

Iceland

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

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

IN 2014

PREFACE

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

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

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

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

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

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

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

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1 ANIMAL POPULATIONS

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

1.1.1 Information on susceptible animal population

Sources of information

Due to the circumstances (strike, vacation) it was not possible to collect more recent information for animal population. Therefore the information was copied from the previous year, 2013. Information is estimated from the livestock database BUSTOFN where all animals and animal owners are registered. The Icelandic Food and Veterinary Authority (MAST) is responsible for the database. Information regarding slaughtered animals comes from the register of slaughtered animals which is hosted at the Farmers Association. Information for number of poultry for meat production comes from the Veterinary Officer for Poultry diseases.

Dates the figures relate to and the content of the figures

The figures for livestock and herds relate to the year 2013 (31.12.2013). As not all the animal groups mentioned exist in Iceland there are no figures on some animal groups in the report. For Poultry the number of flocks is cumulative for the year 2013.

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

Herd means an animal or group of animals kept on a holding as an epidemiological unit. In Iceland, there is generally only one herd of the same animal species except for poultry.

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

When evaluating the number of susceptible populations the figures are relatively accurate, considering that these figures have been confirmed during annual on the spot controls last years for all herds. Livestock officers are responsible for confirming the accuracy of the figures for each animal owner. There has been a change from a general downward trend in the figures for dairy cows toward a increased number of dairy cows, there are fewer holdings but at the same time each holding is getting bigger. Population numbers for sheep and horses have been stable for the past decade.

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

All existing animal groups in Iceland are relatively evenly spread around the agricultural lowland areas. There are no herds or holdings in the highlands, which cover over 80 % of the island. In the summer, from June to September, the flocks of sheep and herds of horses are grazing in the highlands.

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

No regular monitoring but sporadic monitoring from 1923 until 1971 was negative and there are no positive findings in slaughterhouses. Mycobacterium bovis is almost unknown in Iceland. The only clinical sample in cattle was in 1922

2.1.2 Mycobacterium in animals

2.1.2.1 M. bovis in animal - Deer - farmed

Monitoring system

Sampling strategy

No deer in the country

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

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

The entire country is free.

Monitoring system

Sampling strategy

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

Brucella abortus has never been found in Iceland

2.2.2 Brucella in animals

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

Status as officially free of bovine brucellosis during the reporting year

The entire country free

yes

Monitoring system

Sampling strategy

Blood samples from 5 cows in 15 herds

Frequency of the sampling

Every year

Type of specimen taken

Serum

Diagnostic/analytical methods used

Brucella abortus (agg) antibody examination by agglutination

Control program/mechanisms

The control program/strategies in place

Annual serological surveillance of dairy cow herds, and annually are taken 80 samples. Randomly selection of 15 herds, from each herd 5 blood samples are taken.

Measures in case of the positive findings or single cases

Stamping out

Notification system in place

Brucellosis in animals is notifiable

Results of the investigation

No positive samples were found.

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

Neither *Brucella abortus* nor other *Brucella* spp. has never been detected in Iceland.

2.2.2.2 *B. melitensis* in animal - Goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Yes

2.2.2.3 *B. melitensis* in animal - Sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Yes

Monitoring system

Sampling strategy

Blood samples taken from rams in a semen station, from whom semen is exported to the USA.

Frequency of the sampling

Annually.

Type of specimen taken

Blood samples.

Methods of sampling (description of sampling techniques)

Case definition

A sample positive in serology for *Brucella melitensis*.

Diagnostic/analytical methods used

Brucella melitensis antibody examination by agglutination

Measures in case of the positive findings or single cases

Stamping out

Notification system in place

Brucella melitensis in animals is a notifiable disease.

Results of the investigation

No positive samples were found.

3 INFORMATION ON SPECIFIC ZONOSSES AND ZONOTIC AGENTS

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

3.1 SALMONELLOSIS

3.1.1 General evaluation of the national situation

3.1.1.1 Salmonella - general evaluation

History of the disease and/or infection in the country

Salmonella is endemic in the pig production but prevalence of Salmonella on pig carcasses has been low since 2007 (0,5 - 2,7%) except for the year 2009 where the prevalence rose to 11,2%. The situation regarding Salmonella in the poultry meat production has been very good, with prevalence under 1% in poultry flocks for many years and 0% prevalence for three consecutive years (2005 - 2007). In 2009 - 2014, however, an increase in positive broiler flocks was seen. Salmonella in breeding flocks (*Gallus gallus*) has only been once been confirmed in the last decade, in 2013 (*S. Agona*). The same applies to flocks of laying hens, salmonella has only been confirmed once, in 2010 (*S. Rissen*). Salmonella infections in sheep holdings have not been investigated but clinical outbreaks have sporadically occurred. A study in 2010 on Salmonella in bovine animals revealed very low prevalence (<0,5%) with no samples positive. As for sheep, sporadic clinical cases and outbreaks of Salmonella have occurred in horses. Spread of Salmonella into the pig production has likely occurred by raw feed materials. PFGE investigations indicate that Salmonella Worthington has spread into poultry production with compound feed.

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

Permanent contamination in broiler premises seem to be the main cause for maintaining the prevalence in the broiler flocks at approximately 1 - 2%.

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

Because of very strict control programmes for reducing salmonella in the pig and poultry production and low numbers of human cases of salmonellosis, domestic food products of animal origin are considered to represent a small risk to the consumer in regard to Salmonella. This assumption is supported by the experience in 2009 and 2010 where the prevalence of Salmonella in pig and poultry meat production rose significantly but where the prevalence of human cases of salmonellosis did not alter in the same direction. Instead the opposite development was observed. Because of changes (see recent actions) in the feed production in 2010 spread of Salmonella seems not to be as important as before.

Recent actions taken to control the zoonoses

Heat treatment of raw soya material (2010) before shipment to pig holdings and replacing an old feed mill (2010) with a new one with excellent bio security are two major factors that have contributed to less spread of Salmonella by feed.

3.1.2 Salmonella in foodstuffs

3.1.2.1 Salmonella spp. in food - Meat from bovine animals

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

No official sampling. Sampling according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At meat processing plant

No official sampling. Sampling according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At retail

No official sampling.

Frequency of the sampling

At slaughterhouse and cutting plant

The frequency of sampling by FBO is proportional to the slaughterhouse's throughput. Slaughtering of beef and horses. >10.000 carcasses / year; 5 samples every second week. 2000- 10000 carcasses; /year 5 samples per month. 500-2000 carcasses / month 5 samples 4 times a year. < 500 carcasses no sampling if GHP can be demonstrated. Slaughtering of lamb / sheep. > 100.000 carcasses / slaughtering periode of 6- 8 weeks; 5 samples 5 times during the periode. 50.000- 100.000 carcasses / slaughtering periode of 6- 8 weeks; 5 samples 4 times during the periode. 10.000- 50.000 carcasses / slaughtering periode of 6- 8 weeks; 5 samples 2 times during the periode. < 10.000 no sampling if GHP can be demonstrated.

At meat processing plant

The frequency of sampling of minced meat and meat preparation by the FBO is according to the production capacity per week. More than 3 tons / week; 5 samples per week. 1 - 3 tons per week; 5 samples every second week. 500 kg - 1 ton; 5 samples 4 times per year. Frequency can be reduced when results have been negative for 30 weeks. Processing plants producing less the 500 kg / week does not need to take samples if they can demonstrate good hygiene practices (GHP).

At retail

The local health authorities (LHA) are responsible for sampling at retail. No official sampling 2014

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

At meat processing plant

Each sample is 25 g of minced meat or meat preparations.

At retail

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

According to MAST guidance the slaughterhouses should swab the carcass before chilling in four designated areas with a sponge. Each area 10 x 10 cm; total 400 cm². Swabs of 5 carcasses can be pooled to one sample.

At meat processing plant

Each sample is 25 g of minced meat or meat preparations. Samples can be pooled into one sample (225 g)

Definition of positive finding

At slaughterhouse and cutting plant

Sample is considered to be positive when salmonella spp. is detected.

At meat processing plant

Sample is considered to be positive when salmonella spp. is detected.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

NMKL No 71:1999, 5th edition

At meat processing plant

NMKL No 71:1999, 5th edition

Preventive measures in place

HACCP activities are verified under official control of FBO.

Measures in case of the positive findings or single cases

Meat should be withdrawn from the market.

Notification system in place

Laboratories as well as the FBO analysing salmonella should notify any detection of Salmonella to MAST. Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993 and according to the national Food Law No. 93/1995. The Competent Authority, MAST, receives all positive results from the respective laboratories regarding Salmonella testing (including serotyping and antimicrobial resistance) on samples from FBO own checks in slaughterhouses, cutting plants and processing plants.

Results of the investigation

The results from the FBO own checks are not available. There is no indication that Salmonella is a problem in bovine meat production. Salmonella has not been notified by FBO to MAST the competent authority.

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

Detection of salmonella in minced meat and meat preparation (bovine meat) was not notified to MAST 2013

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

Salmonella on bovine carcasses seems not to be a major source for human infections.

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

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The FBOs are sampling each slaughter batch

At meat processing plant

No official sampling. Sampling according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At retail

The local competent authorities (LCA) are responsible for sampling at retail. Survey organised by MAST. Samples of poultry produced in EU countries (intra EU trade) taken by LCAs

Frequency of the sampling

At slaughterhouse and cutting plant

Each broiler slaughter batch is sampled

At meat processing plant

The frequency of sampling of minced meat and meat preparation by the FBO is according to the production capacity per week. More than 3 tons / week; 5 samples per week. 1 - 3 tons per week; 5 samples every second week. 500 kg - 1 ton; 5 samples 4 times per year. Frequency can be reduced when results have been negative for 30 weeks. Processing plants producing less than 500 kg / week does not need to take samples if they can demonstrate good hygiene practices.

At retail

Depend on the survey. MAST Survey. 115 samples from 100 batches of raw poultry meat and products thereof collected and analysed (Broiler 86 samples, duck 13 samples, turkey 12 samples, geese 4 samples)

Type of specimen taken

At slaughterhouse and cutting plant

Neck skin

At meat processing plant

Minced meat and meat preparation

At retail

Packed poultry meat and products thereof. One sample from a batch.

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

From each slaughter batch, 50 neck skin samples, each sample consisting of 2-3g, are pooled into one sample. At the laboratory, a subsample of 25g is taken for further culturing.

At meat processing plant

Each sample is 25 g of minced meat or meat preparations.

At retail

Packed products For Mast survey: Whole poultry or pieces of poultry were washed in 225 ml of buffered peptone water.

Definition of positive finding

At slaughterhouse and cutting plant

A sample positive for Salmonella spp.

At meat processing plant

Sample is considered to be positive when salmonella spp. is detected.

At retail

Sample is considered to be positive when salmonella spp. is detected.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: NMKL No 71:1999, 5th edition

At meat processing plant

NMKL 71, 5th ed., 1999

At retail

NMKL 71, 5th ed., 1999 ISO 6579:2002 Wellcolex- serogroup identification

Preventive measures in place

All broiler flocks are sampled before slaughter and salmonella positive flocks are destroyed since it is prohibited to distribute meat from positive flocks. Haccp activities are verified during official control of FBO. According to national legislation there is a warning note on each package containing raw poultry meat. This note recommends the consumer to prevent cross contamination when handling raw poultry meat.

Control program/mechanisms

The control program/strategies in place

As described before

Recent actions taken to control the zoonoses

Measures in case of the positive findings or single cases

When salmonella is detected in a slaughter batch or in a product, the batch is withdrawn from the market.

Notification system in place

The FBO and the laboratory have to report a detection of salmonella spp. immediately to MAST.

Results of the investigation

For Mast Survey: Of 115 samples one sample of duck were positive for Salmonella indiana

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

There are no changes in prevalence of salmonella in slaughter batches.

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

3.1.2.3 Salmonella spp. in food - Meat from pig

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The information needed is whether carcasses are contaminated with Salmonella or not. Therefore are all slaughter batches from all holdings tested for Salmonella. The sampling is a part of permanent control programme and is objective, official and performed by the CA (MAST). Samples are taken from carcasses after cooling where the number of samples depend on the size of the slaughter batch.

At meat processing plant

Sampling according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At retail

The local health authorities (LHA) are responsible for sampling at retail.

Frequency of the sampling

At slaughterhouse and cutting plant

Every herd is sampled at each slaughter. From every herd ten randomly chosen carcasses from the slaughter batch are swabbed if 40 or fewer pigs are slaughtered, twenty carcasses are swabbed if 41 - 120 pigs are slaughtered and thirty carcasses are swabbed if more than 120 pigs are slaughtered. By this number of samples it can be declared by 95% confidence level that at least one positive sample will be detected in the batch if the prevalence in the batch is 10-15% or higher.

At meat processing plant

The frequency of sampling of minced meat and meat preparation by the FBO is according to the production capacity per week. More than 3 tons / week; 5 samples per week. 1 - 3 tons per week; 5 samples every second week. 500 kg - 1 ton; 5 samples 4 times per year. Frequency can be reduced when results have been negative for 30 weeks. Processing plants producing less the 500 kg / week does not need to take samples if they can demonstrate good hygiene practices.

