echinococcus multilocularis (fox and raccoon dog) or E. granulosus G10 (E. canadensis) (wolf) egg DNA in faeces or sedimentation and counting method. 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 according to the Decree No 1010/2013 of the Ministry of Agriculture and Forestry. Echinococcus multilocularis is classified as an animal disease to be controlled according to Decree No 843/2013 of the Ministry of Agriculture and Forestry.

Results of the investigation including the origin of the positive animals

In 2016, hydatid cysts of Echinococcus granulosus (E. canadensis) were found in six slaughtered reindeer (Rangifer tarandus). Fifteen wolves out of 74 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.

3.7 RABIES

3.7.1 General evaluation of the national situation

3.7.1.1 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 Tübingen, 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 Tübingen 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. Second case of EBLV-2 in a Daubenton's bat was detected in 2016

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. From 2004 to 2013, the distribution was 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.

3.7.2 Lyssavirus (rabies) in animals

3.7.2.1 Lyssavirus (rabies) in animal - Dogs - animal sample

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 576/2013 of the European Parliament and of the Council.

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 including the origin of the positive animals

In 2016, 31 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.

3.7.2.2 Rabies virus (RABV) in animal - Wild animals - animal sample

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

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. Since 2014 the vaccination campaign is carried out once in a year, in the autumn. 180 000 bait vaccines are distributed aerially in September-October over a 20-40 km wide and 350 km long zone along the south eastern border against Russia.

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.

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. Evira will decide on whether there is a need to enlarge the oral vaccination area or increase the frequency of the oral vaccination campaign.

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 including the origin of the positive animals

In 2016 a total of 543 wild animals (excluding bats) were examined for rabies, rabies was not detected.

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

No indigenous sylvatic rabies cases (RABV, 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 2016, 19 bats were examined for lyssaviruses, EBLV-2 was detected in one Daubenton's bat. First EBLV-2 positive Daubenton's bat has been detected in 2009.

3.8 Q-FEVER

3.8.1 General evaluation of the national situation

3.8.1.1 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.

3.8.2 Coxiella (Q-fever) in animals

3.8.2.1 C. burnetii in animal - All animals - animal sample

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 and detection of the agent by PCR.

Control program/mechanisms

The control program/strategies in place

Q-fever is an 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 including the origin of the positive animals

During year 2016 115 cattle from 22 farms and 10 goats from one farm were tested due to abortion. Two cattle from one farm were found positive by serology. In previous investigations in 2012 and 2013 animals from the same farm were found positive without any symptoms of disease. The animals tested in 2016 had probably antibodies from the previous infection on this farm. Three 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.

3.9 TOXOPLASMA

3.9.1 General evaluation of the national situation

3.9.1.1 Toxoplasma - general evaluation

History of the disease and/or infection in the country

From 20 to 40 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.

3.9.2 Toxoplasma in animals

3.9.2.1 T. gondii in animal - All animals - animal sample

Monitoring system

Sampling strategy

The occurence 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 after 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, 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 according to Decree No 1010/2013 of the Ministry of Agriculture and Forestry.

3.10 VTEC

3.10.1 General evaluation of the national situation

3.10.1.1 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 first Finnish outbreak caused by VTEC serotype O157 occurred in 1997. The outbreak was associated with swimming in a shallow lake. The annual incidence of VTEC infections in 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 and most of them are caused by VTEC O157. Most human cases are sporadic or family-related infection and some of them have been associated with consumption of unpasteurized milk or with a cattle farm contact. The prevalence of VTEC O157 in cattle faeces was 1.3% in 1997, and in a latter study, in 2003, 0.4%. In 2003, VTEC O157 and non-O157 serotypes were found on 0.07% 11% and of bovine carcass surfaces, respectively. The prevalence of VTEC non-O157 serotypes in cattle faeces was 30%, in 2003. A compulsory control programme for all bovine slaughterhouses started in 2004 for VTEC O157. In addition, a new control progamme for bovine holdings delivering raw milk over 2500 kg/year directly to final consumers, started in 2014.

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

The number of human infections caused by VTEC was stable during the first decade of the 21st century (yearly incidence 0.2-0,6 / 100 000). In 2013, the incidence increased to 1.8/ 100000. The increase was partly due to changes in the VTEC diagnostics and in particular the number of non-O157 serotypes increased partly due to the development of laboratory methods. Visiting farms and cattle contact are major risk factors for infection, especially of young children. Most human infections are sporadic and their source 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 the source of a small outbreak. In 2012, unpasteurized milk and animal contact was associated with an outbreak caused by sorbitol-positive VTEC O157. In 2013, a nationwide outbreak caused by sorbitol-positive, non-motile variant of VTEC O157 (with 10 microbiologically confirmed cases) was detected but the source remained unknown. In 2014, contaminated well was source of an outbreak caused by VTEC O103. In 2016, nine human cases led to investigation at cattle, sheep or goat farm. In two of these cases, an identical VTEC strain was isolated from the farm (one cattle and one sheep farm) and the patient. In both cases, the infected children were living at the farm and had contact with the animals.

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

The number of VTEC human cases is relatively low but the disease caused can be severe and lead to death. Cattle seem to be the major reservoir of VTEC. Same PFGE subtypes are detected among strains isolated from human infections and cattle indicating that cattle might be a common source of human infections in Finland.

Recent actions taken to control the zoonoses

Compulsory control programme for all bovine slaughterhouses started in 2004. The program consists of compulsory monitoring of slaughter bovines, interventions at the holding of origin of the animals and voluntary measures at the slaughterhouse. Since the beginning of 2014, bovine holdings which deliver over 2500 kg/year raw milk directly to the final consumer were obligated to sample the herd and the raw milk for VTEC, at least once a year. Sampling is carried out by the food business operator. However, data is not available for reporting of the results for the years 2014, 2015 and 2016. Discussions have been started on how to renew the VTEC program for bovine slaughterhouses. More information is needed on potential control options especially on farms.

3.10.2 Escherichia coli in animals

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

Monitoring system

Sampling strategy

Compulsory active monitoring of slaughter bovines, since 2004. A compulsory control programme for all bovine slaughterhouses started in January 2004 for serotype O157. Starting from 2015, at least 600 bovines are sampled in a year. Samples are taken from slaughtered bovines by the industry. 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. Besides, cattle herds are tested as part of the epidemiological investigations related to human infections in case of suspected contact to the farm. Sampling is carried out by the official municipal veterinarian.

Frequency of the sampling

Animals at farm

Case based

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 shigatoxin (stx1 and/or stx2) and adhesion genes (eae) or another 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 shigatoxin (stx1 and/or stx2) 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.

Animals at slaughter (herd based approach)

NMKL 164:2005 (ISO 16654:2001)

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

Compulsory monitoring of slaughter bovines, interventions at holding of origin of positive slaughter animals, and voluntary measures at the farms and slaughterhouses. Interventions at farms are related to slaughter animal findings; the farm of origin of the positive slaughter bovine is traced and sampled. In addition, all bovine holdings which are suspected to be connected to human VTEC cases are sampled. 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 at bovine holdings and slaughterhouses. According to the recommendations, a special risk management plan is designed by the official municipal veterinarian and the animal health care veterinarian for holdings that VTEC was confirmed on. The purpose of the plan is to minimize spread of infection to other animals, to neighboring holdings and to people.

Recent actions taken to control the zoonoses

Discussion is currently going on, on how to renew the current VTEC control program.

Measures in case of the positive findings or single cases

In case of a positive finding at slaughter the herd of origin of the animal is sampled by the official municipal veterinarian. In case of positive findings at the holding a voluntary risk management plan is launched. If the farm 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

In 2016, 13 out of 627 samples (2.07 %) from slaughtered cattle were detected to be positive for VTEC O157. One out of five herds tested due to a human case revealed positive.

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

The amount of positive findings in slaughtered animals has been increasing during the last few years.

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.

4 ANTIMICROBIAL RESISTANCE INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

4.1 SALMONELLOSIS

4.1.1 Salmonella in animals

4.1.1.1 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

See Salmonella spp. in bovine animals.

Methods of sampling (description of sampling techniques)

See 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

Isolates were collected from local laboratories and tested in Evira.

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

Additional information

The overall resistance situation continues to be very favourable.

4.1.1.2 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

See Salmonella spp. in pigs.

Methods of sampling (description of sampling techniques)

See 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

Isolates were collected from local laboratories and tested in Evira.

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

Additional information

The overall resistance situation continues to be very favourable.

4.1.1.3 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 - breeding flocks, flocks of laying hens and broiler flocks.

Type of specimen taken

See Salmonella spp. in Gallus gallus - breeding flocks, flocks of laying hens and broiler flocks.

