

## 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 2016

## PREFACE

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

The report contains information on trends and sources of zoonoses and zoonotic agents in Iceland during the year 2016.

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

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

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

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

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

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# 1 ANIMAL POPULATIONS

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

## 1.1 Populations

### 1.1.1 Information on susceptible animal population

#### Sources of information

Information on cattle, pigs, horses, sheep and goat population are collected from the livestock database BUSTOFN. Data from poultry production is collected both from this database and from registrations at MAST on authorized premises. MAST is responsible for the database. Information regarding slaughtered animals is based on data from the slaughterhouses. The data is stored in databases hosted at the Farmers Association but under surveillance of MAST.

#### Dates the figures relate to and the content of the figures

The number livestock population in the report are collected from an autumn report that all livestock owners have to turn in before the end of November each year. The database is based on information which farmers have to turn in according to law. MAST reviews the autumn reports before official numbers are released in May the following year. The information for 2016 is reported in autumn that same year. The number of slaughtered animals indicates all slaughtered animals in slaughterhouses from 1st of January 2015 to 31st of December 2015.

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

The number of poultry flocks is given by the number of houses. The number of holdings and herds are the same for cattle, pigs, horses, sheep and goats.

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

When comparing animal population from 2015 and 2016 the population is relatively stable. There has been an increase in the number of slaughtered cattle, lambs and poultry but a decrease of slaughtered pigs.

#### 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 tuberculosis complex (MTC) - general evaluation**

History of the disease and/or infection in the country

*Mycobacterium bovis* is almost unknown in Iceland. The only clinical case in cattle was detected in 1922. Sporadic monitoring from 1923 until 1971, all negative, and there are no positive findings in slaughterhouses. Passive monitoring at slaughterhouse level today.

#### **2.1.2 Mycobacterium in animals**

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

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

The entire country is free.

## **2.2 BRUCELLOSIS**

#### **2.2.1 Brucella in animals**

##### **2.2.1.1 B. abortus in animal - Cattle (bovine animals) - animal sample**

Status as officially free of bovine brucellosis during the reporting year

The entire country free

The entire country is free of bovine brucellosis.

Monitoring system

## Sampling strategy

Randomly selection of 16 herds, from each herd 5 blood samples are taken. In 2016, 82 samples were taken from 16 herds.

## Frequency of the sampling

Samples are usually taken every year, but some years like 2015, no samples were taken.

## Type of specimen taken

Serum

## Diagnostic/analytical methods used

Brucella abortus (agg) antibody examination by agglutination. Neg: less than 30iu/ml

## Control program/mechanisms

### The control program/strategies in place

Annual serological surveillance of dairy cow herds, and annually are taken ca 80 samples.

## Measures in case of the positive findings or single cases

Isolation of the farm and attempts to eradication of the agent.

## Notification system in place

Brucellosis in animals is notifiable.

## Results of the investigation

No findings.

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

Neither Brucella abortus nor other Brucella spp. has ever been detected in Iceland.

### **2.2.1.2 B. melitensis in animal - Goats - animal sample**

#### Status as officially free of caprine brucellosis during the reporting year

##### The entire country free

The entire country is free of caprine brucellosis.

### **2.2.1.3 B. melitensis in animal - Sheep - animal sample**

#### Status as officially free of ovine brucellosis during the reporting year

## The entire country free

The entire country is free of ovine brucellosis

## Monitoring system

### Sampling strategy

Samples are randomly taken from 5 ewes on around 20 randomly selected farms.

### Frequency of the sampling

Annually.

### Type of specimen taken

Serum.

### Diagnostic/analytical methods used

*Brucella melitensis* antibody examination by agglutination

## Control program/mechanisms

### The control program/strategies in place

Annual serological surveillance and annually are taken ca 100 samples.

## Measures in case of the positive findings or single cases

Isolation of the farm and attempts to eradication of the agent.

## Notification system in place

*Brucella melitensis* in animals is a notifiable disease.

## Results of the investigation

No findings.



## 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 present in the pig production. After 2000, prevalence of Salmonella has been below 1% in broiler flocks and has even been 0% for three consecutive years (2005-2007). In 2009 however, an increase in broiler flocks was seen. Salmonella in breeding flocks (*Gallus gallus*) has only been once 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 (less than 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

Salmonella is present in broiler flocks, although at low levels, and *S. Enteritidis* and *S. Typhimurium* have not been detected in poultry production. The prevalence of salmonella in swab samples from carcasses remained low.

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

Because of the control programmes for reducing Salmonella in the pig and poultry production, 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.

#### 3.1.2 Salmonella in foodstuffs

##### 3.1.2.1 Salmonella in food - Meat from bovine animals - food sample

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

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

At meat processing plant

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. More than 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. Less than 500 carcasses no sampling if GHP can be demonstrated. Slaughtering of lamb / sheep. More than 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. Less than 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 (LCAs) are responsible for sampling at retail. No official sampling 2016.

## 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.

## Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

Swab samples from carcasses before chilling in four designated areas with a sponge. Each area 10 x 10 cm; total 400 cm<sup>2</sup>. 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 procedures are verified under official control of FBO.

## Measures in case of the positive findings or single cases

Meat is withdrawn from the market.

## Notification system in place

Laboratories as well as the FBO analysing Salmonella 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. 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 negative results from the FBO own checks are not collected. Salmonella in food is notifiable. Salmonella in bovine meat production has not been notified by FBO to MAST.

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

Bovine meat is not believed to be an important source of human salmonellosis.

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

Salmonella in bovine meat seems not to be a source for human infections.

### **3.1.2.2 Salmonella in food - Meat from broilers (Gallus gallus) - food sample**

#### Monitoring system

## Sampling strategy

At meat processing plant

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

At retail

The local competent authorities (LCA) are responsible for sampling at retail. No sampling in 2016

## Frequency of the sampling

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.

## Type of specimen taken

At meat processing plant

Minced meat and meat preparation

## Methods of sampling (description of sampling techniques)

At meat processing plant

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

## Definition of positive finding

At meat processing plant

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

## Diagnostic/analytical methods used

At meat processing plant

NMKL 71, 5th ed., 1999

## 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. 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

### 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.

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

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

## **3.1.2.3 Salmonella in food - Meat from broilers (Gallus gallus) - food sample - neck skin**

### Monitoring system

#### Sampling strategy

At slaughterhouse and cutting plant

The FBOs are sampling each slaughter batch.

#### Frequency of the sampling

At slaughterhouse and cutting plant

Each broiler slaughter batch is sampled

#### Type of specimen taken

At slaughterhouse and cutting plant

Neck skin

#### Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

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

#### Definition of positive finding

At slaughterhouse and cutting plant

A sample positive for *Salmonella* spp.

#### Diagnostic/analytical methods used

At slaughterhouse and cutting plant

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

### **3.1.2.4 Salmonella in food - Meat from pig - food sample**

#### Monitoring system

#### Sampling strategy

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 (LCAs) are responsible for sampling at retail. No sampling in 2016

#### Frequency of the sampling

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.

#### Type of specimen taken

At meat processing plant

Minced meat and meat preparation

#### Definition of positive finding

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.

## 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 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.

## 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. 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.

## 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.

### **3.1.2.5 Salmonella in food - Meat from pig - food sample - carcase swabs**

## 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 MAST. Samples are taken from carcasses where the number of samples depend on the size of the slaughter batch.

### 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.

## Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcasses

## 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 health inspection 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 cm<sup>2</sup>. 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.

## 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 (every other year, 2013/652/EC). 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.

## Diagnostic/analytical methods used

At slaughterhouse and cutting plant

RapidChek Select Salmonella. Bacteriological method: NMKL 187:2007 Bacteriological method: NMKL 71:1999 5th edition

## 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.

## Results of the investigation

2016: Swabs samples (RapidChek) taken at the slaughterhouses were 0,8% positive for Salmonella or 24 of 2863. Only 18 were positive in culturing; 4xSalmonella Brandenburg, 1xSalmonella Typhimurium, 6xmonophasic Salmonella Typhimurium, 1xSalmonella Infantis, 1xSalmonella Kedougou, 1xSalmonella London, 2xSalmonella Worthington and 2xSalmonella 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 is relatively stable, 0,3-1,4% for the last 10 years, with the exception of 2009 at the prevalence at 11,2%.

### 3.1.2.6 Salmonella in food - Meat from turkey - food sample

#### Monitoring system

##### Sampling strategy

###### At meat processing plant

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

###### At retail

The local competent authorities (LCA) are responsible for sampling at retail.