At retail

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcasses

At meat processing plant

Minced meat and meat preparation

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

At slaughtering, the pig carcasses are split into two parts along the vertebrate. After cooling both carcass parts are swabbed in three designated areas. One cotton swab is used for both carcass parts. Two of the three areas on each part cover approx. 10 x 10 cm. The third area covers approx. 100 cm². The three different areas on each side of the carcass cover the following sites: Area I: Anus region, inside of the thigh and the pelvis region Area II: The cut surface of the breast and abdomen, underbelly Area III: Inside the cranial part of thorax and the adjacent transected bones/ribs Swabs from 10 carcasses are pooled together in one sample.

At meat processing plant

Definition of positive finding

At slaughterhouse and cutting plant

The swabs tests are RapidChek. A positive test according to the protocol for the test and before confirmation by culturing, is regarded as positive for Salmonella. Confirmation by culturing is not needed, but at least one swab from each slaughter batch is serotyped and tested for antimicrobial resistance. If a positive RapidChek test is negative by bacteriological culturing, the result has no influence on actions already taken regarding next slaughter from the respective herd.

At meat processing plant

Sample is considered to be positive when salmonella spp. is detected.

At retail

Sample is considered to be positive when salmonella spp. is detected.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

RapidChek Select Salmonella. Bacteriological method: NMKL 187:2007 Bacteriological method: NMKL 71:1999

Preventive measures in place

Sanitary slaughtering is performed when slaughtering from herds that are categorised as level 3 herds. For further information about categorizing into levels see chapter Salmonella spp. in pigs (meat juice index) Haccp activities are verified under official control of FBO.

Control program/mechanisms

The control program/strategies in place

The mandatory national control programme for Salmonella in pigs is approved by the Competent Authority, MAST. The aim of the programme is to prevent salmonella in pork and thereby mitigate the risk of human salmonellosis. The surveillance programme is constructed to monitor salmonella infections at farm level by measuring antibodies against Salmonella in meat juice test and to survey salmonella contamination on pig carcasses at slaughtering. Salmonella serotypes are also tested for antimicrobial resistance.

Measures in case of the positive findings or single cases

Finding one positive sample from a level 1 herd initiates reactions. In case of a positive sample all carcasses from the respective herd must be swabbed at next slaughter and quarantined whilst waiting for the results from the swab test. All positive carcasses must be heat treated before entering the market. All carcasses from level 2 and 3 herds are swabbed (and swabs from 5 carcasses are pooled together in one sample) and quarantined at the slaughterhouse and cannot enter the market unless swabs are negative. Carcasses positive for Salmonella must be heat treated. When salmonella is detected in a product, the product is withdrawn from the market.

Notification system in place

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993 and according to the national Food Law No. 93/1995. The Competent Authority, MAST, receives all results from the respective laboratories regarding Salmonella testing (including serotyping and antimicrobial resistance) on samples from pig production, slaughtering and from FBO own checks in slaughterhouses, cutting plants and processing plants.

Results of the investigation

Swabs taken at the slaughterhouses were 0,5% positive for Salmonella. In swab samples Salmonella Brandenburg, Salmonella Typhimurium, Salmonella London and Salmonella spp. were found. Results from the FBOs own checks according to 2073/2005 are not available.

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

The prevalence for Salmonella positive swab samples was 1,1%, 0,5%, 1,4% in 2006, 2007 and 2008. The prevalence rose to 11,2% in 2009 but declined in the two consecutive years i.e. in 2011, 2012, 2013 and 2014 to 1,3%, 0,3%, 0,9% and 0,5% respectively.

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

Salmonella on pig carcasses seems not to be a major source for human infections.

3.1.2.4 Salmonella spp. in food - Meat from turkey

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

The FBOs are sampling each slaughter batch. Sampling at cutting plant according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At meat processing plant

No official sampling. Sampling according to 2073/2005 by FBO is verified under the regular official control of the FBO.

At retail

The local competent authorities (LCA) are responsible for sampling at retail. Survey organised by MAST. Samples of poultry produced in EU countries (intra EU trade) taken by LCAs

Frequency of the sampling

At slaughterhouse and cutting plant

Each turkey slaughter batch is sampled

At meat processing plant

The frequency of sampling of minced meat and meat preparation by the FBO is according to the production capacity per week. More than 3 tons / week; 5 samples per week. 1 - 3 tons per week; 5 samples every second week. 500 kg - 1 ton; 5 samples 4 times per year. Frequency can be reduced when results have been negative for 30 weeks. Processing plants producing less than 500 kg / week does not need to take samples if they can demonstrate good hygiene practices.

At retail

depend on the survey MAST Survey. 115 samples from 100 batches of raw poultry meat and products thereof collected and analysed (Broiler 86 samples, duck 13 samples, turkey 12 samples, geese 4 samples)

Type of specimen taken

At slaughterhouse and cutting plant

Neck skin

At meat processing plant

Minced meat and meat preparation

At retail

Packed poultry meat and products thereof. One sample from a batch.

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

From each slaughter batch, 50 neck skin samples, each sample consisting of 2-3g, are pooled into one sample. At the laboratory, a subsample of 25g is taken for further culturing.

At meat processing plant

Each sample is 25 g of minced meat or meat preparations.

At retail

Packed products For Mast survey: Whole poultry or pieces of poultry were washed in 225 ml of buffered peptone water.

Definition of positive finding

At slaughterhouse and cutting plant

A sample positive for Salmonella spp.

At meat processing plant

Sample is considered to be positive when salmonella spp. is detected.

At retail

Sample is considered to be positive when salmonella spp. is detected.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: NMKL No 71:1999, 5th edition

At meat processing plant

NMKL No 71:1999, 5th edition

At retail

NMKL No 71:1999, 5th edition

Preventive measures in place

All flocks are sampled before slaughter and salmonella positive flocks are destroyed since it is prohibited to slaughter salmonella positive flocks. Haccp activities are verified during official control of FBO.

Measures in case of the positive findings or single cases

When salmonella is detected in a slaughter batch or in a product, the batch is withdrawn from the market.

Notification system in place

The FBO and the laboratory have to report a detection of salmonella spp. immediately to MAST.

Results of the investigation

Results from the FBOs own checks according to 2073/2005 are not available. Mast survey. All turkey samples negative for salmonella.

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

The FBOs should take samples according to a guidance on 2073/2005 issued by MAST in april 2012. Detection of salmonella in minced meat and meat preparation was not notified to MAST 2013

3.1.2.5 Salmonella spp. in food - Eggs

Monitoring system

Sampling strategy

Flocks of laying hens are monitored see under salmonella spp. in flocks of laying hensNo official sampling

Frequency of the sampling

Eggs at egg packing centres (foodstuff based approach)

No official sampling

Eggs at retail

No official sampling

Raw material for egg products (at production plant)

No official sampling

Egg products (at production plant and at retail)

No official sampling

3.1.3 Salmonella in animals

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

Monitoring system

Sampling strategy

Bulk milk from 78 farms. Random. Salmonella Dublin antibody examination in milk by ELISA

Methods of sampling (description of sampling techniques)

Animals at farm

Bulk milk taken at farms and collected in the dairies. Salmonella Dublin antibody examination in milk by ELISA

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

Monitoring system

Sampling strategy

Broiler flocks

The monitoring is applied to the whole country. The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and according to the national control programme from 2012 in accordance with reg. (EC) no. 2130/2003 and reg. (EC) no. 200/2012. Every broiler flock is sampled by the food business operator (FBO). On 10% of the farms, one flock per year is sampled by the competent authority (CA) in accordance with the national control programme. At slaughter samples are also taken from each slaughter batch after evisceration but before chilling.

Frequency of the sampling

Broiler flocks: Before slaughter at farm

Within 3 weeks prior to slaughter

Broiler flocks: At slaughter (flock based approach)

Type of specimen taken

Broiler flocks: Before slaughter at farm

Boot/sock swabs. According to the National Control Program it is also allowed to take one sock sample and one dust sample but it is only practiced during the official sampling.

Methods of sampling (description of sampling techniques)

Broiler flocks: Before slaughter at farm

From each broiler flock two pairs of boot swabs are collected and pooled into one sample. In case one sock sample and one dust sample are taken, the two samples are pooled into one sample. The official sample consists of one sock sample and one dust sample, and the samples are cultured separately.

Case definition

Broiler flocks: Before slaughter at farm

A flock is considered positive when *Salmonella* spp. is found in a sample. According to the national control programme, no confirming samples have to be taken. But as a part of the FBOs own controls, usually a confirmatory sample is taken. When salmonella is not found in two subsequent samples and not in a third sample taken by the CA, the flock is considered to be negative for salmonella.

Diagnostic/analytical methods used

Broiler flocks: Before slaughter at farm

Bacteriological method: NMKL 187

Vaccination policy

Broiler flocks

Vaccination of poultry flocks against salmonella is not practiced in Iceland and not allowed according to the National Control Program.

Other preventive measures than vaccination in place

Broiler flocks

Preventive measures include specific requirements regarding biosecurity in accordance with national legislation.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

A national control programme was published by the Competent Authority on 1.11.2008 and reviewed in february 2012 and december 2013 for the control of salmonella in poultry.

Measures in case of the positive findings or single cases

Broiler flocks: Day-old chicks

Broiler flocks: Before slaughter at farm

Birds from a flock that has been tested positive may not be moved from the farm except to the slaughterhouse. It is not allowed to distribute meat from positive flocks to the market, thus positive flocks are not slaughtered but culled on the farm.

Broiler flocks: At slaughter (flock based approach)

All raw meat from a positive flock at slaughter that has already been distributed is withdrawn from the market. All meat has to be heat treated before further distribution.

Notification system in place

Salmonella is a notifiable disease according to Icelandic legal act no. 25/1993. The laboratory sends an immediate notification to the CA when there is a positive salmonella finding.

Results of the investigation

10 out of 17 cases are likely due to recontamination of flocks in previously contaminated houses. 4 cases are believed to be due to cross contamination between houses on a farm with some contaminated houses. 3 cases are likely from contaminated feed, according to a whole genome sequencing analysis of isolates from a feed mill and from the broiler flocks. The analysis showed that the isolates were very closely related.

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

Since 1997 salmonella prevalence in broiler flocks at the farm level has been below 1%. After 2008 however, the prevalence of salmonella in broiler flocks rose and reached a peak in 2010. In 2013, reinfection of broiler flocks in previously contaminated houses was a major source of infection, as well as infection through contaminated feed.

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

In Iceland it is not allowed to distribute meat from salmonella positive poultry flocks. Therefore, the main sources of contaminated poultry meat are flocks with a negative pre-slaughter sample but a positive sample at the time of slaughter. Cross contamination between negative and positive flocks at the slaughterhouse is also a source. Salmonella prevalence in slaughter flocks has been far below 1% since sampling started in 1998 and until 2010 (except for 2001 when prevalence was 1,8%). After 2010 prevalence in slaughter flocks rose above 1%. However, neither *S. Enteritidis* nor *S. Typhimurium* have been found in broilers during this time and there have been no reports or indications of human infections from infected broiler products in the past years.

3.1.3.3 Salmonella spp. in animal - Pigs

Monitoring system

Sampling strategy

Breeding herds

There are neither breeding herds nor multiplying herds as such in Iceland which produce purebred pigs (f.exs. Landrace , Yorkshire) or hybrid pigs (f.exs. LY, HD) for sale. Breeding or improvement of the stock is done by import of frozen semen from Norway. Therefore all pig herds produce their own purebreds (sows and boars) and hybrid pigs (sows and boars) mostly by insemination. All pig holdings/producers produce pigs for slaughtering, but some holdings can have separate herds with purebred/hybrid production, sow herds with piglet production or herds with fattening pigs. The official sampling is a part of a permanent surveillance programme and performed by the CA (MAST).

Multiplying herds

See breeding herds.

Fattening herds

See also breeding herds. Surveillance of all slaughter pig herds is carried out at the slaughterhouses by continuous serologic testing of meat juice from all herds. The sampling is objective and random meat samples are collected from carcasses after cooling. Number of samples and frequency of sampling depend on herd size and classification into levels (more sampling the higher the level). Sixty, seventy five or one hundred samples shall be taken from herds slaughtering for less than 2000 pigs pr. year, 2001 5000 pigs pr. year and over 5001 pigs pr. year respectively. A Salmonella index is calculated for each herd based on the weighted average of positive meat juice samples from the previous thirteen weeks, where results from the current period (last five weeks) weigh three times as much as the two previous ones (2 periods each consisting of 4 weeks). Approximately twice a month finisher herds are classified into levels; level one, two or three, according to their Salmonella index. Herds having indexes lower than 39 are categorised into level one, into level two having indexes between 40 and 69 and into level three having indexes higher than 70. The surveillance programme for detection of Salmonella infection in pig herds was implemented 1st of October 2006.

Frequency of the sampling

Breeding herds

Fattening herds at farm

Fattening herds at slaughterhouse (herd based approach)

Depends on herd size and classification into levels (see fattening herds)

Type of specimen taken

Fattening herds at slaughterhouse (herd based approach)

Meat juice

Methods of sampling (description of sampling techniques)

Fattening herds at slaughterhouse (herd based approach)

Meat samples are collected from carcasses after cooling. The meat samples are collected in special meat juice containers. Number of samples and frequency of sampling depend on herd size, ex. 75 samples/year from herds that slaughter between 2000 and 5000 pigs/year. All herds are sorted into three levels, depending on the results. Level 1 for those who are salmonella free or very low prevalence and level 2 and 3 as the prevalence is higher. Prevalence is calculated approximately every two to four weeks.

