European Food Safety Authority

ZOONOSES MONITORING

BELGIUM

The Report referred to in Article 9 of Directive 2003/99/EC

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

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

IN 2010

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: Belgium

Reporting Year:

Laboratory name	Description	Contribution
FASFC AFSCA FAVV	Federal Agency for the Safety of the Food Chain	
IPH WIV ISP	Scientific Institute of Public Health	
VAR CODA CERVA	Veterinary and Agrochemical Research Centre	
ITG	Institute of Tropical Medicine	
IPH Pasteur Institute	Pasteur Institute of the Scientific Institute of Public Health	

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 Belgium during the year 2010 .

The information covers the occurrence of these diseases and agents in humans, animals, foodstuffs and in some cases also in feedingstuffs. In addition the report includes data on antimicrobial resistance in some zoonotic agents and commensal 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 Community 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 Community 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 Community Summary Report on zoonoses that is 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.

A. Information on susceptible animal population

Sources of information

SANITEL and BELTRACE database of the Federal Agency for the Safety of the Food Chain.

Dates the figures relate to and the content of the figures

Number of animals = number of animals at a certain time point of the year.
Number of slaughtered animals = total number of slaughtered animals during the year.

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

Holding: any establishment, construction or, in the case of an open-air farm, any place in which animals are held, kept or handled.
The location of the holding is based on the address and the coordinates of the geographical entity. A geographical entity is a unit of one building or a complex of buildings included grounds and territories where an animal species is or could be hold.

Herd: an animal or group of animals kept on a holding as an epidemiological unit; if more than one herd is kept on a holding, each of these herds shall form a distinct unit and shall have the same health status.

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

For the last years, there's a significant decrease in total number of holdings for bovines. On the other hand, the total number of bovine animals is only slightly decreasing what means that the mean total number of animals per premise is increasing.

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

Belgium can be geographically divided into two regions: the Flemish region situated in the north of the country and the Walloon region situated in the south. There's a very dense animal population of bovines, swine and poultry in the Flemish region. The Walloon region is important for his cattle breeding holdings of the Belgian Blue White race. The number of swine and poultry holdings in the Walloon region is limited.

Table Susceptible animal populations

* Only if different than current reporting year

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Cattle (bovine animals)	meat production animals			503277					
	calves (under 1 year)			334013					
	- in total			837290		2721130		35217	
Deer	farmed - in total			706		9239		2717	
	wild - at game handling establishment			12547					
Ducks	meat production flocks	3							
Gallus gallus (fowl)	broilers	8481							
	laying hens	1208							
	- in total	10587							
Goats	- in total			7962		60753		11869	
Pigs	breeding animals			235107		589049			
	fattening pigs			11687658		5286829			
	- in total			11924052		5875878		9063	

Table Susceptible animal populations

		Number of herds or flocks		Number of slaughtered animals		Livestock numbers (live animals)		Number of holdings	
Animal species	Category of animals	Data	Year*	Data	Year*	Data	Year*	Data	Year*
Sheep	- in total			143196		209263		29556	
Solipeds, domestic	horses - in total			8970		198039			
Turkeys	meat production flocks	146							
	- in total	146							
Wild boars	farmed - in total			177					
	wild - at game handling establishment			11748					

2. INFORMATION ON SPECIFIC ZOONOSES AND ZOONOTIC AGENTS

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

2.1 SALMONELLOSIS

2.1.1 General evaluation of the national situation

2.1.2 Salmonella in foodstuffs

A. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring program was organized by the FASFC in slaughterhouses and cutting plants.
Sampling was done by a specially trained staff. For most matrices, independent samples were taken per matrix in order to evaluate the contamination with 95% confidence.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

At meat processing plant

Minced meat, ham, sausages and other

At retail

Meat, minced meat, ham, pate, sausages, meat salads and other

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

The matrices were carcasses, cuts and minced meat of pork. Sampling of pork carcasses was done by means of swabs. The following contamination levels were analyzed: 10 g or 25g (cutting, minced meat of pork) and 600 cm2 (pork carcasses).