##### Frequency of the sampling

###### 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.

##### Type of specimen taken

###### At meat processing plant

Minced meat and meat preparation

##### Methods of sampling (description of sampling techniques)

###### At meat processing plant

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

##### Definition of positive finding

###### At meat processing plant

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

##### Diagnostic/analytical methods used

At meat processing plant

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.

### 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.

## **3.1.2.7 Salmonella in food - Meat from turkey - food sample - neck skin**

### 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.

#### Frequency of the sampling

At slaughterhouse and cutting plant

Each turkey slaughter batch is sampled

#### Type of specimen taken

At slaughterhouse and cutting plant

Neck skin

#### 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.

#### Definition of positive finding

At slaughterhouse and cutting plant

A sample positive for Salmonella spp.

#### Diagnostic/analytical methods used

At slaughterhouse and cutting plant

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

### **3.1.2.8 Salmonella in food - Eggs - food sample**

#### Monitoring system

##### Sampling strategy

No official sampling

### **3.1.3 Salmonella in animals**

#### **3.1.3.1 Salmonella in animal - Cattle (bovine animals) - animal sample - milk**

##### Monitoring system

##### Sampling strategy

Bulk milk from 73 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 in animal - Gallus gallus (fowl) - broilers - animal sample**

##### 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 MAST 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

## 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 boot/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/socks swabs are collected and pooled into one sample. In case one boot/sock sample and one dust sample are taken, the two samples are pooled into one sample. The official sample consists of one boot/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 MAST, the flock is considered to be negative for *Salmonella*.

## Diagnostic/analytical methods used

Broiler flocks: Before slaughter at farm

Bacteriological method: NMKL 187:2007

## 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 MAST 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: 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 MAST when there is a positive salmonella finding.

## Results of the investigation

Prevalence is only 0,4% in broiler flocks in 2016 or 3 of 713. All 3 are cases are likely due to recontamination of flocks in previously contaminated houses.

## 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. Reinfection of broiler flocks in previously contaminated houses is 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% but has been under 1% ever since or 0,1% in 2016. 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 in animal - Pigs - animal sample - meat juice

#### 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 (e.g. 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.

##### Frequency of the sampling

###### 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 weeks.

#### Case definition

##### Fattening herds at slaughterhouse (herd based approach)

An individual sample is considered seropositive if OD% is more than 15 (ELISA kit).

#### Diagnostic/analytical methods used

## Fattening herds at slaughterhouse (herd based approach)

Serological method: 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. 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. 1276/2014 stipulates preventive measures to be implemented.

### 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. 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.

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

Prevalence has been increasing. 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 in animal - Gallus gallus (fowl) - breeding flocks, unspecified - animal sample**

## Monitoring system

### Sampling strategy

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

The 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 MAST 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 MAST has suspicion of a false positive result, MAST 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 MAST has suspicion of a false positive result, MAST 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 MAST. If it is not possible to confirm a first positive finding in two consecutive samples taken by MAST, 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 187:2007

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

Bacteriological method: NMKL 187:2007

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

Bacteriological method: NMKL 187:2007

## 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 MAST 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 MAST 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.

### 3.1.3.5 Salmonella in Turkeys - breeding flocks and meat production flocks

#### Monitoring system

##### Sampling strategy

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

The monitoring of Salmonella in turkey breeding flocks 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 MAST 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 boot/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/sock 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 boot/sock swabs (2 pooled samples) or one pair of boot/sock swab and one dust sample, 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 boot/sock swabs or one pair of boot/sock swabs 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/sock swabs are collected and pooled into one sample. In case one boot/sock sample and one dust sample are taken, the two samples are pooled into one sample. The official sample consists of one boot/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., always confirmed by MAST. If it is not possible to confirm a first positive finding in two consecutive samples taken by MAST, 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 MAST has suspicion of a false positive result, MAST can confirm a first positive finding, and if it is not possible to confirm, the flock will be calculated as negative.

Meat production flocks: Rearing period

A flock is considered positive when Salmonella spp. is found in a sample. According to the national control program, 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 MAST, the flock is considered to be negative for salmonella.

Meat production flocks: Before slaughter at farm

A sample positive for Salmonella spp.

Meat production flocks: At slaughter (flock based approach)

Bacteriological method: NMKL 187:2007

## Diagnostic/analytical methods used

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

Bacteriological method: NMKL 187:2007

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

Bacteriological method: NMKL 187:2007

Meat production flocks: Rearing period

Bacteriological method: NMKL 187:2007

Meat production flocks: Before slaughter at farm

Bacteriological method: NMKL No 71:1999

Meat production flocks: At slaughter (flock based approach)

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

## 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

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

### 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

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

### 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 MAST 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

#### Meat Production flocks

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

### Notification system in place

In 2016, Salmonella spp. was not found in turkey parent flocks nor flocks of fattening turkeys.

### Results of the investigation

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.

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

Following the marketing of chilled broiler meat (only been frozen) the yearly consumption increased from 6 kg per inhabitant in 1996 to 11 kg per inhabitant in 1999. Along with the increased consumption incidences of campylobacteriosis in humans began to increase. 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 meat from positive poultry flocks are either frozen or heat treated before distribution. However *Campylobacter* positive carcasses or chilled meat can have been distributed when a flock turned positive after the pre-slaughter sample had been taken. Only carcasses from poultry flocks that are negative prior to slaughter can be distributed as chilled meat. With regard to the surveillance programme the producers have to produce *Campylobacter* negative broilers if they want to sell and distribute chilled broiler meat. 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

In the recent years the prevalence in broiler slaughter batches has been 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. Epidemiological studies in the recent years showed that other vehicles such as drinking water rather than broiler meat seem to contribute to human campylobacteriosis.

##### 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 the only important source of human campylobacteriosis in Iceland any longer. Other sources might be a more important source of human campylobacteriosis in Iceland than previously thought.

##### 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*) - food sample

##### 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. No sampling in 2016

### 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 thermophilic *Campylobacter* in *Gallus gallus*

## 3.2.3 *Campylobacter* in animals

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

#### 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

Caecal

## 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

Caecum 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

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. Fly nets are used on air inlets for houses on high density farms during the summer period.

## Control program/mechanisms

### The control program/strategies in place

The Icelandic *Campylobacter* surveillance programme is build 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. 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.

## 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 MAST from the laboratories, both negative and positive results.

## Results of the investigation

The prevalence of *Campylobacter* sp. in broiler flocks (pre slaughter samples) has been very low in the recent years.

## 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.

## 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

Sporadic cases in humans, incidence from 0-1/100.000 inhabitants annually.

##### Recent actions taken to control the zoonoses

The requirements of the Regulation (EC) No 2073/2005 apply, i.e. verification of FBO's HACCP procedures, 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 animals

### 3.3.2.1 Listeria in animal - All animals - animal sample

#### 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 the notification system, little changes are seen in the prevalence of listeriosis in animals.

## 3.4 TRICHINELLOSIS

### 3.4.1 General evaluation of the national situation

#### 3.4.1.1 Trichinella - general evaluation

##### History of the disease and/or infection in the country

Samples are taken from all slaughtered pigs and horses according to 2015/1375/EC. When particularly looked for *Trichinella* has neither been found in livestock 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.

### 3.4.2 Trichinella in animals

#### 3.4.2.1 Trichinella in animal - Solipeds, domestic - horses - animal sample - organ/tissue

##### Monitoring system

###### Sampling strategy

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

###### 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 2015/1375/EC. 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

According to 2015/1375/EC, 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 2015/1375/EC 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.

### **3.4.2.2 Trichinella in animal - Pigs - animal sample - organ/tissue**

#### Number of officially recognised Trichinella-free holdings

All holdings are considered trichinella - free.

#### Categories of holdings officially recognised Trichinella-free

No categorization of holdings.

#### Monitoring system

##### Sampling strategy

###### General

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

##### 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 2015/1375/EC 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.

#### Preventive measures in place

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

#### Control program/mechanisms

##### The control program/strategies in place

Sampling of all slaughtered pigs.

#### Measures in case of the positive findings or single cases

In case of a positive sample the pig carcasses will be retested according to 2015/1375/EC. 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

No positive result on trichinella from the samples taken.