Case definition

Breeding herds

Fattening herds at farm

Fattening herds at slaughterhouse (herd based approach)

An individual sample is considered seropositive if OD% > 10 until week 32 then it was OD% > 15. This was due to a change in the recommendation from the manufacturer (new edition of the ELISA kit).

Diagnostic/analytical methods used

Fattening herds at slaughterhouse (herd based approach)

Serological method: SALMOTYPE Pig Screen LDL ELISA until week 32 then it was PIGTYPE Salmonella Ab (qiagen)

Vaccination policy

Breeding herds

No salmonella vaccination occur

Fattening herds

No salmonella vaccination occur

Other preventive measures than vaccination in place

Breeding herds

In national regulation regarding pigs there are provisions on bio security demanding special facilities for entering the herd, isolation of and delivering pigs.

Multiplying herds

See breeding pigs.

Fattening herds

See breeding pigs. Separate transport of pigs to slaughterhouse and separate slaughtering of pigs in level three herds. In national regulation regarding pigs there are provisions on bio security demanding special facilities for entering the herd, isolation of and delivering pigs.

Control program/mechanisms

The control program/strategies in place

Fattening herds

The surveillance programme is constructed to monitor salmonella infections at farm level by measuring antibodies against Salmonella in meat juice test, to survey salmonella contamination on pig carcasses at slaughtering and to monitor Salmonella serotypes in swab samples. Salmonella serotypes are also tested for antimicrobial resistance. The mandatory national control programme for Salmonella in pigs is approved by the Competent Authority, MAST. The aim of the programme is to prevent salmonella in pork and thereby mitigate the risk of human salmonellosis. In order to control Salmonella infections at farm, the national regulation on pig health and housing No. 353/2011 stipulates preventive measures to be implemented.

Recent actions taken to control the zoonoses

The ongoing national control programme for Salmonella in pigs was implemented 1st of October 2006. Because of the nature of the pig production in Iceland especially the feeding system where pig producers bought unheated raw materials from feed mills for feed production the pig production as a whole was considered as a risk for human salmonellosis. When an increase in positive meat juice samples were clearly noted in the years 2009 and 2010 the then national regulation for pig health and housing was amended and entered into force 6th of April 2011 in order to control Salmonella infections at farm level. The control program was reevaluated in October 2013.

Measures in case of the positive findings or single cases

Measures are taken (described in Salmonella spp in pig meat and products thereof) when herds are moved between levels or categories i.e. when a herd is downgraded from level 1 to level 2 or 3. Sanitary slaughtering is performed when herds are categorised as level 3 herds.

Notification system in place

Salmonella is a notifiable disease, according to national legislation on animal diseases No. 25/1993. The Competent Authority, MAST, receives all results from the respective laboratories regarding Salmonella testing (including serotyping and antimicrobial resistance) on samples from pig production and slaughtering.

Results of the investigation

Salmonella is endemic in the pig production. Of all meat juice samples 44% were positive for Salmonella.

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

Meat juice samples have been taken since 2004 even though this test method was first used as an official method for Salmonella monitoring after 1st of October 2006. A fluctuation was seen in positive meat juice samples from the year 2004 to the year 2008 but within the limits of 1 - 5%. In the next consecutive years i.e. in 2009 and 2010 the prevalence ascended significantly (12,7% and 23,4%). In 2011 the prevalence descended again and was in 2012 14,8%. This year it has ascended significantly and is the highest up to date or 44%. Despite of the increase in Salmonella in the pig production salmonellosis in humans in the same period did not alter equally.

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

Salmonella in pig production seems not to be a major source for human infections.

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

Monitoring system

Sampling strategy

Laying hens flocks

The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and revised in 2008. In 2012, a national control programme in accordance with reg. (EU) nr. 2160/2003 and Commission regulation (EU) No 517/2011 was published. All flocks of laying hens where eggs are distributed from are under surveillance, except flocks of laying hens with less than 100 birds and where eggs are distributed directly to the final consumer. At primary production the samples are taken by the food business operator (FBO). Official samples are also taken by the Competent Authority (CA) once a year from one flock from each farm with more than 1000 hens. If a flock of laying hens is slaughtered, samples are taken by the FBO from each slaughter batch after evisceration but before chilling.

Frequency of the sampling

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

At the age of 2-4 weeks, and at the age of 12 - 15 weeks.

Laying hens: Production period

Every 15 weeks.

Laying hens: Before slaughter at farm

Within 3 weeks prior to slaughter.

Laying hens: At slaughter

Every flock is sampled.

Type of specimen taken

Laying hens: Day-old chicks

Internal linings of delivery boxes or fabric swabs

Laying hens: Rearing period

Faeces or sock samples

Laying hens: Production period

Faeces or sock samples. Official samples consist of one dust sample in addition to the fecal or sock samples.

Laying hens: Before slaughter at farm

Faeces or sock samples, or faeces/sock sample and one dust sample

Laying hens: At slaughter

Neck skin

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

One pooled sample of internal linings from 5 delivery boxes.

Laying hens: Rearing period

One pooled sample consisting of 2x150g fecal samples. Or one pooled sample with two pairs of sock samples.

Laying hens: Production period

One pooled sample consisting of 2x150g fecal samples or of two pairs of sock samples. Official samples: one pooled sample consisting of 2x150 g of fecal samples, or two pairs of sock samples and 1 x 100g of dust sample.

Laying hens: Before slaughter at farm

One pooled sample consisting of 2x150g fecal samples or of two pairs of sock samples.

Laying hens: At slaughter

One pooled sample consisting of 50 neck skin samples, each neck skin sample weighting between 3-5 g.

Case definition

Laying hens: Day-old chicks

A sample positive for Salmonella spp.

Laying hens: Rearing period

A sample positive for Salmonella spp.

Laying hens: Production period

Fecal and/or dust sample positive for Salmonella spp. If confirmation samples are taken according to reg. nr. (EC) 2160/2003, and no salmonella is found in the additional samples, the flock is considered to be negative.

Laying hens: Before slaughter at farm

A sample positive for Salmonella spp.

Laying hens: At slaughter

A sample positive for Salmonella spp.

Diagnostic/analytical methods used

Laying hens: Rearing period

Bacteriological method: NMKL 187

Laying hens: Production period

Bacteriological method: NMKL 187

Laying hens: Before slaughter at farm

Bacteriological method: NMKL 187

Laying hens: At slaughter

Bacteriological method: NMKL No 71:1999, 5th edition

Vaccination policy

Laying hens flocks

Vaccination of poultry flocks against salmonella is not practiced and not allowed according to the NCP.

Other preventive measures than vaccination in place

Laying hens flocks

Preventive measures include specific requirements regarding biosecurity in accordance with national legislation.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

A national control programme was published by the Competent Authority on 1.11.2008 and reviewed in february 2012 and december 2013 for the control of salmonella in poultry.

Measures in case of the positive findings or single cases

Laying hens flocks

Birds from a salmonella positive flock may not be moved from the farm and it is not allowed to distribute eggs from a salmonella infected flock. It is not allowed to send a salmonella positive flock to the slaughterhouse. Therefore a positive flock will be culled at the farm.

Notification system in place

Salmonella is a notifiable disease according to Icelandic legal act no. 25/1993. The laboratory sends an immediate notification to the CA when there is a positive salmonella finding.

Results of the investigation

No salmonella spp. has been found in flocks of laying hens in 2014.

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

After the implementation of the national control programme in 2008, salmonella has only been detected twice in flocks of laying hens. Once in an official dust sample on a commercial laying hen farm in 2010 and once in fecal samples taken by an FBO in a backyard flock in 2011, but the latter case could never be confirmed in official samples and was considered to be negative. Salmonella had never been detected in flocks of laying hens before 2008. There has never been any evidence that consumption of eggs or egg products caused human infections.

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

There is no indication that salmonella in Icelandic table eggs or egg products is a major source of infections in humans. Salmonella Enteritidis has never been found in laying hens and is not frequently found in humans. Table eggs have never been suspected as the source of foodborne outbreaks in humans after 2002.

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

Monitoring system

Sampling strategy

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

The monitoring of salmonella in breeding flocks of Gallus gallus is applied to the whole country. The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and according to the national control programme from 2012 in accordance with reg. (EC) no. 2130/2003 and reg. (EU) No 200/2010. Every breeding flock consisting of 250 animals or more is sampled. During primary production samples are both taken by the food business operator (FBO) and by the competent authority (CA) in accordance with the national control programme. The adult breeding flocks are sampled at farm level. When a breeder flock is slaughtered samples are taken from each slaughter batch at the time of slaughter, after evisceration but before chilling. In Iceland there are only parent flocks.

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

At the age of 4 weeks and again 2 weeks before moving to the laying phase.

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

Every 2 weeks. If eggs from a breeding flocks are not incubated monthly or more often, then samples have to be taken each time before eggs are sent for incubation, and the result must be available before eggs are shipped to the hatchery.

Type of specimen taken

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

Hatched eggs

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

Socks / boots wabs, or boot swabs/dust sample, or fecal sample

Methods of sampling (description of sampling techniques)

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

From each breeding flock (paternal and maternal line separately) one sample is taken during hatching. The pooled sample consists of 10 g of broken eggshells taken from a total of 25 separate hatcher baskets, which in total is at least 250g of broken eggshells.

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

From each breeding flock two pairs of boot swabs are collected and pooled into one sample, both at the age of 4 weeks and two weeks before moving to the laying phase.

Breeding flocks: Production period

Industry samples: On their choice, there are either taken 5 pairs of bootswabs (2 pooled samples) or one pair of bootswab and one dustsample, the dust sample is cultured separately. In case it is not possible to take bootswab samples, 2 pooled samples of in total 300 individual fecal samples are taken. The official samples are taken in the same way as the industry samples: two pooled samples with either 5 pairs of bootswabs or one pair of bootswabs and one dust sample, or 300 fecal samples. The samples are taken at the beginning and the end of the laying phase and once in between.

Case definition

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

A sample positive for salmonella spp. In cases where the CA has suspicion of a false positive result, the CA can confirm a first positive finding, and if it is not possible to confirm, the flock will be calculated as negative.

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

A sample positive for salmonella spp. In cases where the CA has suspicion of a false positive result, the CA can confirm a first positive finding, and if it is not possible to confirm, the flock will be calculated as negative.

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

A sample positive for salmonella spp., always confirmed by the CA. If it is not possible to confirm a first positive finding in two consecutive samples taken by the CA, the flock will be calculated as negative.

Diagnostic/analytical methods used

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

Bacteriological method: NMKL 187

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

Bacteriological method: NMKL 187

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

Bacteriological method: NMKL 187

Vaccination policy

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

Vaccination of poultry flocks against salmonella is not allowed according to the national control program.

Other preventive measures than vaccination in place

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

Preventive measures include specific requirements regarding biosecurity in accordance with national legislation.

Control program/mechanisms

The control program/strategies in place

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

A national control programme was published by the Competent Authority on 1.11.2008 and reviewed in february 2012 and december 2013 for the control of salmonella in poultry.

Measures in case of the positive findings or single cases

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

Birds from a flock that has been tested positive may not be moved from the farm except to the slaughterhouse. It is not allowed to distribute meat from positive flocks to the market, thus positive flocks are not slaughtered but culled on the farm.

Notification system in place

Salmonella is a notifiable disease according to Icelandic legal act nr. 25/1993. The laboratory sends an immediate notification to the CA when there is a positive salmonella finding.

Results of the investigation

No Salmonella spp. was found in breeding flocks of Gallus gallus.

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

No Salmonella spp. was found in breeding flocks of Gallus gallus.

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

No salmonella spp. was found in breeding flocks of Gallus gallus and they are not considered as a source of infection in boilers, other animals, foodstuffs or humans.

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

Monitoring system

Sampling strategy

Breeding flocks

Meat production flocks

Frequency of the sampling

Breeding flocks: Day-old chicks

Breeding flocks: Rearing period

Breeding flocks: Production period

Meat production flocks: Before slaughter at farm

Meat production flocks: At slaughter (flock based approach)

Type of specimen taken

Methods of sampling (description of sampling techniques)

Case definition

Diagnostic/analytical methods used

Vaccination policy

Breeding flocks

Meat production flocks

Other preventive measures than vaccination in place

Control program/mechanisms

The control program/strategies in place

Meat production flocks

There was no duck production in Iceland in 2014. The last duck flocks were slaughtered in 2012, then national production ceased.

Measures in case of the positive findings or single cases

Notification system in place

Results of the investigation

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

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

3.1.3.7 Salmonella spp. in Geese - breeding flocks and meat production flocks

Notification system in place

There is no commercial geese meat production ongoing in Iceland. However, there are a few backyard flocks used for private consumption. In case samples would be taken and salmonella would be detected, movement of all birds in the flock will be restricted according to Icelandic laws.