At meat processing plant

The samples were more than 200 g of meat. The detection of Salmonella has been assessed in 10g or 25g of sample.

At retail

The presence of Salmonella has been assessed in 10g or 25g of sample.

Definition of positive finding

At slaughterhouse and cutting plant

A sample is considered positive in case of detection of Salmonella in the sample.

At meat processing plant

A sample is considered positive in case of detection of Salmonella in the sample.

At retail

A sample is considered positive in case of detection of Salmonella in the sample.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

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

The rates of salmonella contamination of carcasses and cutting meat of pig estimated in 2010 were statistically lower than the previous years.

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

The main serotype found on Salmonella risk farms (fattening pigs), on carcasses and in pig meat is Salmonella Typhimurium. The decrease of Salmonella positive carcasses and pig meat did not translate in a decrease of the number of human cases. At the level of the slaughter house and cutting plant, a relative increase in Salmonella Typhimurium var Copenhagen was found. Also this trend was not translated in an increase of the number of human cases for this serotype.

B. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At meat processing plant

A monitoring program was organized at meat processing plants and at retail by the FASFC.

Frequency of the sampling

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At meat processing plant

Minced meat, sausages and other

At retail

Meat, minced meat, pate, sausages, meat salads and other

Methods of sampling (description of sampling techniques)

At meat processing plant

The samples were more than 200 g of meat. The detection of Salmonella has been assessed in 10g or 25g of sample.

At retail

The presence of Salmonella has been assessed in 10g or 25g of sample.

Definition of positive finding

At slaughterhouse and cutting plant

A sample is considered positive in case of detection of Salmonella in the sample.

At meat processing plant

A sample is considered positive in case of detection of Salmonella in the sample.

At retail

A sample is considered positive in case of detection of Salmonella in the sample.

C. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring program in Belgian slaughterhouses and cutting plants was organized by the FASFC.
The matrices were carcasses, fillets and meat preparation of broilers. The carcass samples of broiler consisted of 10g of neck skin. The following contamination levels were analyzed: 25g cutting meat and 10g of minced meat of chicken and 1g of chicken carcasses.
Sampling was done by a specially trained staff. For most matrices, independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Neck skin and cutting meat

At meat processing plant

Minced meat, sausages, meat and other

At retail

Minced meat, sausages, meat and other

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

The matrices were carcasses, fillets and meat preparation of broilers. The carcass samples of broiler consisted of 10g of neck skin. The following contamination levels were analyzed: 25g cutting meat and 10g of minced meat of chicken and 1g of chicken carcasses.

At meat processing plant

The samples were about 200 g of meat. The detection of Salmonella has been assessed in 10g or 25g of sample.

At retail

The presence of Salmonella has been assessed in 25g of sample.

Definition of positive finding

At slaughterhouse and cutting plant

A sample is considered positive in case of detection of Salmonella in the sample.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

Control program/mechanisms

The control program/strategies in place

A microbiological control of carcasses and meat of poultry is made with the aim of following the level of contamination by Salmonella.

Measures in case of the positive findings or single cases

In case of positivite findings, no measure is taken face to products which entered normally the food chain. But corrective measures must be taken at the level of the slaughterhouse or of the cutting plant by the FBO.

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

The rate of Salmonella contamination of poultry meat observed in 2010 is comparable with the previous years.

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

At the level of the slaughterhouse (carcasses) and cutting plants (meat) Salmonella Paratyphi B (var Java) was also the main serotype found. The total number of reported human Salmonella isolates increased in 2010 to 3.626 (3.208 in 2009) with a slight increase of Salmonella Enteritidis to 820 (587 in 2009). The increase of Salmonella Paratyphi B var Java in the poultry sector was not translated into an increase of the number of human cases. The number of human Salmonella Paratyphi B (var Java) cases decreased compared to the results of 2009.