Methods of sampling (description of sampling techniques)

See Salmonella spp. in Gallus gallus - breeding flocks, flocks of laying hens and broiler flocks.

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

Isolates were collected from local laboratories and tested in Evira.

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

Additional information

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

4.2 CAMPYLOBACTERIOSIS

4.2.1 Campylobacter in animals

4.2.1.1 Antimicrobial resistance in C. jejuni Gallus gallus (fowl)

Description of sampling designs

Samples 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 slaughtered broiler production batch was sampled: 1 Nov - 31 May random sampling of slaughter batches is performed according to a particular sampling scheme. Details of the sampling are described in Thermophilic Campylobacter spp. in Gallus gallus.

Type of specimen taken

10 intact caeca per batch, taken at slaughterhouse

Methods of sampling (description of sampling techniques)

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 83 C. jejuni isolates.

Laboratory methodology used for identification of the microbial isolates

See Thermophilic Campylobacter in Gallus gallus.

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

Additional information

In 2016, resistance in C. jejuni from Finnish Gallus gallus was detected against nalidixic acid (14.5%), ciprofloxacin (8.4%), tetracycline (6.0%) and streptomycin (1.2%). Quinolone and tetracycline resistance increased compared to 2015. However, resistance levels are lower than in 2014.

4.3 ESCHERICHIA COLI, NON-PATHOGENIC

4.3.1 Escherichia coli, non-pathogenic in foodstuffs

4.3.1.1 Antimicrobial resistance in E.coli, non-pathogenic, unspecified Meat from broilers (Gallus gallus)

Description of sampling designs

Altogether 309 samples of packed fresh meat were collected at retail to represent the target population of broiler meat batches. Sampling was evenly distributed throughout the year.

Stratification procedures per animal populations and food categories

Selection of samples was stratified as follow: fresh meat of domestic origin, collected from retail shops in three different NUTS-3 areas, NUTS areas covering approximately 45% of the Finnish population.

Randomisation procedures per animal populations and food categories

Samples were randomly selected of all available meat products representing different production batches and filling the sampling criteria. The number of samples collected from each NUT was estimated according to the number of inhabitants in the area.

Sampling strategy used in monitoring

Frequency of the sampling

The collected samples were evenly distributed throughout the year 2016.

Type of specimen taken

Fresh (and chilled, not frozen) broiler meat with skin. The meat samples could be sliced or diced and wrapped in vacuum or in a controlled atmosphere.

Methods of sampling (description of sampling techniques)

Samples were collected at retail shops and transported refridgerated to the laboratory within one day. The temperature of the meat was measured in the laboratory at arrival.

Procedures for the selection of isolates for antimicrobial testing

One E. coli isolate from each sample, if available, was tested for antimicrobial susceptibility. Each sample represented different epidemiological units (batch).

Laboratory methodology used for identification of the microbial isolates

25 grams of meat with skin was aseptically chopped or cut to smaller pieces and pre-enriched in 225 ml buffered peptone-water. Selective isolation of ESBL- AmpC or carbapenemase-producing E. coli was performed according to the DTU laboratory protocol Isolation of ESBL-, AmpC- and carbapenemase-producing E. coli from fresh meat. Presumptive ESBL/AmpC E. coli from MacConkey agar plates (or presumptive carbapenemase producing E. coli from CARBA or OXA-48 plates) were identified using MALDI-TOF (Bruker, Germany).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The broth microdilution method was used (Sensititre, TREK Diagnostics). The susceptibility testing was performed according to the CLSI standards, Escherichia coli ATCC 25922 was used as a quality control strain. All E. coli isolates were tested with panel one according to Decision 2013/652/EC. If a MIC value to cefotaxime, ceftazidime or meropenem were above the ECOFF, the isolate was further tested with panel two.

Cut-off values used in testing

EUCAST ECOFFs

Additional information

Of the total of 309 meat samples tested, presumptive ESBL/AmpC producing E. coli were isolated from 68 (22%) of the samples. One E. coli was lost after species identification and was not available for susceptibility testing.

4.3.2 Escherichia coli, non-pathogenic in animals

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

Description of sampling designs

Sampling was performed at slaughter from healthy animals. Altogether, 306 samples were collected and screened for the presence of indicator E. coli and ESBL/AmpC/carbapenemase producing E. coli.

Stratification procedures per animal populations and food categories

The samples originated from broilers slaughtered in the three major slaughterhouses that accounted for approximately 98 % of the domestically slaughtered broilers in Finland in 2016. The number of randomly taken samples from each slaughterhouse was proportional to the annual slaughter throughput.

Randomisation procedures per animal populations and food categories

Samples were collected randomly and each sample represented a different epidemiological unit (flock).

Sampling strategy used in monitoring

Frequency of the sampling

The collected samples were evenly distributed between February and December in 2016.

Type of specimen taken

One caecum per animal was taken.

Methods of sampling (description of sampling techniques)

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/carbapenemase producing E. coli.

Procedures for the selection of isolates for antimicrobial testing

Altogether, 184 E. coli isolates were selected for the susceptibility testing (systematic random selection). 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 37°C. Typical colonies were subsequently spread on blood agar and stored at -80°C until susceptibility testing. In the specific monitoring of ESBL/AmpC and carbapenemase producing E. coli, 1 g of caecal content was diluted in 10 ml of buffered peptone water (BPW) and incubated overnight at 37°C. Subsequently, 10 µl of the BPW broth was spread on MacConkey agar plates (Becton, Dickinson and Company) containing 1 mg/l cefotaxime for the detection of ESBL/AmpC producers, and on CARBA and OXA-48 plates (Biomerieux) for the detection of possible carbapenemase producers. MacConkey plates were incubated overnight at 44°C, and CARBA and OXA-48 plates overnight at 37°C. Presumptive E. coli colonies from the selective plates were confirmed with MALDI-TOF (Bruker, Germany).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The broth microdilution method was used (Sensititre, TREK Diagnostics). The susceptibility testing was performed according to the CLSI standards, Escherichia coli ATCC 25922 was used as a quality control strain. All E. coli isolates were tested with panel one according to Decision 2013/652/EC. If a MIC value to cefotaxime, ceftazidime or meropenem were above the ECOFF, the isolate was further tested with panel two. The antimicrobials tested are laid down in Decision 2013/652/EC.

Cut-off values used in testing

EUCAST ECOFFs

Additional information

The antimicrobial resistance levels in indicator E. coli in broilers varied from none to low. The most common resistance traits were seen against tetracycline, ampicillin, sulfamethoxazole, trimethoprim, ciprofloxacin and nalidixic acid (in descending order). Resistance to third generation cephalosporins was detected in one (0.5%) randomly selected indicator E. coli isolate (a presumptive AmpC producer). However, ESBL or AmpC E. coli isolates were found in the specific monitoring from 44 (14%) of the samples. The resistance in indicator E. coli has been quite stable compared to the years 2011 and 2014. However, a slightly increasing trend in resistance to ampicillin, and a slightly decreasing trend in sulfamethoxazole and trimethoprim can be seen when comparing resistance levels in 2016 to years 2011 and 2014.The prevalence of ESBL or AmpC producing E. coli has increased from 7% in 2014 to 14% in 2016.

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, epidemological 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, including 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 Borne Outbreaks Register (NFWDR). 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 NFWDR 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 2016 compared to previous years. By the introduction of the electronic reporting system, the pick lists used for the collection of data into the NFWDR 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 NFWDR, 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 2016, the municipal food control authorities notified 59 food- and waterborne outbreaks, of which 56 were associated with food and three with drinking water. The total number of outbreaks was a bit bigger than in year 2015. Since 2001, the annual number of reported outbreaks has fluctuated between 32 and 59 with a few year intervals. The lowest number so far, 32 outbreaks, was recorded in 2007. Most of the reported outbreaks are foodborne (95 % in 2016). 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 2016, only two large outbreaks (over 100 persons infected) were reported, of wich one was foodborne and one waterborne.

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 2016 norovirus caused 22 (39 %) foodborne outbreaks. Other causative agents in 2016 were Bacillus cereus (3), Campylobacter (5), Clostridium perfringens (2), Yersinia enterocolitica (2), Salmonella (2) and VTEC/EHEC (2) from different sources, causing 16 foodborne outbreaks. In 2016 occured again three outbreaks associated with raw beetroot. The symptoms (vomiting, nausea and abdominal pain) occurred almost immediately (15 min – 1 hour) and though investigation we have not been able to find out the cause. In 2010 we had several similar beetroot assosiated outbreaks, but after issuing a recommendation only to serve beetroot heat treated we have only had sporadic raw beetroot outbreaks. In 2016 in 15 (27 %) 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 (48 %) reported in 2016 was a buffet meal or mixed food 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 19 (34 %) outbreaks. Of these, the most common vehicles (7; 12 %) were vegetables and juices and other products thereof.