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

Monitoring system

Sampling strategy

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

The monitoring of salmonella in turkey breeding flocks of Gallus gallus is applied to the whole country. The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and according to the national control programme from 2012 in accordance with reg. (EC) no. 2130/2003 and reg. (EU) No 1190/2012. Every breeding flock consisting of 250 animals or more is sampled. During primary production samples are both taken by the food business operator (FBO) and by the competent authority (CA) in accordance with the national control programme. The adult breeding flocks are sampled at farm level. When a breeder flock is slaughtered samples are taken from each slaughter batch at the time of slaughter, after evisceration but before chilling. In Iceland there are only parent flocks.

Meat production flocks

The monitoring is applied to the whole country. The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and according to the national control programme from 2012 in accordance with reg. (EC) no. 2130/2003 and reg. (EC) no. 1190/2012. Every flock is sampled by the food business operator (FBO). Official samples are taken from 10% of flocks with more than 500 animals. At slaughter samples are also taken from each slaughter batch after evisceration but before chilling. The sampling strategy is according to national requirements that were implemented in 2001 and 2002 and according to the national control programme. Official samples are taken by the competent authority from one flock on one farm once a year (from 10% of all farms with over 500 fattening turkeys).

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

At the age of 4 weeks and two weeks before moving to the laying house.

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

Every 3 weeks.

Meat production flocks: Before slaughter at farm

3 weeks prior to slaughter.

Meat production flocks: At slaughter (flock based approach)

Every batch is sampled.

Type of specimen taken

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

Hatched eggs

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

Socks / boots wabs, or boot swabs/dust sample

Meat production flocks: Before slaughter at farm

Boot/sock swabs. According to the National Control Program it is also allowed to take one sock sample and one dust sample but it is only practiced during the official sampling.

Meat production flocks: At slaughter (flock based approach)

Neck skin

Methods of sampling (description of sampling techniques)

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

From each breeding flock (paternal line and maternal line separately) one sample is taken during hatching. The pooled sample consists of 10 g of broken eggshells taken from a total of 25 separate hatcher baskets, which in total is at least 250g of broken eggshells.

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

From each breeding flock two pairs of boot swabs are collected and pooled into one sample, both at the age of 4 weeks and two weeks before moving to the laying phase.

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

Industry samples: On their choice, there are either taken 5 pairs of bootswabs (2 pooled samples) or one pair of bootswab and one dustsample, the dust sample is cultured separately. The official samples are taken in the same way as the industry samples: two pooled samples with either 5 pairs of bootswabs or one pair of bootswabs and one dust sample. The samples are taken once a year from 10% of all flocks.

Meat production flocks: Before slaughter at farm

From each flock two pairs of boot swabs are collected and pooled into one sample. In case one sock sample and one dust sample are taken, the two samples are pooled into one sample. The official sample consists of one sock sample and one dust sample, and the samples are cultured separately.

Meat production flocks: At slaughter (flock based approach)

From each slaughter flock one pooled sample consisting of 50 neck skin samples is taken, with each neck skin sample weighting between 3 - 5 g.

Case definition

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

A sample positive for salmonella spp. In cases where the CA has suspicion of a false positive result, the CA can confirm a first positive finding, and if it is not possible to confirm, the flock will be calculated as negative.

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

A sample positive for salmonella spp., always confirmed by the CA. If it is not possible to confirm a first positive finding in two consecutive samples taken by the CA, the flock will be calculated as negative.

Meat production flocks: Before slaughter at farm

A flock is considered positive when Salmonella spp. is found in a sample. According to the NCP, no confirming samples have to be taken. But as a part of the FBOs own controls, usually a confirmatory sample is taken. When salmonella is not found in two subsequent samples and not in a third sample taken by the CA, the flock is considered to be negative for salmonella.

Meat production flocks: At slaughter (flock based approach)

A sample positive for Salmonella spp.

Diagnostic/analytical methods used

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

Bacteriological method: NMKL 187

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

Bacteriological method: NMKL 187

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

Bacteriological method: NMKL 187

Meat production flocks: Before slaughter at farm

Bacteriological method: NMKL 187

Meat production flocks: At slaughter (flock based approach)

Bacteriological method: NMKL No 71:1999

Vaccination policy

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

Vaccination of poultry flocks against salmonella is not allowed according to the national control program.

Meat production flocks

Vaccination of poultry flocks against salmonella is not allowed according to the national control program.

Other preventive measures than vaccination in place

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

Preventive measures include specific requirements regarding biosecurity in accordance with national legislation.

Meat production flocks

Preventive measures include specific requirements regarding biosecurity in accordance with national legislation.

Control program/mechanisms

The control program/strategies in place

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

A national control programme was published by the Competent Authority on 1.11.2008 and reviewed in february 2012 and december 2013 for the control of salmonella in poultry.

Meat production flocks

A national control programme was published by the Competent Authority on 1.11.2008 and reviewed in february 2012 and december 2013 for the control of salmonella in poultry.

Measures in case of the positive findings or single cases

Birds from a flock that has been tested positive may not be moved from the farm except to the slaughterhouse. It is not allowed to distribute meat from positive flocks to the market, thus positive flocks are not slaughtered but culled on the farm. All raw meat from a positive flock at slaughter that has already been distributed is withdrawn from the market and has to be heat treated before further distribution.

Notification system in place

Salmonella is a notifiable disease according to Icelandic legal act no. 25/1993. The laboratory sends an immediate notification to the CA when there is a positive salmonella finding.

Results of the investigation

In 2014, Salmonella spp. was not found in turkey parent flocks nor flocks of fattening turkeys.

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

Salmonella had never been detected in turkey breeder flocks. However, in the recent years, S. Worthington in flocks of fattening turkeys has been connected with contaminated feed.

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

No salmonella spp. has been found in turkey breeding flocks and they are not considered as a source of infection in flocks of fattening turkeys, other animals, foodstuffs or humans. In Iceland it is not allowed to slaughter salmonella positive poultry flocks. Therefore, the main sources of contaminated poultry meat are flocks with a negative pre-slaughter sample but a positive sample at the time of slaughter, which has not been the case for turkey flocks. In recent years there have been no indications of any human infections from infected icelandic turkey meat.

3.2 CAMPYLOBACTERIOSIS

3.2.1 General evaluation of the national situation

3.2.1.1 Thermophilic Campylobacter spp., unspecified - general evaluation

History of the disease and/or infection in the country

Icelandic studies have shown that many species of wild birds, farmed animals and pets are frequent carriers of a thermophilic *Campylobacter* spp. A pilot study done in 1999 (July-Oct) showed that 25% of broiler flocks in Iceland were infected and that the prevalence in broiler meat on the market in Iceland was 45%. In 1998 the incidence of campylobacteriosis in humans began to increase, from 34,5 in 1997 to 79,8 in 1998. In 1999 the incidence was 155,9, where 116,8 were identified as being of domestic origin. In 1996 it was authorized for the first time to sell and distribute chilled broiler meat, where in the decades before only frozen broiler meat had been available and no poultry meat was imported to Iceland. Following the marketing of chilled broiler meat the yearly consumption increased from 6 kg pr. Inhabitant in 1996 to 11 kg pr. Inhabitant in 1999. Icelandic veterinary and human health authorities came to the conclusion that the major increase of human campylobacteriosis in Iceland in 1999 was linked to the consumption and handling of chilled broiler meat. In cooperation with the poultry industry in Iceland the authorities implemented a national surveillance programme for *Campylobacter* in poultry. It began as a voluntary programme in May 2000, but by late 2001 and early 2002 it was implemented into national legislation. The objective of the programme is to prevent the distribution of chilled poultry carcasses or poultry meat that is known to be *Campylobacter* positive. Therefore all positive poultry flocks and all positive slaughter batches are either frozen or heat treated before distribution, however as the results from the slaughter samples are not available until two days after slaughter, campylobacter positive carcasses or chilled meat can occasionally be distributed. Only carcasses from poultry flocks that are negative prior to slaughter can be distributed from the slaughterhouses as chilled meat. The Icelandic consumer prefers chilled poultry meat to frozen and is willing to pay more for it. In Iceland there are three poultry companies and each company owns all the establishments throughout the processing chain (i.e. the hatchery, farm, slaughterhouse, cutting plant and processing plants for meat and ready-to-eat products). With regard to the surveillance programme the poultry companies have to produce *Campylobacter* negative broilers if they want to sell and distribute chilled broiler meat, as all *Campylobacter* positive broilers must be frozen or heat-treated before distribution and marketing. This is why the Icelandic surveillance programme is the driving force for all efforts to prevent broiler flocks from getting contaminated with *Campylobacter*; see chapter on *Campylobacter* in *Gallus gallus*.

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

After the implementation of the national surveillance programme in 2000 the prevalence in broiler flocks, slaughter groups and the incidence in humans decreased dramatically. The *Campylobacter* trend in the last decade has been that it is decreasing in all three stages (i.e. in broilers, slaughter batches and humans). Before the implementation of the surveillance programme the prevalence in broiler flocks was about 25%. However, in recent years it has been very low. Before the implementation of the surveillance programme the prevalence in broiler meat on the market was about 45%. However, in recent years the prevalence in broiler slaughter batches has been also very low. It is assumed that the implementation of the surveillance programme has decreased the human incidence of campylobacteriosis. These results have been achieved despite the fact that annual consumption of broiler meat has increased from 6 kg pr. inhabitant in 1996 to 24 kg pr. inhabitant in 2009 and that probably over 90% of all broiler meat on the market is sold chilled. No unfrozen or unheattreated poultry meat is imported, but the import of frozen broiler meat is increasing. Since its implementation, through the Icelandic national surveillance programme it was possible to prevent large quantities of *Campylobacter* positive broiler meat from entering the market as chilled meat. The programme is assumed to be very effective to reduce *Campylobacter* contamination in broiler meat and campylobacteriosis in humans, by preventing as much as possible consumers from handling contaminated chilled poultry meat.

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

Consumption and handling of poultry and poultry products is probably not be the primary source of human campylobacteriosis in Iceland any longer. Other sources might be a more important source of human campylobacteriosis in Iceland.

Recent actions taken to control the zoonoses

The implementation of the Icelandic surveillance programme for *Campylobacter* in poultry was a direct response from the food and veterinary authority and the poultry industry to the major increase in human campylobacteriosis in 1999. The programme is almost the same as it was when implemented in 2000 and only minor changes have been made.

3.2.2 *Campylobacter* in foodstuffs

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

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

See text form on thermophilic campylobacter in *Gallus gallus*

At meat processing plant

No official sampling

At retail

There is no regular annual sampling performed. But sporadic surveys are performed. The local competent authorities (LCA) are responsible for sampling at retail. In 2014, in a survey by MAST, Samples of poultry produced in EU countries (intra EU trade) were taken.

Frequency of the sampling

At slaughterhouse and cutting plant

At retail

MAST Survey 2014: 115 samples from 100 batches of raw poultry meat and products were collected and analysed (Broiler 86 samples, duck 13 samples, turkey 12 samples, geese 4 samples).

Type of specimen taken

At retail

Packed poultry meat and products thereof. One sample per batch.

Methods of sampling (description of sampling techniques)

At retail

Mast survey 2014: 11 g of neckskin from whole poultry or 11 g of meat from the surface of poultry pieces were analysed.

Definition of positive finding

At retail

Sample is considered to be positive when *Campylobacter* spp. is detected.

Diagnostic/analytical methods used

At retail

Bacteriological method: NMKL 119-3, 2007, EN/ISO 10272 part 1 and 2

Preventive measures in place

Meat from positive broiler flocks is frozen for at least 14 days or heat treated before it is placed on the market. Meat from other countries has to be frozen for at least 30 days prior to distribution.

Control program/mechanisms

The control program/strategies in place

See text form on thermophilic campylobacter in *Gallus gallus*

Recent actions taken to control the zoonoses

Measures in case of the positive findings or single cases

Notification system in place

Results of the investigation

2014: 5 meat samples were positive for campylobacter. 2 of 86 samples of broiler meat were positive and 3 of 16 samples of duck meat were positive.

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

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

3.2.3 Campylobacter in animals

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

Monitoring system

Sampling strategy

According to the Icelandic Campylobacter National Surveillance Programme every poultry flock is sampled at the farm 2 to 5 days prior to slaughter, if it is intended to distribute meat from the flock unfrozen and unheattreated (fresh). Samples are taken by the food business operator (FBO). Samples are also taken from each poultry flock at slaughter from april 1 to october 31 every year, if the meat from the flock is distributed unfrozen and unheattreated (fresh).

Frequency of the sampling

Before slaughter at farm

Every flock from which the meat is intended to be distributed unfrozen and unheattreated is sampled by the FBO, 2-5 days before slaughter.

At slaughter

Annually, from march 1 to october 31, every batch is sampled by the FBO, if the meat from the flock is intended to be distributed unheattreated and unfrozen. If at slaughter no pre-slaughter sample is available, but it is intended to distribute meat from the batch unheattreated and unfrozen, samples are taken at slaughter and it is not allowed to distribute meat from the batch until results from slaughter samples are available and negative.

Type of specimen taken

Before slaughter at farm

Faeces

At slaughter

Caecae

Methods of sampling (description of sampling techniques)

Before slaughter at farm

10 individual fresh faecal droppings are taken by the FBO 2 to 5 days before slaughter. They are sent as one pooled sample to the laboratory.