D. Salmonella spp. in food

Monitoring system

Sampling strategy

A monitoring program was organized by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 100 retail trades representative of the Belgian production, were selected for this study. The samples assayed were carcasses, cuts and minced meat from pork, carcasses, cuts and meat preparation from chicken, layer carcasses, beef minced meat and other foodstuffs. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain. For most of the matrices, approximately 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence. Salmonella isolates were serotyped and serotypes Typhimurium, Enteritidis, Virchow and Hadar were lysotyped. The antibiotic resistance profiles were determined for all isolates, and included ceftriaxone, ampicillin, kanamycin, sulfamethoxazole, tetracycline, nalidixic acid, ciprofloxacin, chloramphenicol and trimethoprim.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of pork carcasses was done by means of swabs. The carcass samples of broiler and layer consisted of 10g of neck skin. The other samples were about 200g of meat.
The detection of Salmonella has been assessed in these dilutions: 25g (cutting and minced meat of pork, chicken cuts and beef), 600 cm2 (pork carcasses), and 1g (chicken and layer carcasses, chicken meat preparation).

Definition of positive finding

A sample is considered to be positive after biochemical confirmation of one Salmonella spp. in the sample.

Diagnostic/analytical methods used

Five laboratories licensed by the Federal Agency for the Safety of the Food Chain and accredited following ISO 17025 standard analyzed all the samples. The Belgian official method SP-VG-M002 was used for the detection of Salmonella in 25g, 1g or on swabs:
- pre-enrichment in buffered peptone water at 37°C for 16 to 20 h,
- selective enrichment on the semi-solid Diassalm medium at 42°C for 24 h,
- isolation of positive colonies on XLD at 37°C for 24 h,
- confirmation of minimum 2 colonies on TSI at 37°C and miniaturised biochemical tests,
- serotyping and lysotyping were done at the National Reference Center for Salmonella and Shigella (NRCSS-IPH) and at the Institute Pasteur, both located in Brussels, respectively.
- antibiotic resistance determination by IPH Brussels by disk diffusion method.

Preventive measures in place

Controls are made in place by the Federal Agency in case of notification.

Control program/mechanisms

The control program/strategies in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For Salmonella, absence in 25g in ready-to-eat food putted on the market is mandatory. Laboratories have to inform the Federal Agency in case of a positive sample.

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serovars	S. 6,7:i:-	S. 6,8:-:-
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse	FASFC DPA003	Single	1g	395	12	1	7				
Meat from broilers (Gallus gallus) - fresh - at processing plant	FASFC TRA200	Batch	25g	358	21	2	1	2	1		
Meat from broilers (Gallus gallus) - fresh - at retail	FASFC DIS819 DIS821 DIS822 DIS880	Batch	25g	418	20	5	2	2	1		
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA202	Batch	25g or 10g	60	2						
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at retail	FASFC DIS826	Batch	25g or 10g	75	5						
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	FASFC TRA416	Batch	25g	45	0						
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail	FASFC DIS801 DIS877	Batch	25g	46	0						
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at retail	FASFC DIS880	Batch	25g	71	3				1		
Meat from duck - at retail	FASFC DIS821	Batch	25g	4	0						
Meat from turkey - fresh - at retail	FASFC DIS821	Batch	25g	21	0						
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA202	Batch	25g or 10g	15	0						

Table Salmonella in poultry meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serovars	S. 6,7:i:-	S. 6,8:-:-
Meat from turkey - meat preparation - intended to be eaten cooked - at retail	FASFC DIS826	Batch	25g or 10g	10	0						
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant	FASFC DIS880	Batch	25g	8	1						
Meat from other poultry species - fresh - at slaughterhouse (laying hens)	FASFC DPA004	Single	1g	371	122	102		1		1	2