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

In 35 (62 %) outbreaks in 2016, the place of exposure was a restaurant. In 23 (41 %) outbreaks the place of origin of problem was in a restaurant.

Evaluation of the severity and clinical picture of the human cases

Altogether 1542 persons were reported to fall ill in food- and waterborne outbreaks in 2016. The number of patients afflicted by food poisoning was 1392 persons (90 %), while 150 persons (10 %) were infected through contaminated drinking water. According to the reports, 11 persons were hospitalized in eight outbreaks. No deaths were reported.

Descriptions of single outbreaks of special interest

Over 200 persons fell ill in a gastrointestinal outbreak in southern Finland. No one needed hospital care. All the ill people had eaten at 11 various events organized during a weekend in August 2016 and where the food was from one catering company operating in the metropolitan area. The contact persons for the events in question were contacted and they sent instructions to everyone who participated in the events to apply for healthcare in case of symptoms that indicate gastric disease. There were over 30 EHEC positive findings (with PCR method) and over 50 EPEC positive findings from patients. Both EHEC and EPEC strains have been demonstrated also in food samples. Rucola of foreign origin was suspected to be the source of infection on the basis of interviews with catering company staff (food lists), trace-back investigations and microbiological analyzes. Fresh rucola had been included in a chicken dish both marinated and as decoration as well as in a meat dish as decoration. The rucola had been sold in wholesale packages in different parts of Finland. The results from the cohort study concluded that food with rucola was associated with the gastroenteritis, RR 2.19 (95% CI 1.50-3.22, p<0.000). In March-May 2016, approximately 20 people in the Pirkanmaa region were infected with a genetically identical strain of Salmonella Enteritidis. Sprouts sprouted from a particular batch of mung beans were suspected as a possible source of infection based on patient interviews and trace back investigations. Several samples of the batch of mung beans in question were analyzed (beans were sprouted in the laboratory and both sprouts and water was analyzed but all samples were negative for salmonella. The use of the batch was prohibited while the analyses were ongoing but were released after negative results at the end of May. In the summer, the same strain of salmonella was detected in two more ill patients. Preliminary results of a case-control study showed sprouts as a very likely source of infection. In August, Evira instructed importers to withdraw the batch of mung beans and made a RASFF notification. Mung beans in the batch in question were of Chinese origin and had come to the Finnish entrepreneurs via a Dutch entrepreneur. In Finland, beans from the batch had been delivered to various wholesalers and sprouting establishments. Beans were also marketed in consumer packages in grocery stores and health food stores in different parts of the country. Most salmonella cases have been linked to a sprout producer in the Pirkanmaa region. Probably, salmonella has occurred at low levels and unevenly distributed in the bean batch, which can explain why only people from one region of the country became ill and why sample results were negative.

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.

ANIMAL POPULATION TABLES

Table Susceptible animal population

		Population			
Animal species	**Category of animals**	**holding**	**animal**	**slaughter animal (heads)**	**herd/flock**
Cattle (bovine animals)	Cattle (bovine animals)	12,627	909,014	279,402	
	Cattle (bovine animals) - calves (under 1 year) - veal calves	10,850	299,895		
	Cattle (bovine animals) - dairy cows and heifers	7,771	281,569		
	Cattle (bovine animals) - meat production animals	3,701	288,236		
	Cattle (bovine animals) - mixed herds	2,311	39,314		
Deer	Deer - farmed	18	300	75	
	Deer - wild			413	
Ducks	Ducks	949	6,952	10,791	
Gallus gallus (fowl)	Gallus gallus (fowl)	1,628	12,875,438	69,660,148	4,980
	Gallus gallus (fowl) - breeding flocks, unspecified			541,944	
	Gallus gallus (fowl) - broilers	323	6,839,600	69,077,977	3,589
	Gallus gallus (fowl) - laying hens	1,305	4,085,264	40,227	1,391
Geese	Geese	329	540	3,657	
Goats	Goats	953	7,165	273	
Moose	Moose - wild			215	
Mouflons	Mouflons			0	
Pheasants	Pheasants	382	89,005		
Pigs	Pigs	1,589	1,213,332	2,051,168	
	Pigs - breeding animals	808	121,408	43,100	
	Pigs - fattening pigs	1,102	1,170,232	2,008,068	
Reindeers	Reindeers	4,421	196,852	62,441	
Sheep	Sheep	3,869	143,132	60,153	
Solipeds, domestic	Solipeds, domestic - horses	16,000	74,600	1,261	
Turkeys	Turkeys	581	31,002	878,541	359
Wild boars	Wild boars - farmed	168	695	338	

DISEASE STATUS TABLES

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

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of herds tested under surveillance by bulk milk	Number of animals or pools tested under surveillance by bulk milk	Number of infected herds tested under surveillance by bulk milk	Number of notified abortions whatever cause	Number of isolations of Brucella infections	Number of abortions due to Brucella abortus	Number of animals tested by microbiology under investigations of suspect cases
FINLAND	161	0	0	0	12,627	0	909,014	0	0	12,627	0	810	810	0	105	0	0	105

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

Region	Number of animals serologically tested under investigations of suspect cases	Number of suspended herds under investigations of suspect cases	Number of seropositive animals under investigations of suspect cases	Number of animals positive in microbiological testing under investigations of suspect cases	Number of herds with status officially free	Number of infected herds	Total number of animals	Number of herds tested under surveillance	Number of animals tested under surveillance	Total number of herds	Number of infected herds tested under surveillance	Number of animals tested by microbiology under investigations of suspect cases
FINLAND	51	0	0	0	4,822	0	150,297	111	4,134	4,822	0	15

DISEASE STATUS TABLES

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

Region	Number of herds with status officially free	Number of infected herds	Total number of animals	Interval between routine tuberculin tests	Number of animals tested with tuberculin routine testing	Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
FINLAND	12,627	0	909,014	0	0	0	1	0	12,627

Table Tuberculosis in farmed deer

Region	Number of infected herds	Number of herds with status free	Total number of animals	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination	Total number of herds
FINLAND	0	18	325	0	0	18

PREVALENCE TABLES

Table BRUCELLA in animal

Area of Sampling	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
Not Available	Alpacas - Unspecified - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	8	0	Brucella	0
	Deer - zoo animals - Zoo - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	17	0	Brucella	0
	Dogs - pet animals - Unspecified - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	10	1	Brucella canis	1
	Dogs - pet animals - Unspecified - Unknown - animal sample - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Brucella	0
	Lamas - Zoo - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	4	0	Brucella	0
	Moose - zoo animal - Zoo - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	2	0	Brucella	0
	Other ruminants - zoo animals - Zoo - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	4	0	Brucella	0
	Pigs - Conservation facilities - Unknown - animal sample - blood - Unspecified - Official sampling - Not specified	animal	162	0	Brucella	0
	Pigs - Farm - Unknown - animal sample - foetus/stillbirth - Clinical investigations - Official sampling - Suspect sampling	animal	34	0	Brucella	0
	Pigs - Unspecified - Unknown - animal sample - blood - Surveillance - Official sampling - Selective sampling	animal	2055	0	Brucella	0
	Reindeers - semi-domesticated - Unspecified - Finland - animal sample - blood - Unspecified - Official sampling - Not specified	animal	92	0	Brucella	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - blood - Monitoring - Official sampling - Convenient sampling	animal	51	0	Brucella	0
	Wild boars - wild - Hunting - Unknown - animal sample - Monitoring - Official sampling - Convenient sampling	animal	116	6	Brucella, unspecified sp.	6

Table CAMPYLOBACTER in animal

Area of Sampling	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
Not Available	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Census	slaughter animal batch	1618	79	Campylobacter jejuni	79
	Gallus gallus (fowl) - broilers - Slaughterhouse - Finland - animal sample - caecum - Control and eradication programmes - Industry sampling - Objective sampling	slaughter animal batch	330	5	Campylobacter jejuni	5

Table COXIELLA in animal

Area of Sampling	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
Not Available	Cattle (bovine animals) - Artificial insemination station - Finland - animal sample - blood - Surveillance - Official sampling - Objective sampling	animal	3	0		Coxiella	0
	Cattle (bovine animals) - Farm - Finland - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	115	2		Coxiella burnetii	2
	Goats - milk goats - Farm - Finland - animal sample - blood - Clinical investigations - Official sampling - Suspect sampling	animal	10	0		Coxiella	0