#### 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 description of the positive cases and the verification of the *Trichinella* species

##### Breeding sows and boars

No cases have been reported in Iceland, neither in humans or live stock nor in domestic wild animals (foxes, minks) in Iceland.

## 3.5 ECHINOCOCCOSIS

### 3.5.1 General evaluation of the national situation

### **3.5.1.1 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.

## 4 ANTIMICROBIAL RESISTANCE INFORMATION ON SPECIFIC ZONOSES AND ZONOTIC AGENTS

### 4.1 SALMONELLOSIS

#### 4.1.1 Salmonella in foodstuffs

##### 4.1.1.1 Antimicrobial resistance in Salmonella Meat from pig

###### Description of sampling designs

The isolates detected through the national control programme (swab samples from carcasses) for Salmonella in pigs were NOT tested for AMR in 2016 (2013/652/EU). See chapter on Salmonella in pigs.

###### Stratification procedures per animal populations and food categories

Since all samples were included in the AMR monitoring, no stratification procedures had to be implemented.

###### Randomisation procedures per animal populations and food categories

Since all isolates were included in the AMR testing, no randomisation procedures had to be implemented

##### 4.1.1.2 Antimicrobial resistance in Salmonella Meat from poultry, unspecified

###### Stratification procedures per animal populations and food categories

Since all samples were included in the AMR monitoring, no stratification procedures had to be implemented.

###### Randomisation procedures per animal populations and food categories

Since all isolates were included in the AMR testing, no randomisation procedures had to be implemented

###### Sampling strategy used in monitoring

###### Frequency of the sampling

Salmonella found in neck skin samples taken according to the national 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

Neck skin samples. Isolates detected within the national control program

###### Methods of sampling (description of sampling techniques)

Isolates detected within the national control program

###### Procedures for the selection of isolates for antimicrobial testing

MAST selects the isolates to ensure that only one isolate from each serovar from each batch is tested for AMR.



## Methods used for collecting data

The laboratory performing the AMR testing sends all results to MAST.

## 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.

## 4.1.2 Salmonella in animals

### 4.1.2.1 Antimicrobial resistance in Salmonella Pigs

#### Sampling strategy used in monitoring

##### Frequency of the sampling

Salmonella isolates found in pig herds within the national control programme are included in the resistance monitoring (every other year, according to Decision 2013/652/EU). No samples were taken from pig herds on farms in 2016.

### 4.1.2.2 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 national control programme is included in the resistance monitoring.

##### Type of specimen taken

Sock samples, fecal samples, dust samples from all types of poultry production, according to the national control programme.

##### Methods of sampling (description of sampling techniques)

Isolates detected within the national control programme.

### Procedures for the selection of isolates for antimicrobial testing

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

### Methods used for collecting data

The laboratory performing the AMR testing sends all results to MAST.

### 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.

## 4.2 ESCHERICHIA COLI, NON-PATHOGENIC

### 4.2.1 Escherichia coli, non-pathogenic in animals

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

##### Description of sampling designs

Cecal samples at slaughter. For ESBL/AmpC producing E. coli, 150 samples are taken, evenly distributed over the year. For commensal indikator E. coli, sample from each epidemiological unit.

##### Stratification procedures per animal populations and food categories

Since all samples were included in the AMR monitoring, no stratification procedures had to be implemented.

##### Randomisation procedures per animal populations and food categories

Since all isolates were included in the AMR testing, no randomisation procedures had to be implemented

##### Sampling strategy used in monitoring

## Type of specimen taken

Cecal sample at slaughter

## Procedures for the selection of isolates for antimicrobial testing

All positive samples tested for AMR

## Methods used for collecting data

The laboratory performing the AMR testing sends all results to MAST.

## Laboratory used for detection for resistance

## Antimicrobials included in monitoring

Panel of antimicrobial substances (panel 1) according to decision 2013/652/EC; Ampicillin, Cefotaxime, Ceftazidime, Chloramphenicol, Ciprofloxacin, Colistin, Gentamicin, Meropenem, Nalidixic acid, Sulfamethoxazole, Tetracycline, Trimethoprim, Azithromycin, Tigecycline. For positive ESBL/AmpC producing E. coli panel 2 is included; Cefoxitin, Cefepime, Cefotaxime+clavulanic acid, Ceftazidime+clavulanic acid, Meropenem, Temocillin, Imipenem, Ertapenum, Cefotaxime, Ceftazidime.

## Cut-off values used in testing

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

## 5 FOODBORNE OUTBREAKS

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

### 5.1 Outbreaks

#### 5.1.1 Foodborne outbreaks

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

LCAs and 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 and coordination of the LCAs. MAST and the LCSs are responsible for investigation of food and the FBOs .

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 (0-5) each year. The situation has been stable the past 10 years.

Additional information

Standardized reporting and harmonization not fully implemented between different authorities. Therefore, reporting of FBO's is not possible. Standardization to be implemented in 2017. Four different FBO registered in 2016; One VTEC, one Campylobacter and two Salmonella cases.

## 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) - dairy calves               | 709                             | 11,626  |                          | 709        |
|   | Cattle (bovine animals) - calves (under 1 year) - for slaughter              | 714                             | 10,423  |                          | 714        |
|   | Cattle (bovine animals) - dairy cows - adult                                 | 648                             | 26,347  |                          | 648        |
|   | Cattle (bovine animals) - dairy cows - young cattle (1-2 years)              | 636                             | 6,546   |                          | 636        |
|   | Cattle (bovine animals) - meat production animals - suckler cows             | 132                             | 2,176   |                          | 132        |
|   | Cattle (bovine animals) - unspecified  |                                 |         | 22,658                   |            |
|   | Cattle (bovine animals) - young cattle (1-2 years)                           | 796                             | 22,906  |                          | 796        |
|   | Gallus gallus (fowl)   | Gallus gallus (fowl) - broilers | 34      | 683,556                  | 5,371,118  |
| Gallus gallus (fowl) - laying hens - adult  |  | 301                             | 196,206 |                          | 301        |
| Gallus gallus (fowl) - laying hens - during rearing period  |  | 38                              | 51,294  |                          | 38         |
| Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult                 |  | 4                               | 50,590  | 24,687                   | 19         |
| Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period |  | 6                               | 52,672  |                          | 14         |
| Gallus gallus (fowl) - parent breeding flocks for egg production line - adult                     |  | 4                               | 7,984   |                          | 6          |
| Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period     |  | 1                               | 5,092   |                          | 1          |
| Goats   | Goats  | 106                             | 1,188   | 194                      | 106        |
| Pigs  | Pigs - breeding animals - raised under controlled housing conditions - boars | 16                              | 59      | 108                      | 16         |
|   | Pigs - breeding animals - raised under controlled housing conditions - sows  | 19                              | 3,451   | 1,492                    | 19         |
|   | Pigs - fattening pigs - raised under controlled housing conditions           | 20                              | 25,791  | 74,522                   | 20         |
|   | Pigs - fattening pigs - raised under controlled housing conditions - piglets | 15                              | 8,715   |                          | 15         |
| Sheep   | Sheep - animals over 1 year  | 2,470                           | 389,800 | 42,356                   | 2,470      |
|   | Sheep - animals under 1 year (lambs)   | 2,279                           | 86,093  | 555,617                  | 2,279      |
| Solipeds, domestic  | Solipeds, domestic - horses  |                                 | 67,186  | 7,889                    |            |
| Turkeys   | Turkeys - meat production flocks   | 8                               | 17,005  | 44,665                   | 9          |
|   | Turkeys - parent breeding flocks - adult                                     | 1                               | 503     |                          | 3          |
|   | Turkeys - parent breeding flocks - during rearing period                     | 2                               | 1,447   |                          | 2          |

**DISEASE STATUS TABLES**

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

| <b>Region</b> | <b>Number of herds with status officially free</b> | <b>Number of infected herds</b> | <b>Total number of herds</b> |
|---------------|--|---------------------------------|------------------------------|
| ICELAND       | 846  | 0                               | 846                          |

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

| <b>Region</b> | <b>Number of herds with status officially free</b> | <b>Number of infected herds</b> | <b>Total number of herds</b> |
|---------------|--|---------------------------------|------------------------------|
| ICELAND       | 2,480  | 0                               | 2,480                        |

**DISEASE STATUS TABLES**

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

| <b>Region</b> | <b>Number of herds with status officially free</b> | <b>Number of infected herds</b> | <b>Total number of herds</b> |
|---------------|--|---------------------------------|------------------------------|
| ICELAND       | 846  | 0                               | 846                          |