At slaughter

Caecae from 10 broiler carcasses are taken at the slaughter line by the FBO, pooled into one sample.

Case definition

Before slaughter at farm

A flock is considered positive when *Campylobacter* spp. is detected.

At slaughter

A slaughter batch is considered positive when *Campylobacter* spp. is detected.

Diagnostic/analytical methods used

Rearing period

Before slaughter at farm

Bacteriological method: NMKL 119-3, 2007

At slaughter

Bacteriological method: NMKL 119-3, 2007, EN/ISO 10272 part 1 and 2

Vaccination policy

There is no vaccination against *Campylobacter* in Iceland.

Other preventive measures than vaccination in place

Generally the freezing policy (meat from contaminated flocks has to be frozen) is the driving force for all preventive measures at farm level. As only flocks that test negative for *Campylobacter* prior to slaughter can be processed as fresh chilled products the farmers aim to produce negative flocks, as the fresh chilled products have the highest market value. The most important interventions done at the farm level is maintaining a very high biosecurity all year round. Preferably flocks are not thinned. In 2005 many farmers began to slaughter the broilers at a younger age (approx. 32 days) during the summer period (June-September) as younger broilers have lower *campylobacter* prevalence. The rest of the year broilers are slaughtered at the age of approx. 36 days. The latest preventative measure (since 2008) is to use fly nets on the broiler house inlets during the summer period on high risk farms (i.e. where all in - all out method cannot be implemented at farm level). All preventative measures at the farm level are voluntary interventions.

Control program/mechanisms

The control program/strategies in place

The Icelandic Campylobacter surveillance programme is built on the freezing policy which means that all poultry flocks positive in the pre-slaughter sample are submitted to freezing or are heat treated before distribution. If campylobacter is detected in a slaughter batch, no further meat will be distributed from the slaughter house unless frozen or heat treated, but meat already distributed is not withdrawn from the market. Only carcasses from poultry flocks that are negative prior to slaughter can be processed as chilled meat from the slaughterhouses. The objective of the programme is to prevent distribution of poultry carcasses or poultry meat that is known to be Campylobacter positive as chilled products. The surveillance programme started in the year 2000 as a voluntary programme in collaboration with the poultry industry. In 2002 it was implemented into national legislation (reg. no. 260/1980 (amended by reg. no 688/2002) and reg. no. 251/1995 (amended by reg. no 904/2001)).

Recent actions taken to control the zoonoses

Fly nettings on air inlets on high risk houses (after 2008)

Measures in case of the positive findings or single cases

Carcasses from flocks that test positive for thermophilic Campylobacter sp. based upon the pre-slaughter sampling are either subjected to heat-treatment or freezing.

Notification system in place

All results from samples taken from broiler flocks are as a part of the surveillance programme reported directly to the authorities from the laboratories, both negative and positive results.

Results of the investigation

The prevalence of Campylobacter sp. in broiler flocks keeps on being low, also in 2014. Before slaughter the prevalence was only 3,9%, somewhat higher than in 2013, but still low compared to previous years. It seems that it was possible one more year to maintain a high level of biosecurity on broiler farms.

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

The trend in the last decade has been that the Campylobacter prevalence in broiler flocks is decreasing.

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

3.3 LISTERIOSIS

3.3.1 General evaluation of the national situation

3.3.1.1 Listeria - general evaluation

History of the disease and/or infection in the country

The prevalence of Listeria monocytogenes in smoked and gravad fish was determined in a survey 2011. The results were: The probability (95%) to find Listeria monocytogenes in smoked and gravad fish on the market is 3.83% 7.16% and there is 95% probability that cfu/g is >100 in 1.99% 4.6% of smoked and gravad fish. .

Recent actions taken to control the zoonoses

The requirements of the Regulation (EC) No 2073/2005 apply, i.e., monitoring of the production process, shelf-life studies when deemed appropriate, withdrawal from the market when unsatisfactory results and taking measures to prevent the recurrence of the contamination, such as reviewing the production routines and shelf life of the product. Dietary advice is given to pregnant women.

3.3.2 Listeria in foodstuffs

3.3.2.1 Listeria in food

Monitoring system

Sampling strategy

No continuous monitoring of foodstuffs takes place. Surveys are occasionally performed. Samples of ready to eat meat products and smoked and gravled fish were taken at the production plant. The FBO should follow the EU requirements regarding testing for *L. monocytogenes* in ready-to-eat foods (Regulation (EC) NO2073/2005). Samples are taken as part of internal control programmes in the food producing industry and sampling is verified in regular official control.

Frequency of the sampling

At the production plant

FBO; Not known. It is the FBO that should decide the frequency. MAST survey. 32 samples were taken from 16 producers of ready to eat meat products, smoked fish and gravled fish.

Type of specimen taken

At the production plant

Packed ready to eat products i

Methods of sampling (description of sampling techniques)

At the production plant

MAST survey: 5 samples (packed product) of minimum 200 g were taken from each batch n=5. 5*25 g were pooled and analysed for *Listeria monocytogenes* (Enrichment; 5*25 g in 1125 ml broth)

Definition of positive finding

At the production plant

Samples positive for *Listeria monocytogenes* are considered positive.

Diagnostic/analytical methods used

At retail

NMKL 136, 5th ed., 2010

Preventive measures in place

HACCP activities are verified under official control. Producers should take samples to verify that they fulfill the requirement in 2073/2004 with regard to *Listeria monocytogenes*. Dietary advice is given to pregnant women.

Notification system in place

The laboratories and the FBO operators should notify to MAST if they detect *Listeria monocytogenes* in ready to eat food.

Results of the investigation

2014: *Listeria monocytogenes* in ready to eat food has not been notified to MAST.MAST survey. All samples were negative for *Listeria monocytogenes*.

3.3.3 *Listeria* in animals

3.3.3.1 *Listeria* in animal

Monitoring system

Sampling strategy

There is no active surveillance in animals regarding *L. monocytogenes*.

Notification system in place

Listeriosis in animals is a notifiable disease.

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

Based on notifications little changes are seen in the prevalence of listeriosis in animals.

Additional information

3.4 E. COLI INFECTIONS

3.4.1 *Escherichia coli*, pathogenic in animals

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

Monitoring system

Sampling strategy

No samples taken

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

Regular, systematic surveillance of *Trichinella* sp. had not been done so far in Iceland, but as of January 1st 2012 samples are taken from all slaughtered pigs and horses according to Commission Regulation (EC) No 2075/2005. When particularly looked for *Trichinella* has neither been found in live stock nor in domestic wild animals (foxes, minks) in Iceland. Three cases of *Trichinella* sp. in stray polar bears are known from the years 1963, 2008 and 2010. In 1963 *Trichinella* sp. was found in a stray polar bear which came ashore in the north-western part of the country, in 2008 *Trichinella* native was found in another polar bear that came ashore in the northern part of the country and in 2010 *Trichinella* sp. was found in the third animal which was detected in the north-eastern part of Iceland. When exporting horse meat some purchasers demand *Trichinella* testing at slaughter and prior to export. As a result of these demands approx. 1.600 samples from horses had been investigated up until the year 2008, which were negative with regard to *Trichinella* sp. *Trichinella* has never been diagnosed in humans in Iceland.

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

The risk of *Trichinella* spp. being introduced into Icelandic wildlife does exist because of occasional stray polar bears coming ashore. The probability of the risk is however very low because polar bears are euthanized and their carcasses removed as soon as they are detected.

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

The probability of contracting trichinellosis from food producing animals of Icelandic origin is close to zero.

Recent actions taken to control the zoonoses

None, other than euthanizing and removing polar bears from the environment and disposing of the carcasses after post-mortem investigations.

3.5.2 Trichinella in animals

3.5.2.1 Trichinella in animal - Solipeds, domestic - horses

Monitoring system

Sampling strategy

Samples were taken from all slaughtered horses intended to be put on the market.

Sampling strategy

For categories of holdings officially recognised *Trichinella*-free

There is no categorization of holdings.

Frequency of the sampling

Samples were taken from all horses.

Type of specimen taken

Tongue or masseter muscle.

Methods of sampling (description of sampling techniques)

Methods used were in accordance with Regulation (EC) No 2075/2005. For analyses, 5 g per animal is included in a pooled sample of maximum 100 g.

Case definition

An animal with a positive test result in the official examination.

Diagnostic/analytical methods used

Commission Regulation (EC) 2075/2005, Car 1, Chap 1 Magnetic stirrer method for pooled sample digestion for the detection of Trichinella in meat

Control program/mechanisms

The control program/strategies in place

Sampling was according to 2075/2005 and is monitored by official vets.

Measures in case of the positive findings or single cases

In case of a positive sample the horse carcasses will be retested individually. Pursuant to the Law on Animal Health No 25/1993, the Minister can issue national regulation on any necessary measures to be taken in order to find the source of the infection, restrict movement of animals, hinder the spread of and eradicate the disease.

Notification system in place

According to the national Law on Animal Health, no. 25/1993, trichinellosis is a list B disease that must be notified.

Results of the investigation including the origin of the positive animals

No cases of Trichinellosis were reported among slaughtered horses.

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

No cases have been reported in Iceland, neither in humans nor in animals.

3.5.2.2 Trichinella in animal - Pigs

Monitoring system

Sampling strategy

General

Samples were taken from all slaughtered pigs intended to be placed on the market.

For Trichinella free holdings

For categories of holdings officially recognised Trichinella-free

For regions with negligible Trichinella risk

Frequency of the sampling

General

Samples were taken from all pigs slaughtered.

Type of specimen taken

General

Muscle clip from the pillar of diaphragma.

Methods of sampling (description of sampling techniques)

General

Samples are taken according to 2075/2005 by a trained employee of the slaughterhouse under the supervision of the official vet. 1g of muscle clip from the pillar of diaphragma (max 100 pigs per analyse).

Case definition

General

An animal where *Trichinella* spp. larvae has been detected.

Diagnostic/analytical methods used

General

Artificial digestion method of pooled samples.

Officially recognised regions with negligible *Trichinella* risk

Number of officially recognised *Trichinella*-free holdings

All holdings are considered trichinella - free.

Categories of holdings officially recognised *Trichinella*-free

No categorization of holdings.

Control program/mechanisms

The control program/strategies in place

Sampling of all slaughtered pigs.

Recent actions taken to control the zoonoses

None

Notification system in place

According to the national Law on Animal Health, no. 25/1993, trichinellosis is a list B disease that must be notified.

Preventive measures in place

Controlled housing condition in pig farms. Regular official control of farms and slaughterhouses.

Measures in case of the positive findings or single cases

In case of a positive sample the pig carcasses will be retested according to the regulation 2075/2005. Pursuant to the Law on Animal Health No 25/1993, the Minister can issue national regulation on any necessary measures to be taken in order to find the source of the infection, restrict movement of animals, hinder the spread of and eradicate the disease.

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

No positive result on trichinella from the samples taken.

Summary results of the inspections of *Trichinella*-free holdings including information on farmer compliance

Not applicable

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

No cases have been reported in Iceland, neither in humans nor in animals.

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

None

The contingency plan in place

Is under preparation but not issued yet.

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 multilocularis has never been diagnosed. *Echinococcus granulosus* used to be quite frequent but has now apparently been eradicated, the last incidence detected in animals was in 1979 and in humans in 1988.

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

Emphasis is put on keeping the country free from *Echinococcus*. Annual treatment of dogs with anthelmintics is required and all carcasses at slaughterhouses are checked visually. The risk of introduction of *Echinococcus multilocularis* is considered moderate or low as the main definitive host, the red fox (*Vulpes vulpes*) is not present in the country and not wolves or coyotes neither. The same applies for many common intermediate hosts such as vole, lemming and muskrat. The only fox in Iceland is the arctic fox (*Vulpes lagopus*), which is seldom seen in the vicinity of residential areas.

3.7 STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) INFECTION

3.7.1 Staphylococcus in animals

3.7.1.1 Staphylococcus in animal

Monitoring system

Sampling strategy

Survey: 4 samples (inc. 5 nasal swabs from 5 animals) collected at slaughterhouse from each holding (producing > 200 fattening pigs per year = 14 holdings in total). The survey did extend to the year 2015 and therefore the rest of the results will be reported next year. All samples were negative.

Type of specimen taken

Nasal swabs after killing at slaughterhouse.

4 ANTIMICROBIAL RESISTANCE INFORMATION ON SPECIFIC ZONOSSES AND ZOO NOTIC AGENTS

4.1 SALMONELLOSIS

4.1.1 Salmonella in foodstuffs

4.1.1.1 Antimicrobial resistance in Salmonella Meat from pig

Sampling strategy used in monitoring

Frequency of the sampling

Salmonella found on pig carcasses in the Icelandic Salmonella Control Programme is included in the resistance monitoring. All herds are always objective sampled but in a case of a positive sample the herd is census sampled. At least one serotype is tested for antimicrobial sensitivity.

Type of specimen taken

The carcasses are swabbed with cotton swabs. Isolates from positive swabs are tested.

Methods of sampling (description of sampling techniques)

See Salmonella spp. in pig meat and products thereof.