Table ECHINOCOCCUS in animal

Area of Sampling	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
FINLAND	Cattle (bovine animals) - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	279402	0	Echinococcus	0
	Deer - farmed - Game handling estabilishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	75	0	Echinococcus	0
	Deer - wild - Game handling estabilishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	413	0	Echinococcus	0
	Foxes - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	animal	230	0	Echinococcus	0
	Goats - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	273	0	Echinococcus	0
	Moose - wild - Game handling estabilishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	215	0	Echinococcus	0
	Moose - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	animal	15	0	Echinococcus	0
	Pigs - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	2051168	0	Echinococcus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - faeces - Monitoring - Official sampling - Convenient sampling	animal	466	0	Echinococcus	0
	Reindeers - semi-domesticated - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - Official sampling - Convenient sampling	animal	23	0	Echinococcus	0
	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	62441	6	Echinococcus granulosus	6
	Sheep - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	60153	0	Echinococcus	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	1261	0	Echinococcus	0
	Voles - wild - Natural habitat - Finland - animal sample - Survey - Official sampling - Objective sampling	animal	1857	0	Echinococcus	0
	Wild boars - farmed - Game handling estabilishment - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	338	0	Echinococcus	0
	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	74	15	Echinococcus granulosus	15
Satakunta	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	2	0	Echinococcus	0
Pirkanmaa	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	1	0	Echinococcus	0
Helsinki-Uusimaa (NUTS level 2)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	2	0	Echinococcus	0
Varsinais-Suomi (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	6	0	Echinococcus	0
Pohjois- ja Itä-Suomi	Reindeers - semi-domesticated - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	62441	6	Echinococcus granulosus	6
Pohjois-Savo (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	9	0	Echinococcus	0
Pohjois-Karjala (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	21	6	Echinococcus granulosus	6
Kainuu (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	13	6	Echinococcus granulosus	6
Keski-Pohjanmaa (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	2	0	Echinococcus	0
Pohjois-Pohjanmaa (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	9	0	Echinococcus	0
Lappi (NUTS 2010-2013)	Wolves - wild - Natural habitat - Finland - animal sample - Monitoring - Official sampling - Convenient sampling	animal	9	3	Echinococcus granulosus	3

Table ESCHERICHIA COLI in animal

Area of Sampling	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
Not Available	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock	1	1	VTEC O157	1
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Objective sampling	animal	627	13	VTEC O157	13
	Sheep - Farm - Finland - animal sample - faeces - Unspecified - Official sampling - Suspect sampling	herd/flock	1	1	VTEC O157	1

Table LISTERIA in food

Area of Sampling	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
FINLAND	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - European Union - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	10	Gram	293	0	<= 100	Listeria monocytogenes	13	0
							>100	Listeria monocytogenes	13	0
	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - European Union - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	25	Gram	293	0	detection	Listeria monocytogenes	293	0
	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Finland - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	10	Gram	110	0	<= 100	Listeria monocytogenes	6	0
							>100	Listeria monocytogenes	6	0
	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Finland - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	25	Gram	110	0	detection	Listeria monocytogenes	110	0

Table LYSSAVIRUS in animal

Area of Sampling	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
FINLAND	Badgers - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	7	0	Lyssavirus	0
	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	19	1	European bat lyssavirus 2	1
	Bears - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	5	0	Lyssavirus	0
	Bears - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	7	0	Lyssavirus	0
	Cats - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	6	0	Lyssavirus	0
	Cattle (bovine animals) - Farm - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Lyssavirus	0
	Dogs - pet animals - Unspecified - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	31	0	Lyssavirus	0
	Foxes - wild - Hunting - Finland - animal sample - brain - Monitoring - Official sampling - Convenient sampling	animal	92	0	Lyssavirus	0
	Foxes - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	12	0	Lyssavirus	0
	Hares - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	1	0	Lyssavirus	0
	Hedgehogs - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Suspect sampling	animal	1	0	Lyssavirus	0
	Lynx - wild - Hunting - Finland - animal sample - brain - Monitoring - Official sampling - Convenient sampling	animal	2	0	Lyssavirus	0
	Lynx - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	41	0	Lyssavirus	0
	Marten - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	10	0	Lyssavirus	0
	Minks - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Lyssavirus	0
	Other carnivores - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Lyssavirus	0
	Otter - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Lyssavirus	0
	Otter - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	33	0	Lyssavirus	0
	Raccoon dogs - wild - Hunting - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	287	0	Lyssavirus	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Suspect sampling	animal	21	0	Lyssavirus	0
	Sheep - Farm - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Lyssavirus	0
	Solipeds, domestic - horses - Farm - Finland - animal sample - brain - Clinical investigations - Official sampling - Suspect sampling	animal	1	0	Lyssavirus	0
	Wolverine - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Convenient sampling	animal	1	0	Lyssavirus	0
	Wolves - wild - Natural habitat - Finland - animal sample - brain - Surveillance - Official sampling - Convenient sampling	animal	20	0	Lyssavirus	0
Keski-Suomi	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Lyssavirus	0
Pirkanmaa	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	4	0	Lyssavirus	0
Helsinki-Uusimaa (NUTS level 3)	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	9	1	European bat lyssavirus 2	1
Kymenlaakso (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	2	0	Lyssavirus	0
Pohjois-Savo (NUTS 2010-2013)	Bats - wild - Natural habitat - Finland - animal sample - brain - Monitoring - passive - Official sampling - Convenient sampling	animal	3	0	Lyssavirus	0

Table SALMONELLA in animal

Area of Sampling	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
Not Available	Cattle (bovine animals) - breeding bulls - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	151	0	Salmonella	0
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Control and eradication programmes - Official sampling - Suspect sampling	herd/flock		N_A	29	1	Salmonella Enteritidis 1	1
	Cattle (bovine animals) - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	3310	6	Salmonella Derby	1
							Salmonella Hessarek	1
							Salmonella Typhimurium DT 1	1
							Salmonella Typhimurium DT RDNC	2
							Salmonella Typhimurium U 277	1
	Cattle (bovine animals) - unspecified - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	3149	4	Salmonella Enteritidis PT 33	3
							Salmonella Typhimurium DT RDNC	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	3074	N	3074	1	Salmonella Tennessee	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	3589	Y	3589	1	Salmonella Tennessee	1
	Gallus gallus (fowl) - broilers - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock	515	N	515	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	1	Y	1	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	1	0	Salmonella	0
	Gallus gallus (fowl) - grandparent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	1	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	929	Y	929	1	Salmonella Typhimurium DT 41	1
	Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	230	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	302	0	Salmonella	0
	Gallus gallus (fowl) - laying hens - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	160	N_A	160	1	Salmonella Enteritidis 1	1
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	140	Y	140	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	70	2	Salmonella Typhimurium DT 41	2
	Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	102	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	22	Y	22	1	Salmonella Typhimurium DT 41	1
	Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	14	0	Salmonella	0
	Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock		N_A	10	0	Salmonella	0
	Pigs - breeding animals - Farm - Finland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	42	1	Salmonella Typhimurium RDNC	1

Area of Sampling	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
Not Available	Pigs - breeding animals - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	3180	2	Salmonella Mbandaka	2
	Pigs - breeding animals - unspecified - boars - Farm - European Union - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	animal		N_A	185	0	Salmonella	0
	Pigs - fattening pigs - Slaughterhouse - Finland - animal sample - lymph nodes - Control and eradication programmes - Industry sampling - Objective sampling	animal		N_A	3210	0	Salmonella	0
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Industry sampling - Not specified	herd/flock		N_A	371	1	Salmonella Derby	1
	Pigs - unspecified - Farm - Finland - animal sample - faeces - Monitoring - Official sampling - Suspect sampling	herd/flock		N_A	29	1	Salmonella Mbandaka	1
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock		N_A	276	1	Salmonella Poona	1
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	343	Y	343	1	Salmonella Poona	1
	Turkeys - fattening flocks - before slaughter - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock		N_A	67	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	8	N	8	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	8	Y	8	0	Salmonella	0
	Turkeys - parent breeding flocks - adult - Farm - Finland - Not Available - Control and eradication programmes - Official sampling - Census	herd/flock	8	N	8	0	Salmonella	0
	Turkeys - parent breeding flocks - day-old chicks - Farm - European Union - Not Available - Control and eradication programmes - Industry sampling - Census	herd/flock	5	N_A	5	0	Salmonella	0
	Turkeys - parent breeding flocks - during rearing period - Farm - Finland - Not Available - Control and eradication programmes - Official and industry sampling - Census	herd/flock	8	N_A	8	0	Salmonella	0