	S. 6,8:d:-	S. Bareilly	S. Braenderup	S. Bredeney	S. Derby	S. Hadar	S. Indiana	S. Infantis	S. Kentucky	S. Livingstone	S. Mbandaka
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse											
Meat from broilers (Gallus gallus) - fresh - at processing plant				1				1	1		
Meat from broilers (Gallus gallus) - fresh - at retail	1						1				2
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant						1					
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at retail					1	1				1	
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant											

Table Salmonella in poultry meat and products thereof

	S. 6,8:d:-	S. Bareilly	S. Braenderup	S. Bredeney	S. Derby	S. Hadar	S. Indiana	S. Infantis	S. Kentucky	S. Livingstone	S. Mbandaka
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail											
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at retail								1			
Meat from duck - at retail											
Meat from turkey - fresh - at retail											
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant											
Meat from turkey - meat preparation - intended to be eaten cooked - at retail											
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant						1					
Meat from other poultry species - fresh - at slaughterhouse (laying hens)		2	1					4		2	5

	S. Muenchen	S. Paratyphi B	S. Rissen	S. Saintpaul	S. Typhimurium var. Copenhagen
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse		4			
Meat from broilers (Gallus gallus) - fresh - at processing plant		12			
Meat from broilers (Gallus gallus) - fresh - at retail	1	3	2		

Table Salmonella in poultry meat and products thereof

	S. Muenchen	S. Paratyphi B	S. Rissen	S. Saintpaul	S. Typhimurium var. Copenhagen
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant				1	
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at retail		2			
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant					
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail					
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at retail		1			
Meat from duck - at retail					
Meat from turkey - fresh - at retail					
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant					
Meat from turkey - meat preparation - intended to be eaten cooked - at retail					
Meat from turkey - minced meat - intended to be eaten cooked - at processing plant					
Meat from other poultry species - fresh - at slaughterhouse (laying hens)		1			1

Table Salmonella in poultry meat and products thereof

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cheeses made from cows' milk - at processing plant	FASFC TRA134	Batch	25g	60	0			
Cheeses made from cows' milk - at retail	FASFC DIS818 DIS849	Batch	25g	106	0			
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant	FASFC TRA134	Batch	25g	40	0			
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail	FASFC DIS818	Batch	25g	40	0			
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at retail	FASFC DIS849	Batch	25g	32	0			
Cheeses made from goats' milk - at processing plant	FASFC TRA134	Batch	25g	59	0			
Cheeses made from goats' milk - at retail	FASFC DIS818 DIS851 DIS878	Batch	25g	82	0			
Cheeses made from sheep's milk - at retail	FASFC DIS818 DIS879	Batch	25g	141	0			
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk - at retail	FASFC DIS858	Batch	25g	23	0			
Dairy products (excluding cheeses) - ice-cream - at retail	FASFC DIS859	Batch	25g	46	0			
Dairy products (excluding cheeses) - milk powder and whey powder - at processing plant	FASFC TRA123	Batch	25g	45	0			

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Cheeses made from cows' milk - fresh - made from pasteurised milk - at processing plant	FASFC TRA134	Batch	25g	20	0			
Cheeses made from cows' milk - fresh - made from pasteurised milk - at retail	FASFC DIS818	Batch	25g	19	0			
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA026	Batch	25g	15	0			
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at farm	FASFC DPA008	Batch	25g	28	0			
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at retail	FASFC DIS818 DIS878	Batch	25g	59	0			
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA011 DPA023	Batch	25g	22	0			
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS851	Batch	25g	23	0			
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at retail	FASFC DIS818 DIS879	Batch	25g	118	0			
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA024	Batch	25g	18	0			
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at retail	FASFC DIS818	Batch	25g	23	0			
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk - at farm	FASFC DPA009	Batch	25g	45	0			

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Dairy products (excluding cheeses) - cream - made from raw or low heat-treated milk - at farm	FASFC DPA025	Batch	25g	45	0			
Dairy products (excluding cheeses) - ice-cream - at farm	FASFC DPA010	Batch	25g	45	0			