## PREVALENCE TABLES

Table CAMPYLOBACTER in animal

| Area of Sampling | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy   | Sampling unit          | Total units tested | Total units positive | Zoonoses                                  | N of units positive |
|------------------|--|------------------------|--------------------|----------------------|---|---------------------|
| Not Available    | Gallus gallus (fowl) - broilers - before slaughter - Farm - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census     | herd/flock             | 715                | 22                   | thermotolerant Campylobacter, unspecified | 22                  |
|                  | Gallus gallus (fowl) - broilers - Slaughterhouse - Iceland - animal sample - caecum - Control and eradication programmes - Industry sampling - Selective sampling  | slaughter animal batch | 449                | 11                   | thermotolerant Campylobacter, unspecified | 11                  |
|                  | Turkeys - meat production flocks - before slaughter - Farm - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census    | herd/flock             | 36                 | 1                    | thermotolerant Campylobacter, unspecified | 1                   |
|                  | Turkeys - meat production flocks - Slaughterhouse - Iceland - animal sample - caecum - Control and eradication programmes - Industry sampling - Selective sampling | slaughter animal batch | 25                 | 0                    | Campylobacter                             | 0                   |

**Table COXIELLA in animal**

| <b>Area of Sampling</b> | <b>Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy</b>                            | <b>Sampling unit</b> | <b>Total units tested</b> | <b>Total units positive</b> | <b>N of clinical affected herds</b> | <b>Zoonoses</b> | <b>N of units positive</b> |
|-------------------------|--|----------------------|---------------------------|-----------------------------|-------------------------------------|-----------------|----------------------------|
| Not Available           | Cattle (bovine animals) - dairy cows - adult - Farm - Iceland - animal sample - milk - Monitoring - Official sampling - Objective sampling | herd/flock           | 73                        | 0                           | 0                                   | Coxiella        | 0                          |

**Table HISTAMINE in food**

| Area of Sampling | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy   | Sampling unit     | Sample weight | Sample weight unit | Total units tested | Total units positive | Method | Zoonoses  | N of units tested | N of units positive |
|------------------|--|-------------------|---------------|--------------------|--------------------|----------------------|--------|-----------|-------------------|---------------------|
| Not Available    | Fishery products, unspecified - ready-to-eat - chilled - Border inspection activities - Thailand - food sample - Surveillance - Official sampling - Selective sampling | batch (food/feed) | 5             | Gram               | 27                 | 0                    | <= 100 | Histamine | 0                 | 0                   |

**Table LISTERIA in food**

| Area of Sampling | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy                 | Sampling unit     | Sample weight | Sample weight unit | Total units tested | Total units positive | Method    | Zoonoses               | N of units tested | N of units positive |
|------------------|--|-------------------|---------------|--------------------|--------------------|----------------------|-----------|------------------------|-------------------|---------------------|
| Not Available    | Roe - frozen - Border inspection activities - Peru - food sample - Surveillance - Official sampling - Objective sampling | batch (food/feed) | 25            | Gram               | 5                  | 0                    | detection | Listeria monocytogenes | 5                 | 0                   |

Table SALMONELLA in animal

| Area of Sampling | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy   | Sampling unit          | N of flocks under control programme | Target verification | Total units tested | Total units positive | Zoonoses               | N of units positive |
|------------------|--|------------------------|-------------------------------------|---------------------|--------------------|----------------------|------------------------|---------------------|
| Not Available    | Cattle (bovine animals) - dairy cows - adult - Farm - Not Available - Not Available - Monitoring - Official sampling - Objective sampling  | herd/flock             |                                     | N_A                 | 73                 | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - broilers - before slaughter - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census                                   | herd/flock             | 713                                 | Y                   | 713                | 3                    | Salmonella Agona       | 1                   |
|                  |  |                        |                                     |                     |                    |                      | Salmonella Infantis    | 1                   |
|                  |  |                        |                                     |                     |                    |                      | Salmonella Worthington | 1                   |
|                  | Gallus gallus (fowl) - laying hens - adult - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census   | herd/flock             | 53                                  | Y                   | 49                 | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - laying hens - day-old chicks - Farm - Iceland - environmental sample - delivery box liner - Control and eradication programmes - Industry sampling - Census                                       | herd/flock             |                                     | N_A                 | 33                 | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - laying hens - during rearing period - Farm - Iceland - animal sample - faeces - Control and eradication programmes - Industry sampling - Census   | herd/flock             |                                     | N_A                 | 7                  | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for broiler production line - adult - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census    | herd/flock             | 39                                  | Y                   | 39                 | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for broiler production line - day-old chicks - Farm - Iceland - animal sample - eggshells - Control and eradication programmes - Industry sampling - Census                | herd/flock             |                                     | N_A                 | 7                  | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for broiler production line - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census | herd/flock             |                                     | N_A                 | 15                 | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for egg production line - adult - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census        | herd/flock             | 7                                   | Y                   | 7                  | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for egg production line - day-old chicks - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census            | herd/flock             |                                     | N_A                 | 2                  | 0                    | Salmonella             | 0                   |
|                  | Gallus gallus (fowl) - parent breeding flocks for egg production line - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census     | herd/flock             |                                     | N_A                 | 2                  | 0                    | Salmonella             | 0                   |
|                  | Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Iceland - animal sample - meat juice - Control and eradication programmes - Official sampling - Objective sampling                 | slaughter animal batch |                                     | N_A                 | 1056               | 275                  | Salmonella             | 275                 |
|                  | Turkeys - fattening flocks - before slaughter - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Official and industry sampling - Census  | herd/flock             | 25                                  | Y                   | 25                 | 0                    | Salmonella             | 0                   |
|                  | Turkeys - parent breeding flocks - adult - Farm - Iceland - environmental sample - boot swabs and dust - Control and eradication programmes - Official and industry sampling - Census                                    | herd/flock             | 3                                   | Y                   | 3                  | 0                    | Salmonella             | 0                   |
|                  | Turkeys - parent breeding flocks - day-old chicks - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census   | herd/flock             |                                     | N_A                 | 2                  | 0                    | Salmonella             | 0                   |
|                  | Turkeys - parent breeding flocks - during rearing period - Farm - Iceland - environmental sample - boot swabs - Control and eradication programmes - Industry sampling - Census  | herd/flock             |                                     | N_A                 | 3                  | 0                    | Salmonella             | 0                   |

Table SALMONELLA in food

| Area of Sampling                   | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy  | Sampling unit          | Sample weight | Sample weight unit | Total units tested | Total units positive | Zoonoses               | N of units positive |
|------------------------------------|---|------------------------|---------------|--------------------|--------------------|----------------------|------------------------|---------------------|
| Not Available                      | Dairy products (excluding cheeses) - Border inspection activities - United States - food sample - Surveillance - Official sampling - Objective sampling   | batch (food/feed)      | 25            | Gram               | 5                  | 0                    | Salmonella             | 0                   |
|                                    | Dairy products (excluding cheeses) - milk powder and whey powder - Border inspection activities - Canada - food sample - Surveillance - Official sampling - Objective sampling                            | batch (food/feed)      | 25            | Gram               | 5                  | 0                    | Salmonella             | 0                   |
|                                    | Dairy products (excluding cheeses) - milk powder and whey powder - Border inspection activities - United States - food sample - Surveillance - Official sampling - Objective sampling                     | batch (food/feed)      | 25            | Gram               | 10                 | 0                    | Salmonella             | 0                   |
|                                    | Meat from broilers (Gallus gallus) - carcass - Slaughterhouse - Iceland - food sample - neck skin - Control and eradication programmes - Industry sampling - Census                                       | batch (food/feed)      | 25            | Gram               | 822                | 1                    | Salmonella Infantis    | 1                   |
|                                    | Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - frozen - Border inspection activities - Thailand - food sample - meat - Surveillance - Official sampling - Objective sampling | batch (food/feed)      | 25            | Gram               | 10                 | 0                    | Salmonella             | 0                   |
|                                    | Meat from pig - carcass - Slaughterhouse - Iceland - food sample - carcass swabs - Control and eradication programmes - Official sampling - Census  | slaughter animal batch | Not Available |                    | 2863               | 18                   | Salmonella Brandenburg | 4                   |
| Salmonella Infantis                |   |                        |               |                    |                    |                      | 1                      |                     |
| Salmonella Kedougou                |   |                        |               |                    |                    |                      | 1                      |                     |
| Salmonella London                  |   |                        |               |                    |                    |                      | 1                      |                     |
| Salmonella spp., unspecified       |   |                        |               |                    |                    |                      | 2                      |                     |
| Salmonella Typhimurium             |   |                        |               |                    |                    |                      | 1                      |                     |
| Salmonella Typhimurium, monophasic |   |                        |               |                    |                    |                      | 6                      |                     |
| Salmonella Worthington             | 2   |                        |               |                    |                    |                      |                        |                     |
|                                    | Meat from turkey - carcass - Slaughterhouse - Iceland - food sample - neck skin - Control and eradication programmes - Industry sampling - Census   | batch (food/feed)      | 25            | Gram               | 64                 | 0                    | Salmonella             | 0                   |