Table SALMONELLA in food

Area of Sampling	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
Not Available	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - European Union - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	25	Gram	293	0	Salmonella	0
	Cheeses made from cows' milk - hard - made from pasteurised milk - Retail - Finland - food sample - Survey - national survey - Official sampling - Convenient sampling	single (food/feed)	25	Gram	110	0	Salmonella	0
	Meat from bovine animals - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	3141	0	Salmonella	0
	Meat from bovine animals - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	1717	1	Salmonella Enteritidis PT 33	1
	Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	203	0	Salmonella	0
	Meat from broilers (Gallus gallus) - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	6	0	Salmonella	0
	Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	54	0	Salmonella	0
	Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	110	0	Salmonella	0
	Meat from pig - carcase - Slaughterhouse - Finland - food sample - carcase swabs - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	1400	Square centimetre	6397	0	Salmonella	0
	Meat from pig - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	single (food/feed)	25	Gram	1399	0	Salmonella	0
	Meat from turkey - carcase - Slaughterhouse - Finland - food sample - neck skin - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	69	0	Salmonella	0
	Meat from turkey - fresh - Cutting plant - Finland - food sample - meat - Control and eradication programmes - Industry sampling - Objective sampling	batch (food/feed)	25	Gram	18	0	Salmonella	0
	Meat from turkey - meat preparation - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	38	0	Salmonella	0
	Meat from turkey - minced meat - intended to be eaten cooked - Processing plant - Finland - food sample - meat - Surveillance - HACCP and own check - Not specified	batch (food/feed)	25	Gram	17	0	Salmonella	0

Table SALMONELLA in feed

Area of Sampling	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
Not Available	Compound feedingstuffs for cattle - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	78	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	5	0	Salmonella	0
	Compound feedingstuffs for fish - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs for fur animal - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	18	1	Salmonella Derby	1
	Compound feedingstuffs for horses - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	2	0	Salmonella	0
	Compound feedingstuffs for horses - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Farm - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	3	0	Salmonella	0
	Compound feedingstuffs for pigs - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	51	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Farm - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs for poultry (non specified) - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	46	0	Salmonella	0
	Compound feedingstuffs for reindeers - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Compound feedingstuffs, not specified - final product - Feed mill - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	6	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Farm - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	3	0	Salmonella	0
	Feed material of cereal grain origin - barley derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - maize derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - oat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	2	0	Salmonella	0

Area of Sampling	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
Not Available	Feed material of cereal grain origin - oat derived - Retail - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	9	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	10	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - by-products of brewing and distilling - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	10	0	Salmonella	0
	Feed material of cereal grain origin - other cereal grain derived - Farm - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of cereal grain origin - wheat derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	14	0	Salmonella	0
	Feed material of land animal origin - meat and bone meal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	4	0	Salmonella	0
	Feed material of land animal origin - offal - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	7	0	Salmonella	0
	Feed material of marine animal origin - fish meal - Border inspection activities - Denmark - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	1	0	Salmonella	0
	Feed material of oil seed or fruit origin - linseed derived - Border inspection activities - Kazakhstan - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	2	0	Salmonella	0
	Feed material of oil seed or fruit origin - rape seed derived - Border inspection activities - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	34	6	Salmonella Tennessee	6
	Feed material of oil seed or fruit origin - rape seed derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	11	0	Salmonella	0
	Feed material of oil seed or fruit origin - soya (bean) derived - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	4	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Border inspection activities - Russia - feed sample - Surveillance - Official sampling - Selective sampling	batch (food/feed)	25	Gram	3	0	Salmonella	0
	Feed material of oil seed or fruit origin - sunflower seed derived - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	28	0	Salmonella	0
	Other feed material - other seeds and fruits - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Other feed material - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	18	1	Salmonella Leeuwarden	1
	Other feed material - tubers, roots and similar products - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	4	0	Salmonella	0

Area of Sampling	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
Not Available	Other feed material - tubers, roots and similar products - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Other feed material - yeast - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	1	0	Salmonella	0
	Pet food - final product - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	8	0	Salmonella	0
	Pet food - final product - Retail - Not Available - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	57	0	Salmonella	0
	Premixtures - Processing plant - Finland - feed sample - Surveillance - Official sampling - Selective sampling	single (food/feed)	25	Gram	8	0	Salmonella	0

Table TOXOPLASMA in animal

Area of Sampling	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
Not Available	Cats - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Suspect sampling	animal	251	3	Toxoplasma gondii	3
	Dogs - Unspecified - Finland - animal sample - Clinical investigations - Official sampling - Suspect sampling	animal	746	0	Toxoplasma	0
	Hares - Natural habitat - Finland - animal sample - Monitoring - passive - Official sampling - Convenient sampling	animal	162	9	Toxoplasma gondii	9
	Sheep - Farm - Finland - animal sample - Clinical investigations - Official sampling - Suspect sampling	animal	164	0	Toxoplasma	0

Table TRICHINELLA in animal

Area of Sampling	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
Not Available	Badgers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	11	1	Trichinella, unspecified sp.	1
	Bears - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	62	4	Trichinella nativa	4
	Bears - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	12	1	Trichinella, unspecified sp.	1
	Bears - wild - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	48	0	Trichinella	0
	Beavers - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	1	0	Trichinella	0
	Dogs - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	2	0	Trichinella	0
	Eagle - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	30	0	Trichinella	0
	Falcons - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	19	1	Trichinella, unspecified sp.	1
	Foxes - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	90	30	Trichinella, unspecified sp.	30
	Lynx - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	46	15	Trichinella, unspecified sp.	15
	Marten - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	11	3	Trichinella, unspecified sp.	3
	Minks - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	6	0	Trichinella	0
	Otter - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	39	1	Trichinella, unspecified sp.	1
	Owls - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	9	0	Trichinella	0
	Pigs - breeding animals - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	43038	0	Trichinella	0
	Pigs - breeding animals - raised under controlled housing conditions - sows - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	13	0	Trichinella	0
	Pigs - fattening pigs - not raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	2007052	0	Trichinella	0
	Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	329	0	Trichinella	0
	Raccoon dogs - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	227	88	Trichinella, unspecified sp.	88
	Rats - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	1	1	Trichinella, unspecified sp.	1
	Seals - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	5	0	Trichinella	0
	Solipeds, domestic - horses - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	1261	0	Trichinella	0
	Wild boars - farmed - Slaughterhouse - Finland - animal sample - organ/tissue - Surveillance - Official sampling - Census	animal	338	0	Trichinella	0
	Wild boars - farmed - Unspecified - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	4	0	Trichinella	0
	Wild boars - wild - Hunting - Finland - animal sample - organ/tissue - Surveillance - HACCP and own check - Not specified	animal	924	0	Trichinella	0
	Wolverine - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	2	2	Trichinella, unspecified sp.	2
	Wolves - wild - Natural habitat - Finland - animal sample - organ/tissue - Monitoring - passive - Official sampling - Convenient sampling	animal	90	27	Trichinella, unspecified sp.	27

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

		Outbreak strenght	Strong			Weak			
Causative agent	Food vehicle	N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Bacillus cereus	Pig meat and products thereof	1	14	0	0				
	Cereal products including rice and seeds/pulses (nuts, almonds)	1	5	0	0	1	2	0	0
Campylobacter jejuni	Milk	1	2	2	0				
	Tap water, including well water	1	22	2	0				
	Buffet meals	1	10	0	0				
Campylobacter, unspecified sp.	Mixed food	1	2	0	0				
	Buffet meals					1	16	0	0
	Unknown					1	24	0	0
Clostridium perfringens	Buffet meals	1	3	0	0	1	2	0	0
Norovirus	Crustaceans, shellfish, molluscs and products thereof	1	19	0	0				
	Vegetables and juices and other products thereof					1	53	1	0
	Drinks, including bottled water	1	24	0	0				
	Bakery products	1	70	0	0	1	33	0	0
	Mixed food	1	44	1	0	2	19	0	0
	Buffet meals	2	147	0	0	11	353	1	0
	Unknown					1	22	0	0
Salmonella	Unknown					1	3	0	0
Salmonella Enteritidis	Vegetables and juices and other products thereof	1	22	0	0				
Sapporo virus	Tap water, including well water	1	120	0	0				
Unknown	Vegetables and juices and other products thereof	2	31	0	0	1	37	0	0
	Tap water, including well water					1	8	0	0
	Other foods					1	14	0	0
	Mixed food					2	10	0	0
	Buffet meals					6	74	1	0
	Unknown					6	73	0	0
Verocytotoxigenic E. coli (VTEC)	Vegetables and juices and other products thereof	1	237	0	0				
	Unknown					1	3	1	0
Yersinia enterocolitica	Vegetables and juices and other products thereof	1	20	2	0				
	Unknown					1	4	0	0