Procedures for the selection of isolates for antimicrobial testing

Salmonella isolates are sent to Institute for experimental pathology at Keldur for testing of antimicrobial susceptibility. The Icelandic Food and Veterinary Authority MAST selects only one isolate from each serovar from each batch for testing for AMR.

Methods used for collecting data

The laboratories send regularly data to MAST or as soon as results are obtained.

Laboratory methodology used for identification of the microbial isolates

The Salmonella Tecra Unique Rapid Test is used for detection of Salmonella (Enrichment immunocapture immunoenrichment and detection steps). In the middle of the year the RapidChek Select test was taken into use instead of the Tecra Rapid test. When Salmonella is detected in the Tecra/RapidChek test, the Bacteriological method used is: NMKL 187:2007. For serotyping, the presumptive Salmonella colonies are confirmed with MALDI TOF, then serotyped.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Gentamicin, Meropenem, Nalidixic acid, Sulfamethoxazole, Tetracycline, Trimethoprim, Azithromycin, Tigecycline. According to decision 2013/652/EU.

Cut-off values used in testing

The values used are ECOFF values given in the 2013/652/EU decision.

Preventive measures in place

See Salmonella in pigs.

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of AMR in meat. Veterinarians are reminded of prudent use of antimicrobial.

Recent actions taken to control the zoonoses

See Salmonella in pigs.

Measures in case of the positive findings or single cases

No specific actions are taken.

Notification system in place

AMR in Salmonella isolates is not notifiable, but all results from the surveillance are reported from Keldur to MAST.

Results of the investigation

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

In 2014, AMR in Salmonella from pigs was for the first time investigated with epidemiological cut off values. Therefore, no conclusions can be drawn on the trends. Only resistance to sulfonamides was found, at a level of 55% (6/11 isolates).

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

4.1.1.2 Antimicrobial resistance in Salmonella Meat from poultry, unspecified

Sampling strategy used in monitoring

Frequency of the sampling

Salmonella found on poultry carcasses in samples taken according to the Icelandic Salmonella Control Programme is included in the resistance monitoring. One positive sample from each poultry flock is serotyped and tested for antimicrobial sensitivity.

Type of specimen taken

See chapter Salmonella spp. in broiler meat and products thereof and chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

Methods of sampling (description of sampling techniques)

See chapter Salmonella spp. in broiler meat and products thereof and chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

Procedures for the selection of isolates for antimicrobial testing

Salmonella isolates are sent to the Institute for experimental Pathology at Keldur for testing of antimicrobial susceptibility. The Icelandic Food and Veterinary Authority MAST selects only one isolate from each serovar from each batch for testing for AMR.

Methods used for collecting data

The laboratories send regularly data to MAST or as soon as results are obtained.

Laboratory methodology used for identification of the microbial isolates

NMKL No 71:1999. For serotyping, the presumptive Salmonella colonies are confirmed with MALDI TOF, then serotyped.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Gentamicin, Meropenem, Nalidixic acid, Sulfamethoxazole, Tetracycline, Trimethoprim, Azithromycin, Tigecycline. According to decision 2013/652/EU.

Cut-off values used in testing

The values used are ECOFF values given in the 2013/652/EU decision.

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of AMR in meat. Veterinarians are reminded of prudent use of antimicrobial.

Recent actions taken to control the zoonoses

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

Measures in case of the positive findings or single cases

No specific actions are taken.

Notification system in place

AMR in Salmonella is not notifiable, but all results from surveillance are reported from Keldur to Mast.

Results of the investigation

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

In 2014, AMR in salmonella from poultry meat was for the first time investigated with epidemiological cut off values. Therefore, no conclusions can be drawn on the trends. Only one isolate was tested, and it was susceptible to all agents.

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

4.1.2 Salmonella in animals

4.1.2.1 Antimicrobial resistance in Salmonella Cattle (bovine animals)

Sampling strategy used in monitoring

Frequency of the sampling

4.1.2.2 Antimicrobial resistance in Salmonella Pigs

Sampling strategy used in monitoring

Frequency of the sampling

Salmonella found in pig herds in the Icelandic Salmonella Monitoring Programme is included in the resistance monitoring (at least one isolate per serotype per herd).

Type of specimen taken

Isolates from all herds are tested, i.e. breeding herds, piglet production herds and herds with fattening pigs. No positive samples in 2014

Methods of sampling (description of sampling techniques)

For description of the Icelandic Salmonella Control programme, see the parts describing Salmonella in pigs. Other sampling methods vary depending on the situation.

Procedures for the selection of isolates for antimicrobial testing

Mast selects one isolate per serotype per herd for antimicrobial testing.

Methods used for collecting data

The laboratories send regularly data to MAST or as soon as results are obtained.

Laboratory methodology used for identification of the microbial isolates

NMKL No 187, 2007. For serotyping, the presumptive Salmonella colonies are confirmed with MALDI TOF, then serotyped.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Gentamicin, Meropenem, Nalidixic acid, Sulfamethoxazole, Tetracycline, Trimethoprim, Azithromycin, Tigecycline. According to decision 2013/652/EC.

Cut-off values used in testing

The values used are ECOFF values given in the 2013/652/EU decision.

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of AMR in production animals. Veterinarians are reminded of prudent use of antimicrobial.

Recent actions taken to control the zoonoses

See Salmonella in pigs.

Measures in case of the positive findings or single cases

No specific actions are taken when antimicrobial resistance is detected in Salmonella isolates in production animals.

Notification system in place

AMR in Salmonella isolates is not notifiable, but all results from surveillance is reported from Keldur to MAST.

Results of the investigation

No Salmonella isolates were detected, therefore, no results are available.

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

No Salmonella isolates were detected, therefore, no results are available.

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

4.1.2.3 Antimicrobial resistance in Salmonella Poultry, unspecified

Sampling strategy used in monitoring

Frequency of the sampling

Salmonella found in poultry in samples taken according to the Icelandic Salmonella Control Programme is included in the resistance monitoring. At least one positive sample from each flock is serotyped and tested for antimicrobial susceptibility.

Type of specimen taken

See Chapter Salmonella spp. in Gallus Gallus - breeding flocks, broiler flocks and flocks of leaying hens and Chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

Methods of sampling (description of sampling techniques)

See Chapter Salmonella spp. in Gallus Gallus - breeding flocks, broiler flocks and flocks of leaying hens and Chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

Procedures for the selection of isolates for antimicrobial testing

Mast selects the isolates, in order to control, that only one isolate from each flock is tested.

Methods used for collecting data

The laboratories send regularly data to MAST or as soon as results are obtained.

Laboratory methodology used for identification of the microbial isolates

NMKL No 187. For serotyping, the presumptive Salmonella colonies are confirmed with MALDI TOF, then serotyped.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Gentamicin, Meropenem, Nalidixic acid, Sulfamethoxazole, Tetracycline, Trimethoprim, Azithromycin, Tigecycline. According to decision 2013/652/EC

Cut-off values used in testing

The values used are ECOFF values given in the 2013/652/EU decision.

Preventive measures in place

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of AMR in production animals. Veterinarians are reminded of prudent use of antimicrobial.

Recent actions taken to control the zoonoses

See Chapter Salmonella spp. in Gallus Gallus - breeding flocks, broiler flocks and flocks of leaying hens and Chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

Measures in case of the positive findings or single cases

All poultry flocks positive for Salmonella spp. are destructed on the farm since it is not allowed to distribute meat from positive flocks. No additional actions are taken for flocks with salmonella isolates resistant to one or more antibiotics.

Notification system in place

AMR in Salmonella isolates is not notifiable, but all results from surveillance are reported from Keldur to MAST.

Results of the investigation

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

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

See Chapter Salmonella spp. in Gallus Gallus - breeding flocks, broiler flocks and flocks of leaying hens and Chapter Salmonella spp. in ducks and turkey - breeding flocks and meat production flocks.

4.2 CAMPYLOBACTERIOSIS

4.2.1 Campylobacter in animals

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

Sampling strategy used in monitoring

Frequency of the sampling

No samples taken

4.2.1.2 Antimicrobial resistance in Campylobacter jejuni and coli in Poultry, unspecified

Sampling strategy used in monitoring

Frequency of the sampling

See thermophilic Campylobacter in Gallus gallus.

Laboratory methodology used for identification of the microbial isolates

Bacteriological method: NMKL 119-3, 2007

Type of specimen taken

Fecal samples from flocks at farm before slaughter, cecal samples at slaughter

Methods of sampling (description of sampling techniques)

At farm: 10 fecal samples pooled into one sample
At slaughter: 10 cecal samples pooled into one sample

Procedures for the selection of isolates for antimicrobial testing

One isolate is tested from each positive broiler flock. If more than one isolates are available (both fecal and cecal sample), generally the isolate obtained from the cecal samples is used for AMR testing.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

Erythromycin, Ciprofloxacin, Tetracyclin, Streptomycin, Gentamicin, Nalidixin acid. According to decision 2013/652/EC.

Cut-off values used in testing

According to decision 2013/652/EC.

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of AMR in production animals. Veterinarians are reminded of prudent use of antimicrobial.

Measures in case of the positive findings or single cases

No special measures are taken at the moment.

Notification system in place

AMR in *Campylobacter* spp. is not notifiable, but all results from surveillance are reported from Keldur to Mast.

Results of the investigation

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

4.3 ESCHERICHIA COLI , NON-PATHOGENIC

4.3.1 Escherichia coli, non-pathogenic in animals

4.3.1.1 Antimicrobial resistance in E.coli, non-pathogenic, unspecified

Description of sampling designs

Presence of ESBL/AmpC producing E. coli in broilers. 48 pooled cecal samples from broilers during slaughter, taken in all three slaughterhouses. 48 pooled final broiler product samples, taken at the cutting plant in two slaughterhouses sharing 85% of the domestic production. 5 broiler parent flocks sampled during rearing in quarantine.

Sampling strategy used in monitoring

Frequency of the sampling

Broiler flocks at slaughter: 4 pooled samples per month. Meat from broilers: 4 pooled samples per month. It was intended to sample all broiler parent flocks during rearing. Broiler parents: 10 fecal samples.

Type of specimen taken

Broiler flocks: 10 cecal samples. Products: 2 packages with fresh meat from one batch. Broiler parent flocks: 10 cecal samples

Randomisation procedures per animal populations and food categories

Samples taken at previously predetermined days, according to a plan designed in the beginning of the year.

Laboratory methodology used for identification of the microbial isolates

Microbroth dilution.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

According to decision 2031/652/EC

Cut-off values used in testing

According to decision 2031/652/EC

Control program/mechanisms

The control program/strategies in place

Up to date, there are no strategies for the control or reduction of ESBL/AmpC E. coli in production animals. Veterinarians are reminded of prudent use of antimicrobial.

Measures in case of the positive findings or single cases

There are no specific actions taken at the moment.

Notification system in place

The detection of ESBL/AmpC producing E. coli is not notifiable, but all results from surveillance are reported from Keldur to MAST.

Results of the investigation

Since the isolates were of the same predominating genotype as in broiler production in other nordic countries, it is assumed that ESBL/AmpC producing E. coli has been vertically transmitted to Iceland through the import of hatching egg.

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

The presence of ESBL/AmpC producing E. coli in broiler production has been monitored for the first time in Iceland. These bacteria were found at a low prevalence, and all isolates were identified to be of the same genotype CMY-2.

5 INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

5.1 HISTAMINE

5.1.1 General evaluation of the national situation

5.1.1.1 Histamine - general evaluation

History of the disease and/or infection in the country

No cases reported 2014.

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

Scromboid species like herring and mackerel are produced in Iceland. Rapid cooling on board vessel is effective quality and hygiene measures, chilling and the testing is verified under regular official control. assurance system. Surveys are performed occasionally. No survey in 2014. In former surveys the levels of histamine were under the detection limit.

Recent actions taken to control the hazard

Information to the FBO on preventive measures like rapid cooling and sampling for analysing of histamine (2073/2005) has been issued. The results are checked by inspectors in official control.

5.1.2 Histamine in foodstuffs

5.1.2.1 Histamine in food

Monitoring system

Sampling strategy

No official sampling.

5.2 STAPHYLOCOCCAL ENTEROTOXINS

5.2.1 General evaluation of the national situation

5.2.1.1 Staphylococcal enterotoxins - general evaluation

History of the disease and/or infection in the country

5.2.2 Staphylococcal enterotoxins in foodstuffs

5.2.2.1 Staphylococcal enterotoxins in food

Monitoring system

Sampling strategy

No official sampling.

6 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.

6.1 Outbreaks

6.1.1 Foodborne outbreaks

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

LCAs, the Food and Veterinary authority (MAST) shall inform the chief epidemiologist immediately if they become aware of a risk of infections. Laboratories detecting zoonosis in food should report to MAST. Physicians and laboratories analysing human samples are required, according to article 3 in the Act on Health Security and Communicable Diseases no. 1997/19 to report notifiable diseases and diseases subject to registration to the the Chief epidemiologist. The Chief epidemiologist monitor the data and shall report suspected foodborne outbreaks to MAST and the relevant LCAs. MAST, chief epidemiologist and LCA if relevant work together in investigations of food borne outbreak. The chief epidemiologist is responsible for epidemiological investigation of humans and MAST is responsible investigation of animals, food, FBO and coordination of the relevant LCAs.