Table SALMONELLA in feed

| Area of Sampling | Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy  | Sampling unit     | Sample weight | Sample weight unit | Total units tested | Total units positive | Zoonoses               | N of units positive |
|------------------|---|-------------------|---------------|--------------------|--------------------|----------------------|------------------------|---------------------|
| Not Available    | All feedingstuffs - Feed mill - Iceland - environmental sample - dust - Surveillance - Industry sampling - Selective sampling                                 | batch (food/feed) | 25            | Gram               | 341                | 5                    | Salmonella Enteritidis | 2                   |
|                  |   |                   |               |                    |                    |                      | Salmonella Infantis    | 1                   |
|                  |   |                   |               |                    |                    |                      | Salmonella Mikawasima  | 1                   |
|                  |   |                   |               |                    |                    |                      | Salmonella Stanley     | 1                   |
|                  | All feedingstuffs - Feed mill - Iceland - environmental sample - dust - Surveillance - Official sampling - Selective sampling                                 | batch (food/feed) | 25            | Gram               | 42                 | 1                    | Salmonella Worthington | 1                   |
|                  | Feed material of marine animal origin - fish meal - Feed mill - Iceland - environmental sample - dust - Surveillance - Industry sampling - Selective sampling | batch (food/feed) | 25            | Gram               | 615                | 2                    | Salmonella Montevideo  | 2                   |
|                  | Pet food - final product - pelleted - Border inspection activities - United States - feed sample - Surveillance - Official sampling - Objective sampling      | batch (food/feed) | 25            | Gram               | 10                 | 0                    | Salmonella             | 0                   |

**Table TRICHINELLA in animal**

| <b>Area of Sampling</b> | <b>Matrix - Sampling stage - Sampling origin - Sample type - Sampling context - Sampler - Sampling strategy</b>  | <b>Sampling unit</b> | <b>Total units tested</b> | <b>Total units positive</b> | <b>Zoonoses</b> | <b>N of units positive</b> |
|-------------------------|--|----------------------|---------------------------|-----------------------------|-----------------|----------------------------|
| Not Available           | Pigs - fattening pigs - raised under controlled housing conditions - Slaughterhouse - Iceland - animal sample - organ/tissue - Monitoring - Official sampling - Census | animal               | 77603                     | 0                           | Trichinella     | 0                          |
|                         | Solipeds, domestic - horses - Slaughterhouse - Iceland - animal sample - organ/tissue - Monitoring - Official sampling - Census  | animal               | 7669                      | 0                           | Trichinella     | 0                          |



## **FOODBORNE OUTBREAKS TABLES**

### **Foodborne Outbreaks: summarized data**

No data returned for this view. This might be because the applied filter excludes all data.

## Strong Foodborne Outbreaks: detailed data

No data returned for this view. This might be because the applied filter excludes all data.

## Weak Foodborne Outbreaks: detailed data

No data returned for this view. This might be because the applied filter excludes all data.

# ANTIMICROBIAL RESISTANCE TABLES FOR CAMPYLOBACTER

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

Sampling Stage: Farm

Sampling Type: animal sample - faeces

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Census

Programme Code: OTHER AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling details: N\_A

| AM substance                | Ciprofloxacin                  | Erythromycin (Erythromycin A) | Gentamicin  | Nalidixic acid | Streptomycin | Tetracycline |
|-----------------------------|--------------------------------|-------------------------------|-------------|----------------|--------------|--------------|
| <b>ECOFF</b>                | <b>0.5</b>                     | <b>4</b>                      | <b>2</b>    | <b>16</b>      | <b>4</b>     | <b>1</b>     |
| <b>Lowest limit</b>         | <b>0.12</b>                    | <b>1</b>                      | <b>0.12</b> | <b>1</b>       | <b>0.25</b>  | <b>0.5</b>   |
| <b>Highest limit</b>        | <b>16</b>                      | <b>128</b>                    | <b>16</b>   | <b>64</b>      | <b>16</b>    | <b>64</b>    |
| <b>N of tested isolates</b> | <b>7</b>                       | <b>7</b>                      | <b>7</b>    | <b>7</b>       | <b>7</b>     | <b>7</b>     |
| <b>MIC</b>                  | <b>N of resistant isolates</b> | <b>0</b>                      | <b>0</b>    | <b>2</b>       | <b>0</b>     | <b>0</b>     |
| <=0.12                      | 5                              |                               | 4           |                |              |              |
| <=0.25                      |                                |                               |             |                | 1            |              |
| 0.25                        |                                |                               | 3           |                |              |              |
| <=0.5                       |                                |                               |             |                |              | 7            |
| 0.5                         |                                |                               |             |                | 1            |              |
| <=1                         |                                | 7                             |             |                |              |              |
| 1                           |                                |                               |             |                | 3            |              |
| 2                           |                                |                               |             |                | 2            |              |
| 4                           |                                |                               |             | 5              |              |              |
| 8                           | 2                              |                               |             |                |              |              |
| >64                         |                                |                               |             | 2              |              |              |

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Control and eradication programmes

Sampler: Industry sampling

Sampling Strategy: Selective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling details: Sampling only during high risk summer months

| AM substance                   | MIC           |                               |             |                |              |              |
|--------------------------------|---------------|-------------------------------|-------------|----------------|--------------|--------------|
|                                | Ciprofloxacin | Erythromycin (Erythromycin A) | Gentamicin  | Nalidixic acid | Streptomycin | Tetracycline |
| <b>ECOFF</b>                   | <b>0.5</b>    | <b>4</b>                      | <b>2</b>    | <b>16</b>      | <b>4</b>     | <b>1</b>     |
| <b>Lowest limit</b>            | <b>0.12</b>   | <b>1</b>                      | <b>0.12</b> | <b>1</b>       | <b>0.25</b>  | <b>0.5</b>   |
| <b>Highest limit</b>           | <b>16</b>     | <b>128</b>                    | <b>16</b>   | <b>64</b>      | <b>16</b>    | <b>64</b>    |
| <b>N of tested isolates</b>    | <b>16</b>     | <b>16</b>                     | <b>16</b>   | <b>16</b>      | <b>16</b>    | <b>16</b>    |
| <b>N of resistant isolates</b> | <b>2</b>      | <b>0</b>                      | <b>0</b>    | <b>2</b>       | <b>0</b>     | <b>1</b>     |
| <=0.12                         | 13            |                               | 10          |                |              |              |
| <=0.25                         |               |                               |             |                | 1            |              |
| 0.25                           | 1             |                               | 5           |                |              |              |
| <=0.5                          |               |                               |             |                |              | 15           |
| 0.5                            |               |                               | 1           |                | 6            |              |
| <=1                            |               | 16                            |             | 1              |              |              |
| 1                              |               |                               |             |                | 8            |              |
| 2                              |               |                               |             | 6              | 1            |              |
| 4                              |               |                               |             | 5              |              |              |
| 8                              | 2             |                               |             | 2              |              |              |
| 64                             |               |                               |             |                |              | 1            |
| >64                            |               |                               |             | 2              |              |              |