Strong Foodborne Outbreaks: detailed data

Causative agent	Other 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 cereus	Staphylococcal enterotoxins	582	General	Pig meat and products thereof	pulled pork	Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent$Descriptive environmental evidence	Household	Household	Unknown	Cross-contamination$Inadequate chilling$Storage time/temperature abuse	N_A	1	14	0	0
	unk	586	General	Cereal products including rice and seeds/pulses (nuts, almonds)	rice for sushi	Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent$Descriptive environmental 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	N_A	1	5	0	0
Campylobacter jejuni	unk	592	General	Milk	unpasteurized milk	Descriptive epidemiological evidence$Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans$Descriptive environmental evidence	Household	Farm (not specified)	Unknown	Inadequate heat treatment$Unprocessed contaminated ingredient	N_A	1	2	2	0
		594	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental 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	Cross-contamination$Inadequate heat treatment$Unprocessed contaminated ingredient	N_A	1	10	0	0

Causative agent	Other 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
Campylobacter jejuni	unk	641	General	Tap water, including well water	N_A	Descriptive epidemiological evidence$Descriptive environmental evidence	Household	Water source	Unknown	Water treatment failure	N_A	1	22	2	0
Campylobacter, unspecified sp.	unk	598	General	Mixed food	N_A	Descriptive epidemiological evidence$Descriptive environmental 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	Cross-contamination$Other contributory factor	N_A	1	2	0	0
Clostridium perfringens	Bacillus - B. cereus	603	General	Buffet meals	N_A	Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent$Descriptive environmental evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Inadequate chilling$Storage time/temperature abuse	N_A	1	3	0	0
Norovirus	unk	528	General	Buffet meals	N_A	Descriptive epidemiological evidence$Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans$Descriptive environmental 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$Other contributory factor	N_A	1	60	0	0
		557	General	Bakery products	marzipan cake	Analytical epidemiological evidence$Descriptive epidemiological evidence	Others	Household	Finland	Infected food handler	N_A	1	70	0	0

Causative agent	Other 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
Norovirus	unk	570	General	Buffet meals	N_A	Descriptive epidemiological evidence$Detection of causative agent in food chain or its environment - Detection of indistinguishable causative agent in humans$Descriptive environmental 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	N_A	1	87	0	0
		618	General	Crustaceans, shellfish, molluscs and products thereof	oysters	Analytical epidemiological evidence$Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Farm (not specified)	Unknown	Inadequate heat treatment$Unprocessed contaminated ingredient	N_A	1	19	0	0
		620	General	Mixed food	sushi	Analytical epidemiological evidence$Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	44	1	0
		630	General	Drinks, including bottled water	ice cubes	Analytical epidemiological evidence$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	Unknown	Cross-contamination	In mid-December 2016, more than 20 people from two different companies fell ill in gastroenteritis after Christmas parties at a restaurant in the Pirkanmaa region. Also some sporadic restaurant visitors were suspected of falling ill at the same time. After analyzing the questionnaire the results showed a clear connection between ice and / or ice water and illness. Inspection visits in the restaurant showed that a possible cause was an incorrect drain valve in the space where the ice-cube machine was located.	1	24	0	0

Causative agent	Other 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
Salmonella Enteritidis	unk	631	General	Vegetables and juices and other products thereof	mung bean sprouts	Analytical epidemiological evidence$Descriptive epidemiological evidence	Household	Farm (not specified)	Unknown	Inadequate heat treatment$Unprocessed contaminated ingredient	In March-May 2016, approximately 20 people in the Pirkanmaa region were infected with a genetically identical strain of Salmonella Enteritidis. Sprouts sprouted from a particular batch of mung beans were suspected as a possible source of infection based on patient interviews and trace back investigations. Several samples of the batch of mung beans in question were analyzed (beans were sprouted in the laboratory and both sprouts and water was analyzed but all samples were negative for salmonella. The use of the batch was prohibited while the analyses were ongoing but were released after negative results at the end of May. In the summer, the same strain of salmonella was detected in two more ill patients. Preliminary results of a case-control study showed sprouts as a very likely source of infection. In August, Evira instructed importers to withdraw the batch of mung beans and made a RASFF notification. Mung beans in the batch in question were of Chinese origin and had come to the Finnish entrepreneurs via a Dutch entrepreneur. In Finland, beans from the batch had been delivered to various wholesalers and sprouting establishments. Beans were also marketed in consumer packages in grocery stores and health food stores in different parts of the country. Most salmonella cases have been linked to a sprout producer in the Pirkanmaa region. Probably, salmonella has occurred at low levels and unevenly distributed in the bean batch, which can explain why only people from one region of the country became ill and why sample results were negative.	1	22	0	0
Sapporo virus	unk	637	General	Tap water, including well water	N_A	Analytical epidemiological evidence$Descriptive epidemiological evidence$Descriptive environmental evidence	Household	Water distribution system	Unknown	Other contributory factor	In October 2016, over 100 people in central Finland suffered from gastroenteritis in a waterborne outbreak. The water pipeline had broken and coliforms was found in the drinking water. The public was instructed to boil the drinking water. In patient samples, sapovirus, norovirus and Dientamoeba fragilis were found. In the water samples, sapovirus was detected. Only after two months the intensive chlorination and boiling of the drinking water ended.	1	120	0	0

Causative agent	Other 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
Unknown	unk	519	General	Vegetables and juices and other products thereof	raw grated beetroot	Analytical epidemiological evidence$Descriptive epidemiological evidence$Descriptive environmental evidence	School or kindergarten	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Finland	Inadequate heat treatment$Unprocessed contaminated ingredient	Symptoms occurred almost immediately, within 15 minutes to 1 hour, after eating raw grated beetroot in salad. The most common symptoms were vomiting, nausea and abdominal pain.	1	16	0	0
		621	General	Vegetables and juices and other products thereof	raw grated beetroot	Analytical epidemiological evidence$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	Unknown	Inadequate heat treatment$Unprocessed contaminated ingredient	Symptoms occurred almost immediately, the first in 15 minutes, after eating raw grated beetroot. The most common symptoms were nausea and abdominal pain.	1	15	0	0

Causative agent	Other 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
Verocytotoxigenic E. coli (VTEC)	Escherichia coli, pathogenic - Enteropathogenic E. coli (EPEC)	638	General	Vegetables and juices and other products thereof	rucola	Analytical epidemiological evidence$Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans$Product-tracing investigations	Multiple places of exposure in one country	Farm (not specified)	Denmark	Unprocessed contaminated ingredient	Over 200 persons fell ill in a gastrointestinal outbreak in southern Finland. No one needed hospital care. All the ill people had eaten at 11 various events organized during a weekend in August 2016 and where the food was from one catering company operating in the metropolitan area. The contact persons for the events in question were contacted and they sent instructions to everyone who participated in the events to apply for healthcare in case of symptoms that indicate gastric disease. There were over 30 EHEC positive findings (with PCR method) and over 50 EPEC positive findings from patients. Both EHEC and EPEC strains have been demonstrated also in food samples. Rucola of foreign origin was suspected to be the source of infection on the basis of interviews with catering company staff (food lists), trace-back investigations and microbiological analyzes. Fresh rucola had been included in a chicken dish both marinated and as decoration as well as in a meat dish as decoration. The rucola had been sold in wholesale packages in different parts of Finland. The results from the cohort study concluded that food with rucola was associated with the gastroenteritis, RR 2.19 (95% CI 1.50-3.22, p<0.000).	1	237	0	0
Yersinia enterocolitica	unk	585	General	Vegetables and juices and other products thereof	N_A	Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Detection of indistinguishable causative agent in humans	Canteen or workplace catering	Unknown	Unknown	Unknown	N_A	1	20	2	0

Weak Foodborne Outbreaks: detailed data

Causative agent	Other 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 cereus	unk	549	General	Cereal products including rice and seeds/pulses (nuts, almonds)	pasta salad	Descriptive epidemiological evidence$Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent$Descriptive environmental 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	N_A	1	2	0	0
Campylobacter, unspecified sp.	unk	548	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	24	0	0
		588	General	Buffet meals	N_A	Analytical epidemiological evidence$Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	16	0	0
Clostridium perfringens	unk	509	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental 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$Storage time/temperature abuse	N_A	1	2	0	0
Norovirus	unk	523	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	14	0	0
		526	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	35	0	0

Causative agent	Other 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
Norovirus	unk	537	General	Buffet meals	N_A	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	N_A	1	27	1	0
		542	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	36	0	0
		545	General	Unknown	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	22	0	0
		546	General	Buffet meals	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Residential institution (nursing home or prison or boarding school) (not specified)	Unknown	Infected food handler	N_A	1	20	0	0
		547	General	Mixed food	N_A	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	N_A	1	10	0	0
		567	General	Mixed food	N_A	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	N_A	1	9	0	0
		568	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	40	0	0