Description of the types of outbreaks covered by the reporting:

All suspected foodborne outbreaks are notifiable. The definition of a foodborne outbreak is two or more human cases with the same infection where the cases are linked or are probably linked to the same foodsource, or when observed number of human cases exceeds the expected number of cases during the same time period and place, and food is a likely vehicle.

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

Food borne outbreaks of domestic origin are very few (1-5) each year. The situation has been stable the past 10 years.

ANIMAL POPULATION TABLES

Table Susceptible animal population

Animal species	Category of animals	Population			
		holding	animal	slaughter animal (heads)	herd/flock
Cattle (bovine animals)	Cattle (bovine animals) - calves (under 1 year) (not specified)	25	300		25
	Cattle (bovine animals) - dairy cows and heifers	690	65,000		690
	Cattle (bovine animals) - meat production animals (not specified)	180	7,050		180
	Cattle (bovine animals) - mixed herds	40	500		40
	Cattle (bovine animals) (not specified)	95	77,350	17,658	935
Deer	Deer - farmed (not specified)	0	0		0
Ducks	Ducks - meat production flocks (not specified)	0	0		0
Gallus gallus (fowl)	Gallus gallus (fowl) - breeding flocks for broiler production line (not specified)	4	61,000		35
	Gallus gallus (fowl) - breeding flocks for egg production line (not specified)	3	3,800		5
	Gallus gallus (fowl) - broilers (not specified)	28	737,000		657
	Gallus gallus (fowl) - laying hens (not specified)	12	191,000		46
	Gallus gallus (fowl) (not specified)	47	992,800	4,912,770	743
Goats	Goats (not specified)	90	860		90
Pigs	Pigs - breeding animals (not specified)	4	1,451		4
	Pigs - fattening pigs (not specified)	7	24,600		7
	Pigs - mixed herds (not specified)	10			10
	Pigs (not specified)	21	26,051	78,529	21
Sheep	Sheep - animals under 1 year (lambs)	2,646	476,300		2,646
	Sheep (not specified)	2,646	476,300	593,725	2,646
Solipeds, domestic	Solipeds, domestic - horses	2,550	78,000	9,262	2,550
Turkeys	Turkeys - meat production flocks (not specified)	4	1,200		28
	Turkeys - parent breeding flocks (not specified)	1	800		2
	Turkeys (not specified)	5	2,000		30

DISEASE STATUS TABLES

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

Region	Total number of herds	Number of infected herds	Number of herds with status officially free	Number of infected herds tested under surveillance	Number of animals tested under surveillance	Number of herds tested under surveillance	Total number of animals
Ísland (**)	935	0	935	0	76	15	77,350

DISEASE STATUS TABLES

PREVALENCE TABLES

Table CAMPYLOBACTER in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - broilers - Farm (not specified) - Iceland - animal sample - faeces - Monitoring - Industry sampling - Census	herd/flock	630	18	Campylobacter - C. coli	0
				Campylobacter - C. jejuni	1
				Campylobacter - C. lari	0
				Campylobacter - C. upsaliensis	0
				Campylobacter - Thermophilic Campylobacter spp., unspecified	17
Gallus gallus (fowl) - broilers - Slaughterhouse - Iceland - animal sample - caecum - Monitoring - Industry sampling - Census	slaughter batch	405	14	Campylobacter - C. coli	0
				Campylobacter - C. jejuni	14
				Campylobacter - C. lari	0
				Campylobacter - C. upsaliensis	0
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Turkeys - Farm (not specified) - Iceland - animal sample - faeces - Monitoring - Industry sampling - Census	herd/flock	29	4	Campylobacter - C. coli	0
				Campylobacter - C. jejuni	2
				Campylobacter - C. lari	0
				Campylobacter - C. upsaliensis	0
				Campylobacter - Thermophilic Campylobacter spp., unspecified	2
Turkeys - Slaughterhouse - Iceland - food sample - neck skin - Monitoring - Industry sampling - Census	slaughter batch	9	0	Campylobacter - C. coli	0
				Campylobacter - C. jejuni	0
				Campylobacter - C. lari	0
				Campylobacter - C. upsaliensis	0
				Campylobacter - Thermophilic Campylobacter spp., unspecified	0

Table CAMPYLOBACTER in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	11	Gram	86	2	Campylobacter - C. coli	1
						Campylobacter - C. jejuni	1
						Campylobacter - C. lari	0
						Campylobacter - C. upsaliensis	0
						Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from duck - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	11	Gram	13	3	Campylobacter - C. coli	1
						Campylobacter - C. jejuni	1
						Campylobacter - C. lari	1
						Campylobacter - C. upsaliensis	0
						Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from geese - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	11	Gram	4	0	Campylobacter - C. coli	0
						Campylobacter - C. jejuni	0
						Campylobacter - C. lari	0
						Campylobacter - C. upsaliensis	0
						Campylobacter - Thermophilic Campylobacter spp., unspecified	0
Meat from turkey - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	11	Gram	12	0	Campylobacter - C. coli	0
						Campylobacter - C. jejuni	0
						Campylobacter - C. lari	0
						Campylobacter - C. upsaliensis	0
						Campylobacter - Thermophilic Campylobacter spp., unspecified	0

Table LISTERIA in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Method	Zoonoses	N of units tested	N of units positive
Fish - smoked - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	9	0	>100	Listeria - L. monocytogenes	0	0
						<= 100	Listeria - L. monocytogenes	0	0
Fish - smoked - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	9	0	detection	Listeria - L. monocytogenes	9	0
Meat from bovine animals - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	8	0	>100	Listeria - L. monocytogenes	0	0
						<= 100	Listeria - L. monocytogenes	0	0
Meat from bovine animals - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	8	0	detection	Listeria - L. monocytogenes	8	0
Meat from broilers (Gallus gallus) - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	225	Gram	3	0	>100	Listeria - L. monocytogenes	0	0
						<= 100	Listeria - L. monocytogenes	0	0
Meat from broilers (Gallus gallus) - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single	225	Gram	3	0	detection	Listeria - L. monocytogenes	3	0
Meat from pig - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	12	0	>100	Listeria - L. monocytogenes	0	0
						<= 100	Listeria - L. monocytogenes	0	0
Meat from pig - meat products - Processing plant - Iceland - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	12	0	detection	Listeria - L. monocytogenes	12	0

Table SALMONELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - broilers - Farm (not specified) - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	658	Y	658	17	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	7
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	7
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	3
Gallus gallus (fowl) - laying hens - - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census	herd/flock	25	Y	16	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - laying hens - - Iceland - environmental sample - delivery box liner - Control and eradication programmes - Industry sampling - Census	herd/flock	61	Y	23	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - laying hens - Farm (not specified) - Iceland - animal sample - faeces - Control and eradication programmes - Official and industry sampling - Census	herd/flock	44	Y	41	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census	herd/flock	7	Y	7	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	14	Y	14	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Gallus gallus (fowl) - parent breeding flocks for broiler production line - - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	14	Y	14	0	Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for broiler production line - - Iceland - environmental sample - boot swabs and dust - Control and eradication programmes - Official and industry sampling - Census	herd/flock	35	Y	35	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
						Salmonella - Salmonella spp., unspecified	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census	herd/flock	2	Y	2	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	2	Y	2	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
Gallus gallus (fowl) - parent breeding flocks for egg production line - - Iceland - environmental sample - boot swabs and dust - Control and eradication programmes - Official and industry sampling - Census	herd/flock	7	Y	5	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Hadar	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - S. Virchow	0
Pigs - fattening pigs - Slaughterhouse - Iceland - animal sample - meat juice - Monitoring - Official sampling - Objective sampling	animal		NA	1124	494	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	494
Turkeys - breeding flocks, unspecified - Farm (not specified) - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census	herd/flock	2	Y	2	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	N of flocks under control programme	Target verification	Total units tested	Total units positive	Zoonoses	N of units positive
Turkeys - breeding flocks, unspecified - Farm (not specified) - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census	herd/flock	2	Y	2	0	Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Turkeys - breeding flocks, unspecified - Farm (not specified) - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census	herd/flock	3	Y	3	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Turkeys - breeding flocks, unspecified - Farm (not specified) - Iceland - environmental sample - boot swabs and dust - Control and eradication programmes - Official and industry sampling - Census	herd/flock	3	Y	3	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Turkeys - fattening flocks - Farm (not specified) - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census	herd/flock	31	Y	31	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Agona	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0

Table SALMONELLA in food

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from broilers (Gallus gallus) - carcase - Slaughterhouse - Iceland - food sample - neck skin - Surveillance - Industry sampling - Census	batch	25	Gram	712	1	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	0
						Salmonella - S. Infantis	1
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Meat from broilers (Gallus gallus) - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	86	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Meat from duck - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	13	1	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	1
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Meat from geese - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	12	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Meat from pig - carcase - Slaughterhouse - Iceland - food sample - carcase swabs - Surveillance - Official sampling - Objective sampling	batch	600	Square centimetre	4921	23	Salmonella - Not typeable	16
						Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Brandenburg	3
						Salmonella - S. Enteritidis	0
						Salmonella - S. London	1
						Salmonella - S. Typhimurium	3
						Salmonella - Salmonella spp., unspecified	3
						Salmonella - S. 1,4,[5],12:i:-	0
Meat from turkey - carcase - Slaughterhouse - Iceland - food sample - neck skin - Surveillance - Industry sampling - Census	batch	25	Gram	72	0	Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	0
						Salmonella - S. Infantis	0
						Salmonella - S. Infantis	0

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Sample weight	Sample weight unit	Total units tested	Total units positive	Zoonoses	N of units positive
Meat from turkey - carcass - Slaughterhouse - Iceland - food sample - neck skin - Surveillance - Industry sampling - Census	batch	25	Gram	72	0	Salmonella - S. Typhimurium	0
						Salmonella - Salmonella spp., unspecified	0
Meat from turkey - fresh - Retail - European Union - food sample (not specified) - Surveillance - Official sampling - Convenient sampling	single		NOT AVAILABLE	4	0	Salmonella - S. 1,4,[5],12:i:-	0
						Salmonella - S. Enteritidis	0
						Salmonella - S. Indiana	0
						Salmonella - S. Infantis	0
						Salmonella - S. Typhimurium	0
Salmonella - Salmonella spp., unspecified	0						

Table STAPHYLOCOCCUS AUREUS METICILLIN RESISTANT (MRSA) in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Pigs - fattening pigs - Slaughterhouse - Iceland - animal sample - nasal swab - Monitoring - Official sampling - Objective sampling	slaughter batch	24		Staphylococcus - S. aureus, meticillin resistant (MRSA)	0
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - MRSA, unspecified	0
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t011	0
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t034	0
				Staphylococcus - S. aureus, meticillin resistant (MRSA) - spa-type t108	0

Table TRICHI NELLA in animal

Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy	Sampling unit	Total units tested	Total units positive	Zoonoses	N of units positive
Pigs - fattening pigs - - Iceland - food sample - meat - NOT AVAILABLE - Industry sampling - Census	animal	78529	0	Trichinella - T. spiralis	0
				Trichinella - Trichinella spp., unspecified	0
Solipeds, domestic - horses - Slaughterhouse - Iceland - food sample - meat - Surveillance - Industry sampling - Census	animal	9262	0	Trichinella - T. spiralis	0
				Trichinella - Trichinella spp., unspecified	0

FOODBORNE OUTBREAKS TABLES

Foodborne Outbreaks: summarized data

Causative agent	Food vehicle	Outbreak strenght				Outbreak strenght			
		Strong				Weak			
		N outbreaks	N human cases	N hospitalized	N deaths	N outbreaks	N human cases	N hospitalized	N deaths
Bacillus - B. cereus	Buffet meals	1	30	0	0				
	Mixed food	1	3	0	0				
	Bovine meat and products thereof	1	3	0	0				
Campylobacter - Campylobacter spp., unspecified	Tap water, including well water	1	3	0	0				
	Unknown					1	3	0	0

Strong Foodborne Outbreaks: detailed data

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Bacillus - B. cereus		General	Buffet meals	Rice was served with the food	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Mobile retailer or market/street vendor	Take-away or fast-food outlet	Iceland	Inadequate chilling		1	30	0	0
			Mixed food	Rice was served with the food	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Restaurant or Cafe or Pub or Bar or Hotel or Catering service	Take-away or fast-food outlet	Iceland	Inadequate chilling		1	3	0	0
		Household / domestic kitchen	Bovine meat and products thereof	Lamb stew and rice	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Residential institution (nursing home or prison or boarding school) (not specified)	Household	Iceland	Inadequate chilling		1	3	0	0
Campylobacter - Campylobacter spp., unspecified		Unknown	Tap water, including well water		Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent	Unknown	Unknown	Unknown	Unknown		1	3	0	0

Weak Foodborne Outbreaks: detailed data

Causative agent	FBO nat. code	Outbreak type	Food vehicle	More food vehicle info	Nature of evidence	Setting	Place of origin of problem	Origin of food vehicle	Contributory factors	Comment	N outbreaks	N human cases	N hosp.	N deaths
Campylobacter - Campylobacter spp., unspecified		Unknown	Unknown		Analytical epidemiological evidence	Unknown	Unknown	Unknown	Unknown		1	3	0	0

ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

Table Antimicrobial susceptibility testing of Campylobacter - C. coli in Ducks (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

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

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

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

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

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Gallus gallus (fowl) - broilers - before slaughter

Sampling Stage: Farm (not specified)

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: Iceland

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

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Ducks (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: France

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

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Turkeys - fattening flocks (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

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

Table Antimicrobial susceptibility testing of Campylobacter - C. jejuni in Turkeys - fattening flocks - before slaughter

Sampling Stage: Farm (not specified)

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: Iceland

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

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
ECOFF	2	4	0.5	4	16	1
Lowest limit	0.12	0.25	0.12	1	1	0.5
Highest limit	16	16	16	128	64	64
N of tested isolates	28	28	28	28	28	28
N of resistant isolates	0	0	1	0	1	0
MIC						
<=0.12	3		27			
<=0.25		2				
0.25	21					
<=0.5						28
0.5	4	6				
<=1				28		
1		20				
4					19	
8					8	
>16			1			
>64					1	

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

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Germany

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

Table Antimicrobial susceptibility testing of Campylobacter - C. lari in Ducks (not specified)

Sampling Stage: Retail

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Denmark

AM substance	Aminoglycosides - Gentamicin	Aminoglycosides - Streptomycin	Fluoroquinolones - Ciprofloxacin	Macrolides - Erythromycin	Quinolones - Nalidixic acid	Tetracyclines - Tetracycline
ECOFF	2	4	0.5	8	16	2
Lowest limit	0.12	0.25	0.12	1	1	0.5
Highest limit	16	16	16	128	64	64
N of tested isolates	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	1	0
MIC						
0.5			1			
<=1				1		
1	1					1
2		1				
32					1	

ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

Table Antimicrobial susceptibility testing of Salmonella - Not typeable in Meat from pig - carcase (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

Sampling Context: Control and eradication programmes

Sampler: Official sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=2													1	
<=4											1			
4								1						
<=8		1												
>1024												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Agona in Gallus gallus (fowl) - broilers - during rearing period

Sampling Stage: Farm (not specified)

Sampling Type: environmental sample - boot swabs

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

Sampler: Industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	6	6	6	6	6	6	6	6	6	6	6	6	6	6
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	3	0	0
<=0.015						6								
<=0.03			6											
<=0.25				6										
<=0.5	6				6									
0.5							4							4
<=1									5	6				
1							2							2
<=2								6						
2									1					
<=4											3			
4													6	
<=8		6												
8											3			
64												3		
1024												1		
>1024												2		

Table Antimicrobial susceptibility testing of Salmonella - S. Agona in Gallus gallus (fowl) - broilers - during rearing period

Sampling Stage: Farm (not specified)

Sampling Type: environmental sample - dust

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Suspect sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=4											1			
<=8		1												
8								1						1
>1024												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Brandenburg in Meat from pig - carcase (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

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

Sampler: Official sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	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						
>1024												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Goma in Feed material of oil seed or fruit origin - soya (bean) derived

Sampling Stage: Feed mill

Sampling Type: feed sample

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Brazil

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03			1											
0.03						1								
<=0.25				1			1							
<=0.5	1				1									
0.5														1
<=1									1	1				
<=2								1					1	
<=4											1			
<=8		1												
256												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Infantis in Gallus gallus (fowl) - broilers - during rearing period

Sampling Stage: Farm (not specified)

Sampling Type: environmental sample - boot swabs

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

Sampler: Industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	7	7	7	7	7	7	7	7	7	7	7	7	7	7
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	3	0	0
<=0.015						1								
<=0.03			7											
0.03						6								
<=0.25				7			6							4
<=0.5	7				7									
0.5							1							3
<=1									7	7				
<=2								1					3	
<=4											7			
4								3					4	
<=8		7												
8								3						
64												4		
>1024												3		

Table Antimicrobial susceptibility testing of Salmonella - S. Infantis in Meat from broilers (Gallus gallus) - carcase (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - neck skin

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

Sampler: Industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							
<=0.5	1				1									
0.5														1
<=1									1	1				
<=2													1	
<=4											1			
<=8		1												
8								1						
32												1		

Table Antimicrobial susceptibility testing of Salmonella - S. London in Meat from pig - carcase (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

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

Sampler: Official sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<=0.015						1								
<=0.03			1											
<=0.25				1										
<=0.5	1				1									
0.5							1							
<=1									1	1				
1														1
<=2								1						
4													1	
<=8		1												
8											1			
512												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Mbandaka in Feed material of oil seed or fruit origin - soya (bean) derived

Sampling Stage: Feed mill

Sampling Type: feed sample

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Brazil

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.015						1								
<=0.03			1											
<=0.25				1			1							
<=0.5	1				1									
0.5														1
<=1									1	1				
<=2													1	
<=4											1			
<=8		1												
8								1						
64												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Montevideo in Compound feedingstuffs for fish (not specified)

Sampling Stage: Feed mill

Sampling Type: feed sample

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	3	3	3	3	3	3	3	3	2	3	3	3	3	3
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.015						3								
<=0.03			3											
<=0.25				3			1							
<=0.5	3				3									
0.5							2							3
<=1									2	3				
<=2								3						
4													3	
<=8		3												
8											2			
16											1			
32												1		
64													2	

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium in Meat from bovine animals - minced meat - intended to be eaten cooked (not specified)

Sampling Stage: Processing plant

Sampling Type: food sample - meat

Sampling Context: Surveillance

Sampler: HACCP and own check

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	1	0	0	0	0	1	0	0	0
<=0.03			1											
<=0.25				1										1
<=0.5	1				1									
0.5						1	1							
<=1									1	1				
<=2													1	
4								1						
<=8		1												
32											1			
128												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Typhimurium in Meat from pig - carcase (not specified)

Sampling Stage: Slaughterhouse

Sampling Type: food sample - carcase swabs

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

Sampler: Official sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=2													1	
<=4											1			
4								1						
<=8		1												
128												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Compound feedingstuffs for poultry, broilers - final product (not specified)

Sampling Stage: Farm (not specified)

Sampling Type: feed sample

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Suspect sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.03			1											
0.03						1								
<=0.25				1										1
<=0.5	1				1									
0.5							1							
<=1								1		1				
<=2													1	
<=4											1			
<=8		1												
8								1						
32												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Gallus gallus (fowl) - broilers - during rearing period

Sampling Stage: Farm (not specified)

Sampling Type: environmental sample - boot swabs

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

Sampler: Industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	3	3	3	3	3	3	3	3	3	3	3	3	3	3
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	0	0
<=0.015						1								
<=0.03			3											
0.03						2								
<=0.25				3										3
<=0.5	3				3									
0.5							3							
<=1									3	3				
<=2													3	
<=4											3			
<=8		3												
8								3						
32												2		
>1024													1	

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Compound feedingstuffs for fish (not specified)

Sampling Stage: Feed mill

Sampling Type: feed sample

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Penicillins - Ampicillin
ECOFF	8
Lowest limit	1
Highest limit	64
N of tested isolates	1
N of resistant isolates	0
MIC	<=1

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Compound feedingstuffs, not specified - process control (not specified)

Sampling Stage: Feed mill

Sampling Type: environmental sample - dust

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	1	1	1	1	1	1	1	1	1	1	1	1	1	1
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<=0.03			1											
0.03						1								
<=0.25				1			1							1
<=0.5	1				1									
<=1									1	1				
<=2													1	
<=4											1			
<=8		1												
8								1						
32												1		

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Compound feedingstuffs, not specified - process control (not specified)

Sampling Stage: Feed mill

Sampling Type: environmental sample - dust

Sampling Context: Surveillance

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MIC														
<=0.015						1								
<=0.03			2											
0.03						1								
<=0.25				2										2
<=0.5	2				2									
0.5							2							
<=1									2	2				
<=2													2	
<=4											2			
<=8		2												
8								2						
32												2		

Table Antimicrobial susceptibility testing of Salmonella - S. Worthington in Compound feedingstuffs, not specified - process control (not specified)

Sampling Stage: Feed mill

Sampling Type: environmental sample - fabric swab

Sampling Context: Surveillance

Sampler: Industry sampling

Sampling Strategy: Objective sampling

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides - Sulfamethoxazole	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.5	2	0.06	1	16	8	2	16	256	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	4	4	4	4	4	4	4	4	4	4	4	4	4	4
N of resistant isolates	0	0	0	0	0	0	0	0	0	0	0	1	0	0
MIC														
<=0.015						2								
<=0.03			4											
0.03						2								
<=0.25				4			1							2
<=0.5	4				4									
0.5							3							2
<=1									4	4				
<=2								1					3	
<=4											3			
4								1					1	
<=8		4												
8								2			1			
32												2		
64												1		
>1024												1		

ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

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

Sampling Stage: Slaughterhouse Sampling Type: animal sample - caecum Sampling Context: Monitoring
 Sampler: Official sampling Sampling Strategy: Objective sampling Programme Code: ESBL MON pn12
 Analytical Method: Dilution - sensititre
 Country of Origin:Iceland

AM substance	Carbapenems - Ertapenem	Carbapenems - Imipenem	Cephalosporins - Cefepime	Cephalosporins - Cefotaxime	Cephalosporins - Cefoxitin	Cephalosporins - Ceftazidime	Cephalosporins + β lactamase inhibitores - Cefotaxime + Clavulanic acid	Cephalosporins + β lactamase inhibitores - Ceftazidime + Clavulanic acid
ESBL genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
AMPC genotype	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2
CARBAPENEM genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
Cefotaxime synergy test	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent
Ceftazidime synergy test	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent
ECOFF	0.06	0.5	0.125	0.25	8	0.5	0.25	0.5
Lowest limit	0.015	0.12	0.06	0.25	0.5	0.25	0.06	0.12
Highest limit	2	16	32	64	64	128	64	128
N of tested isolates	3	3	3	3	3	3	3	3
N of resistant isolates	0	0	3	3	3	3	3	3
MIC								
0.03	1							
0.06	2							
<=0.12		3						
0.25			3					
4							1	2
8				3			1	2
16							2	1
64					3			

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.06	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	3	3	3	3	3	3	3	3	3	3	3	3	3	3
N of resistant isolates	0	0	0	3	3	0	0	0	3	0	0	0	0	0
MIC														
<=0.015						2								
<=0.03			3											
0.03						1								
<=0.25							3							1
<=0.5	2													
0.5														2
<=1										3				
1	1													
<=2														1
<=4											3			
4								2					2	
>4				3										
<=8		3										1		
8					1			1						
>8					2									
16												1		
32												1		
>64									3					

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

Sampling Stage: Cutting plant

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin:Iceland

AM substance	Carbapenems - Ertapenem	Carbapenems - Imipenem	Cephalosporins - Cefepime	Cephalosporins - Cefotaxime	Cephalosporins - Cefoxitin	Cephalosporins - Ceftazidime	Cephalosporins + β lactamase inhibitors - Cefotaxime + Clavulanic acid	Cephalosporins + β lactamase inhibitors - Ceftazidime + Clavulanic acid
ESBL genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
AMPC genotype	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2	CMY-2
CARBAPENEM genotype	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE	NOT AVAILABLE
Cefotaxime synergy test	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent
Ceftazidime synergy test	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent	Negative/Absent
ECOFF	0.06	0.5	0.125	0.25	8	0.5	0.25	0.5
Lowest limit	0.015	0.12	0.06	0.25	0.5	0.25	0.06	0.12
Highest limit	2	16	32	64	64	128	64	128
N of tested isolates	4	4	4	4	4	4	4	4
N of resistant isolates	2	0	4	4	4	4	4	4
MIC								
0.06	2							
<=0.12		3						
0.12	2							
0.25		1	4					
4								1
8				1		4	4	3
16				3				
64					1			
>64					3			

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

Sampling Stage: Cutting plant

Sampling Type: food sample - meat

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin:Iceland

AM substance	Aminoglycosides - Gentamicin	Amphenicols - Chloramphenicol	Carbapenems - Meropenem	Cephalosporins - Cefotaxime	Cephalosporins - Ceftazidime	Fluoroquinolones - Ciprofloxacin	Glycylcyclines - Tigecycline	Macrolides - Azithromycin	Penicillins - Ampicillin	Polymyxins - Colistin	Quinolones - Nalidixic acid	Sulfonamides	Tetracyclines - Tetracycline	Trimethoprim
ECOFF	2	16	0.125	0.25	0.5	0.06	1	16	8	2	16	64	8	2
Lowest limit	0.5	8	0.03	0.25	0.5	0.015	0.25	2	1	1	4	8	2	0.25
Highest limit	32	128	16	4	8	8	8	64	64	16	128	1024	64	32
N of tested isolates	4	4	4	4	4	4	4	4	4	4	4	4	4	4
N of resistant isolates	0	0	0	4	4	0	0	0	4	0	0	0	0	0
MIC														
<=0.015						3								
<=0.03			4											
0.03						1								
<=0.25							4							1
<=0.5	4													
0.5														3
<=1										4				
<=2								1						
<=4											4			
4								3					4	
>4				4										
<=8		4												
8					4									
16												3		
32												1		
>64									4					

OTHER ANTIMICROBIAL RESISTANCE TABLES