# ANTIMICROBIAL RESISTANCE TABLES FOR SALMONELLA

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

Sampling Context: Control and eradication programmes

Sampler: Official and industry sampling

Sampling Strategy: Census

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.5       | 2          | 16              | 0.06          | 2        | 2          | 0.125     | 16             | 256              | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 1          | 1            | 1         | 1          | 1               | 1             | 1        | 1          | 1         | 1              | 1                | 1            | 1           | 1            |
| <b>N of resistant isolates</b> | 0          | 0            | 0         | 0          | 0               | 0             | 0        | 0          | 0         | 0              | 0                | 0            | 0           | 0            |
| <b>MIC</b>                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 1             |          |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |          |            | 1         |                |                  |              |             |              |
| <=0.25                         |            |              | 1         |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=0.5                          |            |              |           | 1          |                 |               |          | 1          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=1                            | 1          |              |           |            |                 |               | 1        |            |           |                |                  |              |             |              |
| 4                              |            | 1            |           |            |                 |               |          |            |           |                |                  | 1            |             |              |
| <=8                            |            |              |           |            | 1               |               |          |            |           |                |                  |              |             |              |
| 8                              |            |              |           |            |                 |               |          |            |           | 1              |                  |              |             |              |
| 64                             |            |              |           |            |                 |               |          |            |           |                | 1                |              |             |              |

## Table Antimicrobial susceptibility testing of Salmonella Infantis in Meat from broilers (Gallus gallus) - carcase

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

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.5       | 2          | 16              | 0.06          | 2        | 2          | 0.125     | 16             | 256              | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 1          | 1            | 1         | 1          | 1               | 1             | 1        | 1          | 1         | 1              | 1                | 1            | 1           | 1            |
| <b>N of resistant isolates</b> | 0          | 0            | 0         | 0          | 0               | 0             | 0        | 0          | 0         | 0              | 0                | 0            | 0           | 0            |
| <b>MIC</b>                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |          |            | 1         |                |                  |              |             |              |
| 0.03                           |            |              |           |            |                 | 1             |          |            |           |                |                  |              |             |              |
| <=0.25                         |            |              | 1         |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.5                          |            |              |           | 1          |                 |               |          | 1          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |          |            |           |                |                  |              | 1           | 1            |
| <=1                            |            |              |           |            |                 |               | 1        |            |           |                |                  |              |             |              |
| 2                              | 1          |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=4                            |            |              |           |            |                 |               |          |            |           | 1              |                  |              |             |              |
| 4                              |            | 1            |           |            |                 |               |          |            |           |                |                  | 1            |             |              |
| 16                             |            |              |           |            | 1               |               |          |            |           |                |                  |              |             |              |
| 64                             |            |              |           |            |                 |               |          |            |           |                | 1                |              |             |              |

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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

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

Sampler: Official and industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.5       | 2          | 16              | 0.06          | 2        | 2          | 0.125     | 16             | 256              | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 1          | 1            | 1         | 1          | 1               | 1             | 1        | 1          | 1         | 1              | 1                | 1            | 1           | 1            |
| <b>N of resistant isolates</b> | 0          | 0            | 0         | 0          | 0               | 0             | 0        | 0          | 0         | 0              | 0                | 0            | 0           | 0            |
| <b>MIC</b>                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 1             |          |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |          |            | 1         |                |                  |              |             |              |
| <=0.25                         |            |              | 1         |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=0.5                          |            |              |           | 1          |                 |               |          | 1          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=1                            | 1          |              |           |            |                 |               | 1        |            |           |                |                  |              |             |              |
| <=2                            |            | 1            |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=4                            |            |              |           |            |                 |               |          |            |           | 1              |                  |              |             |              |
| 4                              |            |              |           |            |                 |               |          |            |           |                |                  | 1            |             |              |
| <=8                            |            |              |           |            | 1               |               |          |            |           |                |                  |              |             |              |
| 64                             |            |              |           |            |                 |               |          |            |           |                | 1                |              |             |              |



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

Sampling Stage: Farm

Sampling Type: environmental sample - boot swabs

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

Sampler: Official and industry sampling

Sampling Strategy: Census

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.5       | 2          | 16              | 0.06          | 2        | 2          | 0.125     | 16             | 256              | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 1          | 1            | 1         | 1          | 1               | 1             | 1        | 1          | 1         | 1              | 1                | 1            | 1           | 1            |
| <b>N of resistant isolates</b> | 0          | 0            | 0         | 0          | 0               | 0             | 0        | 0          | 0         | 0              | 0                | 0            | 0           | 0            |
| <b>MIC</b>                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 1             |          |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |          |            | 1         |                |                  |              |             |              |
| <=0.25                         |            |              | 1         |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=0.5                          |            |              |           | 1          |                 |               |          | 1          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |          |            |           |                |                  |              |             | 1            |
| <=1                            | 1          |              |           |            |                 |               | 1        |            |           |                |                  |              |             |              |
| <=2                            |            |              |           |            |                 |               |          |            |           |                |                  | 1            |             |              |
| <=4                            |            |              |           |            |                 |               |          |            |           | 1              |                  |              |             |              |
| 4                              |            | 1            |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=8                            |            |              |           |            | 1               |               |          |            |           |                |                  |              |             |              |
| 16                             |            |              |           |            |                 |               |          |            |           |                | 1                |              |             |              |

# ANTIMICROBIAL RESISTANCE TABLES FOR INDICATOR ESCHERICHIA COLI

Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance            | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|-------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| ECOFF                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2        | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |
| Lowest limit            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| Highest limit           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| N of tested isolates    | 21         | 21           | 21        | 21         | 21              | 21            | 21       | 21         | 21        | 21             | 21               | 21           | 21          | 21           |
| N of resistant isolates | 5          | 0            | 0         | 0          | 1               | 0             | 0        | 0          | 0         | 0              | 5                | 1            | 0           | 4            |
| MIC                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=0.015                 |            |              |           |            |                 | 21            |          |            |           |                |                  |              |             |              |
| <=0.03                  |            |              |           |            |                 |               |          |            | 21        |                |                  |              |             |              |
| <=0.25                  |            |              | 21        |            |                 |               |          |            |           |                |                  |              | 10          | 9            |
| <=0.5                   |            |              |           | 21         |                 |               |          | 20         |           |                |                  |              |             |              |
| 0.5                     |            |              |           |            |                 |               |          |            |           |                |                  |              | 8           | 7            |
| <=1                     | 2          |              |           |            |                 |               | 21       |            |           |                |                  |              |             |              |
| 1                       |            |              |           |            |                 |               |          | 1          |           |                |                  |              | 3           | 1            |
| <=2                     |            | 15           |           |            |                 |               |          |            |           |                |                  | 7            |             |              |
| 2                       | 4          |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| <=4                     |            |              |           |            |                 |               |          |            |           | 17             |                  |              |             |              |
| 4                       | 9          | 5            |           |            |                 |               |          |            |           |                |                  | 10           |             |              |
| <=8                     |            |              |           |            | 20              |               |          |            |           |                | 3                |              |             |              |
| 8                       | 1          | 1            |           |            |                 |               |          |            |           | 4              |                  | 3            |             |              |
| 16                      |            |              |           |            |                 |               |          |            |           |                | 3                |              |             |              |
| 32                      |            |              |           |            |                 |               |          |            |           |                | 6                |              |             |              |
| >32                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             | 4            |
| 64                      |            |              |           |            | 1               |               |          |            |           |                | 4                | 1            |             |              |
| >64                     | 5          |              |           |            |                 |               |          |            |           |                |                  |              |             |              |

| AM substance            | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|-------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| ECOFF                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2        | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |
| Lowest limit            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| Highest limit           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| N of tested isolates    | 21         | 21           | 21        | 21         | 21              | 21            | 21       | 21         | 21        | 21             | 21               | 21           | 21          | 21           |
| N of resistant isolates | 5          | 0            | 0         | 0          | 1               | 0             | 0        | 0          | 0         | 0              | 5                | 1            | 0           | 4            |
| MIC                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |
| >1024                   |            |              |           |            |                 |               |          |            |           |                | 5                |              |             |              |

## Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance             | Cefepime                | Cefotaxim     | Cefotaxime + Clavulanic acid | Cefoxitin       | Ceftazidim    | Ceftazidime + Clavulanic acid | Ertapenem     | Imipenem      | Meropenem     | Temocillin    |               |
|--------------------------|-------------------------|---------------|------------------------------|-----------------|---------------|-------------------------------|---------------|---------------|---------------|---------------|---------------|
|                          | Cefotaxime synergy test | Not Available | Not Available                | Negative/Absent | Not Available | Not Available                 | Not Available | Not Available | Not Available | Not Available | Not Available |
| Ceftazidime synergy test | Not Available           | Not Available | Not Available                | Not Available   | Not Available | Negative/Absent               | Not Available | Not Available | Not Available | Not Available |               |
| ECOFF                    | 0.125                   | 0.25          | 0.25                         | 8               | 0.5           | 0.5                           | 0.06          | 0.5           | 0.125         | 32            |               |
| Lowest limit             | 0.064                   | 0.25          | 0.064                        | 0.5             | 0.25          | 0.12                          | 0.015         | 0.12          | 0.03          | 0.5           |               |
| Highest limit            | 32                      | 64            | 64                           | 64              | 128           | 128                           | 2             | 8             | 16            | 64            |               |
| N of tested isolates     | 7                       | 7             | 7                            | 7               | 7             | 7                             | 7             | 7             | 7             | 7             |               |
| N of resistant isolates  | 0                       | 7             | 7                            | 7               | 7             | 7                             | 0             | 0             | 0             | 0             |               |
| MIC                      |                         |               |                              |                 |               |                               |               |               |               |               |               |
| <=0.015                  |                         |               |                              |                 |               |                               | 1             |               |               |               |               |
| <=0.03                   |                         |               |                              |                 |               |                               |               |               | 7             |               |               |
| 0.03                     |                         |               |                              |                 |               |                               | 1             |               |               |               |               |
| 0.064                    |                         |               |                              |                 |               |                               | 5             |               |               |               |               |
| <=0.12                   |                         |               |                              |                 |               |                               |               |               | 1             |               |               |
| 0.12                     | 7                       |               |                              |                 |               |                               |               |               |               |               |               |
| 0.25                     |                         |               |                              |                 |               |                               |               |               | 5             |               |               |
| 0.5                      |                         |               |                              |                 |               |                               |               |               | 1             |               |               |
| 2                        |                         |               | 2                            | 5               | 1             |                               |               |               |               |               |               |
| 4                        |                         |               | 5                            | 2               |               |                               | 4             |               |               |               |               |
| 8                        |                         |               |                              |                 | 5             | 3                             |               |               |               |               |               |
| 16                       |                         |               |                              |                 | 1             |                               |               |               |               | 3             |               |
| 64                       |                         |               |                              | 7               |               |                               |               |               |               |               |               |

# Table Antimicrobial susceptibility testing of Escherichia coli, non-pathogenic, unspecified in Pigs - fattening pigs

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

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Collistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|-----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2         | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1         | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16        | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 7          | 7            | 7         | 7          | 7               | 7             | 7         | 7          | 7         | 7              | 7                | 7            | 7           | 7            |
| <b>N of resistant isolates</b> | 7          | 0            | 7         | 7          | 0               | 0             | 0         | 0          | 0         | 0              | 2                | 6            | 0           | 2            |
| <b>MIC</b>                     |            |              |           |            |                 |               |           |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 7             |           |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |           |            | 7         |                |                  |              |             |              |
| <=0.25                         |            |              |           |            |                 |               |           |            |           |                |                  |              | 4           | 1            |
| <=0.5                          |            |              |           |            |                 |               |           | 7          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |           |            |           |                |                  |              | 3           | 4            |
| <=1                            |            |              |           |            |                 |               | 7         |            |           |                |                  |              |             |              |
| <=2                            |            | 7            |           |            |                 |               |           |            |           |                |                  |              |             |              |
| 2                              |            |              | 2         |            |                 |               |           |            |           |                |                  |              |             |              |
| <=4                            |            |              |           |            |                 |               |           |            |           | 6              |                  |              |             |              |
| 4                              |            |              | 4         | 1          |                 |               |           |            |           |                |                  | 1            |             |              |
| >4                             |            |              | 1         |            |                 |               |           |            |           |                |                  |              |             |              |
| <=8                            |            |              |           |            | 7               |               |           |            |           |                | 1                |              |             |              |
| 8                              |            |              |           | 5          |                 |               |           |            |           | 1              |                  |              |             |              |
| >8                             |            |              |           | 1          |                 |               |           |            |           |                |                  |              |             |              |
| 16                             |            |              |           |            |                 |               |           |            |           |                | 1                |              |             |              |
| 32                             |            |              |           |            |                 |               |           |            |           |                | 3                |              |             | 2            |
| >64                            | 7          |              |           |            |                 |               |           |            |           |                |                  | 6            |             |              |
| >1024                          |            |              |           |            |                 |               |           |            |           |                | 2                |              |             |              |

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: AMR MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Collistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|-----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2         | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1         | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16        | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 94         | 94           | 94        | 94         | 94              | 94            | 94        | 94         | 94        | 94             | 94               | 94           | 94          | 94           |
| <b>N of resistant isolates</b> | 6          | 0            | 0         | 0          | 0               | 1             | 0         | 0          | 0         | 1              | 3                | 7            | 0           | 1            |
| <b>MIC</b>                     |            |              |           |            |                 |               |           |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 91            |           |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |           |            | 94        |                |                  |              |             |              |
| 0.064                          |            |              |           |            |                 | 2             |           |            |           |                |                  |              |             |              |
| <=0.25                         |            |              | 94        |            |                 |               |           |            |           |                |                  |              | 37          | 52           |
| 0.25                           |            |              |           |            |                 | 1             |           |            |           |                |                  |              |             |              |
| <=0.5                          |            |              |           | 94         |                 |               |           | 86         |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |           |            |           |                |                  |              | 47          | 36           |
| <=1                            | 4          |              |           |            |                 |               | 94        |            |           |                |                  |              |             |              |
| 1                              |            |              |           |            |                 |               |           | 6          |           |                |                  |              | 10          | 5            |
| <=2                            |            | 84           |           |            |                 |               |           |            |           |                |                  | 26           |             |              |
| 2                              | 37         |              |           |            |                 |               |           | 2          |           |                |                  |              |             |              |
| <=4                            |            |              |           |            |                 |               |           |            |           | 85             |                  |              |             |              |
| 4                              | 42         | 10           |           |            |                 |               |           |            |           |                |                  | 54           |             |              |
| <=8                            |            |              |           |            | 94              |               |           |            |           |                | 19               |              |             |              |
| 8                              | 5          |              |           |            |                 |               |           |            |           | 7              |                  | 7            |             |              |
| 16                             |            |              |           |            |                 |               |           |            |           | 1              | 40               |              |             |              |
| 32                             |            |              |           |            |                 |               |           |            |           |                | 25               |              |             |              |
| >32                            |            |              |           |            |                 |               |           |            |           |                |                  |              |             | 1            |
| 64                             |            |              |           |            |                 |               |           |            |           |                | 7                | 2            |             |              |
| >64                            | 6          |              |           |            |                 |               |           |            |           |                |                  | 5            |             |              |
| 128                            |            |              |           |            |                 |               |           |            |           |                | 2                |              |             |              |

| AM substance            | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Colistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |  |
|-------------------------|------------|--------------|-----------|------------|-----------------|---------------|----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|--|
| ECOFF                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2        | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |  |
| Lowest limit            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1        | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |  |
| Highest limit           | 64         | 64           | 4         | 8          | 128             | 8             | 16       | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |  |
| N of tested isolates    | 94         | 94           | 94        | 94         | 94              | 94            | 94       | 94         | 94        | 94             | 94               | 94           | 94          | 94           |  |
| N of resistant isolates | 6          | 0            | 0         | 0          | 0               | 1             | 0        | 0          | 0         | 1              | 3                | 7            | 0           | 1            |  |
| MIC                     |            |              |           |            |                 |               |          |            |           |                |                  |              |             |              |  |
| >128                    |            |              |           |            |                 |               |          |            |           |                | 1                |              |             |              |  |
| >1024                   |            |              |           |            |                 |               |          |            |           |                |                  | 1            |             |              |  |