Causative agent	Other 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
Norovirus	unk	593	General	Vegetables and juices and other products thereof	sliced vegetables	Descriptive epidemiological evidence	School or kindergarten	Unknown	Unknown	Unknown	N_A	1	53	1	0
		614	General	Buffet meals	N_A	Analytical epidemiological evidence$Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	13	0	0
		615	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	28	0	0
		616	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	25	0	0
		619	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Infected food handler	N_A	1	100	0	0
		625	General	Bakery products	N_A	Descriptive epidemiological evidence	Others	Household	Unknown	Infected food handler	N_A	1	33	0	0
		632	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental 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	N_A	1	15	0	0
Salmonella	unk	551	General	Unknown	N_A	Descriptive epidemiological evidence	Household	Unknown	Unknown	Unknown	N_A	1	3	0	0

Causative agent	Other 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
Unknown	unk	530	General	Other foods	sauce/gravy	Descriptive epidemiological evidence$Descriptive environmental evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Inadequate chilling$Inadequate heat treatment$Storage time/temperature abuse	N_A	1	14	0	0
		540	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	16	0	0
		553	General	Mixed food	kebab meal	Descriptive epidemiological evidence$Descriptive environmental evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	5	0	0
		555	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Storage time/temperature abuse	N_A	1	15	0	0
		558	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental 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	N_A	1	13	0	0
		559	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	5	0	0
		566	General	Unknown	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	15	0	0

Causative agent	Other 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
Unknown	unk	571	General	Buffet meals	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Unknown	Unknown	Unknown	N_A	1	11	0	0
		573	General	Unknown	N_A	Descriptive epidemiological evidence	Residential institution (nursing home or prison or boarding school)	Unknown	Unknown	Unknown	N_A	1	18	0	0
		587	General	Tap water, including well water	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	8	0	0
		589	General	Buffet meals	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	4	0	0
		590	General	Vegetables and juices and other products thereof	raw grated beetroot	Descriptive epidemiological evidence$Descriptive environmental evidence	School or kindergarten	School or kindergarten	Unknown	Inadequate heat treatment$Unprocessed contaminated ingredient	Symptoms occurred almost immediately, within 20 minutes to 1 hour, after eating raw grated beetroot. The most common symptoms were nausea and abdominal pain.	1	37	0	0
		591	General	Buffet meals	N_A	Descriptive epidemiological evidence$Descriptive environmental 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	N_A	1	16	1	0
		595	General	Unknown	N_A	Descriptive epidemiological evidence	Catering on aircraft or ship or train	Unknown	Unknown	Unknown	N_A	1	7	0	0
		604	General	Unknown	N_A	Descriptive epidemiological evidence	Unknown	Unknown	Unknown	Unknown	N_A	1	12	0	0

Causative agent	Other 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
Unknown	unk	613	General	Mixed food	N_A	Descriptive epidemiological evidence	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Unknown	Unknown	Unknown	N_A	1	5	0	0
		633	General	Buffet meals	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	15	0	0
Verocytotoxigenic E. coli (VTEC)	unk	639	General	Unknown	N_A	Descriptive epidemiological evidence	Unknown	Unknown	Unknown	Unknown	N_A	1	3	1	0
Yersinia enterocolitica	unk	580	General	Unknown	N_A	Descriptive epidemiological evidence	Others	Unknown	Unknown	Unknown	N_A	1	4	0	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter jejuni in Gallus gallus (fowl) - broilers

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)

Country of Origin: Finland

Sampling details: sampling in January-May and November-December

	AM substance	Ciprofloxacin	Erythromycin (Erythromycin A)	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**32**	**64**
	N of tested isolates	**5**	**5**	**5**	**5**	**5**	**5**
MIC	**N of resistant isolates**	**3**	**0**	**0**	**4**	**0**	**3**
<=0.12		1		1			
<=0.25						1	
0.25				1			
<=0.5							2
0.5		1		2			
<=1			5		1		
1				1		3	
2						1	
16							1
>16		3					
32					1		
>64					3		2

Table Antimicrobial susceptibility testing of Campylobacter jejuni in Gallus gallus (fowl) - broilers

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)

Country of Origin: Finland

Sampling details: sampling in June-October

	AM substance	Ciprofloxacin	Erythromycin (Erythromycin A)	Gentamicin	Nalidixic acid	Streptomycin	Tetracycline
	ECOFF	**0.5**	**4**	**2**	**16**	**4**	**1**
	Lowest limit	**0.12**	**1**	**0.12**	**1**	**0.25**	**0.5**
	Highest limit	**16**	**128**	**16**	**64**	**32**	**64**
	N of tested isolates	**78**	**78**	**78**	**78**	**78**	**78**
MIC	**N of resistant isolates**	**4**	**0**	**0**	**8**	**1**	**2**
<=0.12		64		5			
<=0.25						1	
0.25		7		32			
<=0.5							75
0.5		3		40		8	
<=1			78				
1				1		53	1
2					5	14	
4		1			59	1	
8		3			6		1
16							1
32						1	
64					2		
>64					6		

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella Derby in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: also S. Konstanz was found in the same herd

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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						
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
64												1			

Table Antimicrobial susceptibility testing of Salmonella Derby in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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
<=0.5					1				1						
0.5														1	
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
16												1			

Table Antimicrobial susceptibility testing of Salmonella Enteritidis 1 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
<=0.03										1					
<=0.25				1										1	1
0.25							1								
<=0.5					1				1						
<=1		1													
<=2													1		
2								1							
4			1												
<=8						1									
16												1			
>128											1				

Table Antimicrobial susceptibility testing of Salmonella Enteritidis 1 in Gallus gallus (fowl) - laying hens

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: Small holding outside the scope of regulation 2160/2003, selling eggs only directly to final consumers

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
<=0.03										1					
<=0.25				1										1	1
0.25							1								
<=0.5					1				1						
<=2													1		
2		1						1							
4			1												
<=8						1									
16												1			
>128											1				

Table Antimicrobial susceptibility testing of Salmonella Enteritidis PT 33 in Cattle (bovine animals) - unspecified

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										3					
0.03							3								
<=0.25				3										3	3
<=0.5					3				3						
<=1								3							
<=2													3		
2		3													
<=4											3				
4			3												
<=8						3									
16												3			

Table Antimicrobial susceptibility testing of Salmonella Hessarek in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Konstanz in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: also S. Derby was found in the same herd

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1		1													
<=2													1		
2								1							
<=4											1				
<=8						1									
16			1									1			

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Pigs - breeding animals

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.015							2								
<=0.03										2					
<=0.25				2										2	2
<=0.5					2				2						
<=1		2						2							
<=2													2		
<=4											2				
<=8						2									
8			2												
16												2			

Table Antimicrobial susceptibility testing of Salmonella Mbandaka in Pigs - unspecified

Sampling Stage: Farm

Sampling Type: environmental sample

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Suspect sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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						
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
16												1			

Table Antimicrobial susceptibility testing of Salmonella Poona in Turkeys - fattening flocks

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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						
<=1		1						1							
<=2													1		
<=4											1				
<=8						1									
8			1												
16												1			

Table Antimicrobial susceptibility testing of Salmonella Tennessee in Gallus gallus (fowl) - broilers

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.064							1								
<=0.5					1				1						
0.5				1											1
<=1								1							
1														1	
4		1													
8											1		1		
16			1												
32						1									
128												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1				1						
<=1								1							
1														1	
4		1													
8											1		1		
16			1			1									
64												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 41 in Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks

Sampling Stage: Farm

Sampling Type: environmental sample - delivery box liner

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: European Union

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	16	0.5	2	16	0.064	2	2	0.125	16	256	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										2					
0.03							2								
<=0.25				2										2	2
<=0.5					2				1						
<=1		2						2							
1									1						
<=2													2		
<=4											2				
4			2												
<=8						2									
16												2			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 41 in Gallus gallus (fowl) - parent breeding flocks for egg production line - adult

Sampling Stage: Farm

Sampling Type: environmental sample - dust

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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
<=0.5					1										
0.5														1	
<=1		1						1							
1									1						
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT 41 in Gallus gallus (fowl) - parent breeding flocks for egg production line - adult

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										1					
0.03							1								
<=0.25				1											1
<=0.5					1										
0.5														1	
<=1		1						1							
1									1						
<=2													1		
<=4											1				
<=8						1									
8			1												
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium DT RDNC in Pigs - breeding animals

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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
<=0.5					1										
0.5				1											
<=1		1						1							
1									1						
<=2													1		
<=4											1				
<=8						1									
8			1												
16												1			