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Crustaceans - at processing plant	FASFC TRA401 TRA403	Batch	10g or 25g	89	1	1		
Crustaceans - at retail	FASFC DIS852 DIS889	Batch	10g or 25g	92	0			
Crustaceans - unspecified - cooked - at processing plant	FASFC TRA401	Batch	25g	44	1	1		
Crustaceans - unspecified - cooked - at retail	FASFC DIS852	Batch	25g	46	0			
Crustaceans - unspecified - raw - at processing plant	FASFC TRA403	Batch	10g	45	0			
Crustaceans - unspecified - raw - at retail	FASFC DIS852 DIS889	Batch	10g	46	0			
Egg products - at processing plant	FASFTC TRA105	Batch	25g	13	0			
Egg products - at retail	FASFC DIS885	Batch	25g	20	0			
Eggs - table eggs - at retail	FASFC DIS868	Batch	25g	118	0			
Fishery products, unspecified - at processing plant	FASFC TRA416	Batch	25g	45	1	1		
Fishery products, unspecified - at retail	FASFC DIS808 DIS873	Batch	25g	137	0			
Foodstuffs intended for special nutritional uses - dried dietary foods for special medical purposes intended for infants below 6 months	FASFC DIS862	Batch	25g	59	0			

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Infant formula - dried - intended for infants below 6 months	FASFC TRA127	Batch	25g	5	0			
Juice - fruit juice - unpasteurised	FASFC TRA517 DIS872	Batch	25g	76	0			
Molluscan shellfish - cooked - at processing plant	FASFC TRA401	Batch	25g	44	1	1		
Molluscan shellfish - cooked - at retail	FASFC DIS852	Batch	25g	46	0			
Molluscan shellfish - raw - at processing plant	FASFC TRA403	Batch	25g	45	0			
Molluscan shellfish - raw - at retail	FASFC DIS852 DIS889	Batch	25g	46	0			

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 6,7:d:-	S. 9:-:-	S. Agona
Meat from bovine animals - meat preparation - intended to be eaten raw - at processing plant	FASFC TRA316	Batch	25g	33	0						
Meat from bovine animals - meat preparation - intended to be eaten raw - at retail	FASFC DIS874	Batch	25g	42	1		1				
Meat from bovine animals - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA312	Batch	10g	10	0						
Meat from bovine animals - meat preparation - intended to be eaten cooked - at retail	FASFC DIS875	Batch	10g	21	0						
Meat from bovine animals - meat products - cooked, ready-to-eat - at processing plant	FASFC TRA317	Batch	25g	2	0						
Meat from bovine animals - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	25g	21	1						
Meat from bovine animals - minced meat - intended to be eaten cooked - at retail	FASFC DIS888	Batch	25g	17	0						
Meat from pig - fresh - at slaughterhouse	FASFC DPA002	Single	600cm2	743	66	1	26	2	1		1
Meat from pig - fresh - at processing plant	FASFC TRA306	Batch	25g	297	5		2				
Meat from pig - meat preparation - intended to be eaten raw - at processing plant	FASFC TRA316	Batch	25g	13	0						
Meat from pig - meat preparation - intended to be eaten raw - at retail	FASFC DIS874	Batch	25g	13	0						
Meat from pig - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA312	Batch	10g	31	2		1			1	

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 6,7:d:-	S. 9:-:-	S. Agona
Meat from pig - meat preparation - intended to be eaten cooked - at retail	FASFC DIS875	Batch	10g	34	1		1				
Meat from pig - meat products - cooked, ready-to-eat - at processing plant	FASFC TRA317	Batch	25g	10	0						
Meat from pig - meat products - cooked, ready-to-eat - at retail	FASFC DIS801 DIS827	Batch	25g	46	0						
Meat from pig - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	25g	22	0						
Meat from pig - minced meat - intended to be eaten cooked - at retail	FASFC DIS888	Batch	10g	23	0						
Meat from bovine animals and pig - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA312	Batch	10g	17	0						
Meat from bovine animals and pig - meat preparation - intended to be eaten cooked - at retail	FASFC DIS875	Batch	10g	4	0						
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at processing plant	FASFC TRA316	Batch	25g	12	1						
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at retail	FASFC DIS815 DIS816 DIS874	Batch	25g	243	0						
Meat from bovine animals and pig - meat products - at processing plant	FASFC TRA300 TRA301 TRA317 TRA416	Batch	25g	179	0						