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON pnl2

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance             | Cefepime      | Cefotaxim     | Cefotaxime + Clavulanic acid |                  | Cefoxitin     | Ceftazidim    | Ceftazidime + Clavulanic acid |                  | Ertapenem     | Imipenem      | Meropenem     | Temocillin    |
|--------------------------|---------------|---------------|------------------------------|------------------|---------------|---------------|-------------------------------|------------------|---------------|---------------|---------------|---------------|
|                          | Not Available | Not Available | Positive/Pres ent            | Negative/Abs ent | Not Available | Not Available | Not Available                 | Not Available    | Not Available | Not Available | Not Available | Not Available |
| Cefotaxime synergy test  | Not Available | Not Available | Positive/Pres ent            | Negative/Abs ent | Not Available | Not Available | Not Available                 | Not Available    | Not Available | Not Available | Not Available | Not Available |
| Ceftazidime synergy test | Not Available | Not Available | Not Available                | Not Available    | Not Available | Not Available | Positive/Pres ent             | Negative/Abs ent | Not Available | Not Available | Not Available | Not Available |
| ECOFF                    | 0.125         | 0.25          | 0.25                         | 0.25             | 8             | 0.5           | 0.5                           | 0.5              | 0.06          | 0.5           | 0.125         | 32            |
| Lowest limit             | 0.064         | 0.25          | 0.064                        | 0.064            | 0.5           | 0.25          | 0.12                          | 0.12             | 0.015         | 0.12          | 0.03          | 0.5           |
| Highest limit            | 32            | 64            | 64                           | 64               | 64            | 128           | 128                           | 128              | 2             | 8             | 16            | 64            |
| N of tested isolates     | 5             | 5             | 5                            | 5                | 5             | 5             | 5                             | 5                | 5             | 5             | 5             | 5             |
| N of resistant isolates  | 3             | 5             | 3                            | 3                | 3             | 5             | 3                             | 3                | 0             | 0             | 0             | 0             |
| <=0.015                  |               |               |                              |                  |               |               |                               |                  | 2             |               |               |               |
| <=0.03                   |               |               |                              |                  |               |               |                               |                  |               |               | 5             |               |
| 0.03                     |               |               |                              |                  |               |               |                               |                  | 2             |               |               |               |
| <=0.064                  |               |               | 2                            |                  |               |               |                               |                  |               |               |               |               |
| 0.064                    |               |               |                              |                  |               |               |                               |                  | 1             |               |               |               |
| <=0.12                   |               |               |                              |                  |               |               | 2                             |                  |               |               |               |               |
| 0.12                     | 2             |               |                              |                  |               |               |                               |                  |               |               |               |               |
| 0.25                     | 1             |               |                              |                  |               |               |                               |                  |               | 5             |               |               |
| 1                        |               |               |                              |                  |               |               |                               |                  |               |               |               | 1             |
| 2                        | 1             |               |                              |                  |               |               |                               |                  |               |               |               | 1             |
| 4                        |               |               |                              |                  | 2             |               |                               |                  |               |               |               | 1             |
| 8                        | 1             | 3             |                              | 3                |               | 2             |                               | 3                |               |               |               | 4             |
| 16                       |               | 1             |                              |                  |               | 1             |                               |                  |               |               |               |               |
| 32                       |               |               |                              |                  | 3             |               |                               |                  |               |               |               |               |



| AM substance             | Cefepime      | Cefotaxim     | Cefotaxime + Clavulanic acid |                  | Cefoxitin     | Ceftazidim    | Ceftazidime + Clavulanic acid |                  | Ertapenem     | Imipenem      | Meropenem     | Temocillin    |
|--------------------------|---------------|---------------|------------------------------|------------------|---------------|---------------|-------------------------------|------------------|---------------|---------------|---------------|---------------|
| Cefotaxime synergy test  | Not Available | Not Available | Positive/Pres ent            | Negative/Abs ent | Not Available | Not Available | Not Available                 | Not Available    | Not Available | Not Available | Not Available | Not Available |
| Ceftazidime synergy test | Not Available | Not Available | Not Available                | Not Available    | Not Available | Not Available | Positive/Pres ent             | Negative/Abs ent | Not Available | Not Available | Not Available | Not Available |
| ECOFF                    | 0.125         | 0.25          | 0.25                         | 0.25             | 8             | 0.5           | 0.5                           | 0.5              | 0.06          | 0.5           | 0.125         | 32            |
| Lowest limit             | 0.064         | 0.25          | 0.064                        | 0.064            | 0.5           | 0.25          | 0.12                          | 0.12             | 0.015         | 0.12          | 0.03          | 0.5           |
| Highest limit            | 32            | 64            | 64                           | 64               | 64            | 128           | 128                           | 128              | 2             | 8             | 16            | 64            |
| N of tested isolates     | 5             | 5             | 5                            | 5                | 5             | 5             | 5                             | 5                | 5             | 5             | 5             | 5             |
| N of resistant isolates  | 3             | 5             | 3                            | 3                | 3             | 5             | 3                             | 3                | 0             | 0             | 0             | 0             |
| MIC                      |               |               |                              |                  |               |               |                               |                  |               |               |               |               |
| 64                       |               | 1             |                              |                  |               |               |                               |                  |               |               |               |               |

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

Sampling Stage: Slaughterhouse

Sampling Type: animal sample - caecum

Sampling Context: Monitoring

Sampler: Official sampling

Sampling Strategy: Objective sampling

Programme Code: ESBL MON

Analytical Method: Dilution - sensititre

Country of Origin: Iceland

Sampling Details: N\_A

| AM substance                   | Ampicillin | Azithromycin | Cefotaxim | Ceftazidim | Chloramphenicol | Ciprofloxacin | Collistin | Gentamicin | Meropenem | Nalidixic acid | Sulfamethoxazole | Tetracycline | Tigecycline | Trimethoprim |
|--------------------------------|------------|--------------|-----------|------------|-----------------|---------------|-----------|------------|-----------|----------------|------------------|--------------|-------------|--------------|
| <b>ECOFF</b>                   | 8          | 16           | 0.25      | 0.5        | 16              | 0.064         | 2         | 2          | 0.125     | 16             | 64               | 8            | 1           | 2            |
| <b>Lowest limit</b>            | 1          | 2            | 0.25      | 0.5        | 8               | 0.015         | 1         | 0.5        | 0.03      | 4              | 8                | 2            | 0.25        | 0.25         |
| <b>Highest limit</b>           | 64         | 64           | 4         | 8          | 128             | 8             | 16        | 32         | 16        | 128            | 1024             | 64           | 8           | 32           |
| <b>N of tested isolates</b>    | 5          | 5            | 5         | 5          | 5               | 5             | 5         | 5          | 5         | 5              | 5                | 5            | 5           | 5            |
| <b>N of resistant isolates</b> | 5          | 0            | 5         | 5          | 0               | 0             | 0         | 0          | 0         | 0              | 2                | 0            | 0           | 0            |
| <b>MIC</b>                     |            |              |           |            |                 |               |           |            |           |                |                  |              |             |              |
| <=0.015                        |            |              |           |            |                 | 5             |           |            |           |                |                  |              |             |              |
| <=0.03                         |            |              |           |            |                 |               |           |            | 5         |                |                  |              |             |              |
| <=0.25                         |            |              |           |            |                 |               |           |            |           |                |                  |              | 3           | 5            |
| <=0.5                          |            |              |           |            |                 |               |           | 5          |           |                |                  |              |             |              |
| 0.5                            |            |              |           |            |                 |               |           |            |           |                |                  |              | 2           |              |
| <=1                            |            |              |           |            |                 |               | 5         |            |           |                |                  |              |             |              |
| 1                              |            |              |           | 2          |                 |               |           |            |           |                |                  |              |             |              |
| <=2                            |            | 5            |           |            |                 |               |           |            |           |                |                  | 1            |             |              |
| <=4                            |            |              |           |            |                 |               |           |            |           | 4              |                  |              |             |              |
| 4                              |            |              |           |            |                 |               |           |            |           |                |                  | 3            |             |              |
| >4                             |            |              | 5         |            |                 |               |           |            |           |                |                  |              |             |              |
| <=8                            |            |              |           |            | 5               |               |           |            |           |                |                  |              |             |              |
| 8                              |            |              |           | 1          |                 |               |           |            |           | 1              |                  | 1            |             |              |
| >8                             |            |              |           | 2          |                 |               |           |            |           |                |                  |              |             |              |
| 16                             |            |              |           |            |                 |               |           |            |           |                | 3                |              |             |              |
| >64                            | 5          |              |           |            |                 |               |           |            |           |                |                  |              |             |              |
| >1024                          |            |              |           |            |                 |               |           |            |           |                | 2                |              |             |              |

**OTHER ANTIMICROBIAL RESISTANCE TABLES**

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

No data returned for this view. This might be because the applied filter excludes all data.



## Latest Transmission set

| <b>Table Name</b>        | <b>Last submitted dataset transmission date</b> |
|--------------------------|---|
| Antimicrobial Resistance | 12-Oct-2017                                     |
| Animal Population        | 27-Jun-2017                                     |
| Disease Status           | 27-Jun-2017                                     |
| Prevalence               | 29-Jun-2017                                     |
| Text Forms               | 28-Jun-2017                                     |