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**
MIC	**N of resistant isolates**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
<=0.03										2					
0.03							2								
<=0.25				2										2	1
<=0.5					2				2						
0.5															1
<=1		1						1							
<=2													2		
2		1						1							
<=4											2				
4			1												
<=8						2									
8			1												
16												2			

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - lymph nodes

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.5**	**2**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**256**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**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						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

Table Antimicrobial susceptibility testing of Salmonella Typhimurium U 277 in Cattle (bovine animals) - unspecified

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Monitoring

Sampler: Industry sampling

Sampling Strategy: Not specified

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	8	16	0.5	2	16	0.064	2	2	0.125	16	256	8	1	2
	Lowest limit	1	2	0.25	0.5	8	0.015	1	0.5	0.03	4	8	2	0.25	0.25
	Highest limit	64	64	4	8	128	8	16	32	16	128	1024	64	8	32
	N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MIC	N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03										1					
0.03							1								
<=0.25				1										1	1
<=0.5					1				1						
<=1		1						1							
<=2													1		
<=4											1				
4			1												
<=8						1									
32												1			

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: 309 meat samples originated from Finland

AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
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	0.125	0.25	0.25	8	0.5	0.5	0.06	0.5	0.125	32
Lowest limit	0.064	0.25	0.064	0.5	0.25	0.12	0.015	0.12	0.03	0.5
Highest limit	32	64	64	64	128	128	2	16	16	128
N of tested isolates	67	67	67	67	67	67	67	67	67	67
N of resistant isolates	54	67	52	52	67	52	2	0	0	0
MIC										
<=0.015							21			
<=0.03									64	
0.03							29			
<=0.064	4		14							
0.064							15		2	
<=0.12						10		23		
0.12	9		1				2		1	
0.25	37					5		42		
0.5	2							2		
1					2					
2			2		12	4				16

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	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	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**
MIC	**N of resistant isolates**	**54**	**67**	**52**	**52**	**67**	**52**	**2**	**0**	**0**	**0**
4		1	5	33	10	8	26				12
8		3	41	16	5	36	22				34
16		3	6	1		9					5
32		6	5		8						
>32		2									
64			9		35						
>64			1		9						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Meat from broilers (Gallus gallus) - fresh

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: 309 meat samples originated from Finland

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**
MIC	**N of resistant isolates**	**67**	**0**	**67**	**67**	**0**	**14**	**0**	**13**	**0**	**13**	**26**	**14**	**0**	**5**
<=0.015							48								
<=0.03										67					
0.03							4								
0.064							1								
<=0.25														57	48
0.25							2								
<=0.5									45						
0.5							7							10	14
<=1								67							
1					2		5		8						
<=2			11										53		
2				1	11				1						
<=4											54				
4			48	8	5										
>4				58											
<=8						67						21			
8			8		25										
>8					24										
16									6			19			
32									7			1			
>32															5

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**	**67**
MIC	**N of resistant isolates**	**67**	**0**	**67**	**67**	**0**	**14**	**0**	**13**	**0**	**13**	**26**	**14**	**0**	**5**
64		2											6		
>64		65											8		
128											4				
>128											9				
>1024												26			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	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	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
MIC	**N of resistant isolates**	**0**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**0**
<=0.015								1			
<=0.03										1	
0.12		1									
0.25									1		
1				1							
2			1				1				
4						1					
8											1
16					1						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

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 Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**
MIC	**N of resistant isolates**	**16**	**0**	**1**	**1**	**0**	**7**	**0**	**0**	**0**	**6**	**10**	**18**	**0**	**7**
<=0.015							170								
<=0.03										184					
0.03							6								
0.064							1								
0.12							1								
<=0.25				183										156	90
0.25							5								
<=0.5					183				114						
0.5							1							28	65
<=1		5						183							
1									68						19
<=2			4										156		
2		80		1				1	2						3
<=4											178				
4		80	87		1								10		
<=8						180						87			
8		3	86												
16			7			4						81			
32											1	4			
>32															7
64											2	2	5		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**	**184**
MIC	**N of resistant isolates**	**16**	**0**	**1**	**1**	**0**	**7**	**0**	**0**	**0**	**6**	**10**	**18**	**0**	**7**
>64		16											13		
128											2				
>128											1				
>1024												10			

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	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	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**
MIC	**N of resistant isolates**	**34**	**44**	**33**	**34**	**44**	**33**	**1**	**0**	**0**	**0**
<=0.015								14			
<=0.03										44	
0.03								24			
<=0.064				9							
0.064								5			
<=0.12							7		24		
0.12		10		2				1			
0.25		23					4		19		
0.5									1		
2				1		9	1				10
4			3	21	4	2	20				14
8		2	27	10	6	25	12				18
16		5	3	1		8					2
32		2	1		4						

	AM substance	Cefepime	Cefotaxim	Cefotaxime + Clavulanic acid	Cefoxitin	Ceftazidim	Ceftazidime + Clavulanic acid	Ertapenem	Imipenem	Meropenem	Temocillin
	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	**0.125**	**0.25**	**0.25**	**8**	**0.5**	**0.5**	**0.06**	**0.5**	**0.125**	**32**
	Lowest limit	**0.064**	**0.25**	**0.064**	**0.5**	**0.25**	**0.12**	**0.015**	**0.12**	**0.03**	**0.5**
	Highest limit	**32**	**64**	**64**	**64**	**128**	**128**	**2**	**16**	**16**	**128**
	N of tested isolates	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**
MIC	**N of resistant isolates**	**34**	**44**	**33**	**34**	**44**	**33**	**1**	**0**	**0**	**0**
>32		2									
64			10		23						
>64					7						

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Gallus gallus (fowl) - broilers

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring - EFSA specifications

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin: Finland

Sampling Details: N_A

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**
MIC	**N of resistant isolates**	**44**	**0**	**44**	**44**	**0**	**12**	**0**	**10**	**0**	**12**	**19**	**11**	**0**	**1**
<=0.015							27								
<=0.03										44					
0.03							5								
<=0.25														42	25
0.25							2								
<=0.5									23						
0.5							9							2	18
<=1								44							
1					1		1		11						
<=2			4										30		
2					7										
<=4											32				
4			25	3	5								3		
>4				41											
<=8						44						10			
8			14		22										
>8					9										
16			1						5			14			
32									5			1			
>32															1
64													3		

	AM substance	Ampicillin	Azithromycin	Cefotaxim	Ceftazidim	Chloramphenicol	Ciprofloxacin	Colistin	Gentamicin	Meropenem	Nalidixic acid	Sulfamethoxazole	Tetracycline	Tigecycline	Trimethoprim
	ECOFF	**8**	**16**	**0.25**	**0.5**	**16**	**0.064**	**2**	**2**	**0.125**	**16**	**64**	**8**	**1**	**2**
	Lowest limit	**1**	**2**	**0.25**	**0.5**	**8**	**0.015**	**1**	**0.5**	**0.03**	**4**	**8**	**2**	**0.25**	**0.25**
	Highest limit	**64**	**64**	**4**	**8**	**128**	**8**	**16**	**32**	**16**	**128**	**1024**	**64**	**8**	**32**
	N of tested isolates	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**	**44**
MIC	**N of resistant isolates**	**44**	**0**	**44**	**44**	**0**	**12**	**0**	**10**	**0**	**12**	**19**	**11**	**0**	**1**
>64		44											8		
128											7				
>128											5				
256												1			
>1024												18			

OTHER ANTIMICROBIAL RESISTANCE TABLES

Specific monitoring of ESBL-/AmpC-/carbapenemase-producing bacteria and specific monitoring of carbapenemase-producing bacteria, in the absence of isolate detected

Programme Code	Matrix Detailed	Zoonotic Agent Detailed	Sampling Strategy	Sampling Stage	Sampling Details	Sampling Context	Sampler	Sample Type	Sampling Unit Type	Sample Origin	Comment	Total Units Tested	Total Units Positive
CARBAMON	Gallus gallus (fowl) - broilers	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Slaughterhouse	N_A	Monitoring - EFSA specifications	Official sampling	animal sample - caecum	herd/flock	Finland	N_A	306	0
	Meat from broilers (Gallus gallus) - fresh	Escherichia coli, non-pathogenic, unspecified	Objective sampling	Retail	N_A	Monitoring - EFSA specifications	Official sampling	food sample - meat	batch (food/feed)	Finland	N_A	309	0

European Food Safety Authority

Latest Transmission set

Table Name	Last submitted dataset transmission date
Antimicrobial Resistance	17-Jan-2018
Animal Population	06-Jul-2017
Disease Status	06-Jul-2017
Food Borne Outbreaks	06-Jul-2017
Prevalence	06-Jul-2017
Text Forms	02-Jun-2017