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. 6,7:d:-	S. 9:-:-	S. Agona
Meat from bovine animals and pig - meat products - at retail	FASFC DIS801 DIS817	Batch	25g	184	0						
Meat from bovine animals and pig - minced meat - intended to be eaten cooked - at retail	FASFC DIS888	Batch	10g	15	0						
Meat from bovine animals and pig - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	25g	12	0						

	S. Brandenburg	S. Derby	S. Goldcoast	S. Heidelberg	S. Infantis	S. Livingstone	S. Paratyphi B	S. Typhimurium var. Copenhagen
Meat from bovine animals - meat preparation - intended to be eaten raw - at processing plant								
Meat from bovine animals - meat preparation - intended to be eaten raw - at retail								
Meat from bovine animals - meat preparation - intended to be eaten cooked - at processing plant								
Meat from bovine animals - meat preparation - intended to be eaten cooked - at retail								
Meat from bovine animals - meat products - cooked, ready-to-eat - at processing plant								
Meat from bovine animals - minced meat - intended to be eaten raw - at retail							1	
Meat from bovine animals - minced meat - intended to be eaten cooked - at retail								

Table Salmonella in red meat and products thereof

	S. Brandenburg	S. Derby	S. Goldcoast	S. Heidelberg	S. Infantis	S. Livingstone	S. Paratyphi B	S. Typhimurium var. Copenhagen
Meat from pig - fresh - at slaughterhouse	3	13	1	1	2	2		13
Meat from pig - fresh - at processing plant		1				1		1
Meat from pig - meat preparation - intended to be eaten raw - at processing plant								
Meat from pig - meat preparation - intended to be eaten raw - at retail								
Meat from pig - meat preparation - intended to be eaten cooked - at processing plant								
Meat from pig - meat preparation - intended to be eaten cooked - at retail								
Meat from pig - meat products - cooked, ready-to-eat - at processing plant								
Meat from pig - meat products - cooked, ready-to-eat - at retail								
Meat from pig - minced meat - intended to be eaten raw - at retail								
Meat from pig - minced meat - intended to be eaten cooked - at retail								
Meat from bovine animals and pig - meat preparation - intended to be eaten cooked - at processing plant								
Meat from bovine animals and pig - meat preparation - intended to be eaten cooked - at retail								

Table Salmonella in red meat and products thereof

	S. Brandenburg	S. Derby	S. Goldcoast	S. Heidelberg	S. Infantis	S. Livingstone	S. Paratyphi B	S. Typhimurium var. Copenhagen
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at processing plant								1
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at retail								
Meat from bovine animals and pig - meat products - at processing plant								
Meat from bovine animals and pig - meat products - at retail								
Meat from bovine animals and pig - minced meat - intended to be eaten cooked - at retail								
Meat from bovine animals and pig - minced meat - intended to be eaten raw - at retail								

2.1.3 Salmonella in animals

A. Salmonella spp. in Gallus Gallus - breeding flocks

Monitoring system

Sampling strategy

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

Breeding flocks are sampled as day-old chicks, at the age of 4 and 16 weeks and every 2 weeks during production. An official control takes place at 16 weeks, 22 weeks, 46 weeks and 58 or 62 weeks. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

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

As day old chicks and at the age of 4 and 16 weeks

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

Every 2 weeks

Type of specimen taken

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

Internal linings of delivery boxes

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

Socks/ boot swabs

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

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

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

At the farm, pieces (5 by 5 cm) of the inner linnings of delivery boxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of innerlining. The two samples are analysed separately. On voluntary basis, 20 living hen-chicks and 20 living cock-chicks are brought to the laboratory for serological testing.
The samples have to be taken the day of delivery, the samples have to reach the lab within 24 hours of sampling.
In the hatcheries, pooled samples from dead-in-the-shell chicks and of fluff and meconium, are taken by the owner every 3 months. These are sent to an accredited laboratory.

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

Samples are taken by the owner at 4 weeks and by one of the animal health organisations at 16 weeks, both in accordance with regulation (EU) Nr. 200/2010.

Breeding flocks: Production period

All samples are taken in accordance with Regulation (EC) Nr. 200/2010.

Case definition

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

A sample is considered positive if Salmonella Enteritidis, Typhimurium, Hadar, Infantis or Virchow is isolated. A flock is considered positive as soon as one sample is positive.

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

A sample is considered positive if Salmonella Enteritidis, Typhimurium, Hadar, Infantis or Virchow is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples (5 feces and 2 dust samples) are taken by or under the supervision of the competent authority. The result of the confirmation sampling is binding.

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

A sample is considered positive if Salmonella Enteritidis, Typhimurium, Hadar, Infantis or Virchow is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples (5 feces and 2 dust samples) are taken by or under the supervision of the competent authority. The result of the confirmation sampling is binding.

Diagnostic/analytical methods used

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

Bacteriological method: ISO 6579:2002 annex D

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

Bacteriological method: ISO 6579:2002 annex D

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

Bacteriological method: ISO 6579:2002 annex D

Vaccination policy

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

Vaccination against Salmonella Enteritidis is compulsory for parent flocks and prohibited for grand parent flocks. Vaccination against Salmonella Typhimurium is strongly recommended for parent flocks and prohibited for grandparent flocks.

Other preventive measures than vaccination in place

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

All breeding flocks must have Health Qualification A. The qualification consists of minimal requirements for infrastructure, management and biosecurity measures.

Control program/mechanisms

The control program/strategies in place

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

The national control programme for Salmonella in breeding flocks is based on Regulations (EG) Nrs. 2160/2003, 200/2010 and 1177/2006.

Measures in case of the positive findings or single cases

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

1) treatment of flock with antimicrobials is forbidden;
2) Incubation of hatching eggs is prohibited;
3) Incubated hatching eggs are removed and destroyed;
4) Not yet incubated hatching eggs may be pasteurized and put on the market for human consumption;
5) Positive breeding flocks are slaughtered within the month;
6) Cleaning and disinfection of housing after removal of the breeding flock;

7) After cleaning and disinfection, a hygienogram is performed;
8) Sampling of the house (swab control) for the detection of Salmonella;
8) A new flock is admitted if Salmonella can not be found after cleaning and disinfection, otherwise the disinfection and swab control is repeated.

Notification system in place

Zoonotic Salmonella is notifiable since the first of Januari 2004. Notification is done by phone, fax or electronic to the Federal Agency for the Safety of the Food Chain. Laboratories and farmers are submitted to the notification.

Results of the investigation

There was one batch of day old chicks found positive for Salmonella Enteritidis. The origin of the infection was traced to the hatchery in another Member State. During rearing, of the 330 flocks, 1 flock was positive for Salmonella Typhimurium, 1 flock for Salmonella Livingstone and 2 flocks each for Salmonella Senftenberg and Paratyphi B var. Java.
During production, of the 568 flocks (grandparent and parent flocks), 1 flock was positive for S. Enteritidis, 1 flock for S. Typhimurium, 1 flock for S. Hadar and 19 flocks were positive for other than the 5 serotypes for which a target is set. In addition, 4 flocks were considered negative for Salmonella Enteritidis after confirmation sampling, 3 flocks for Salmonella Typhimurium and 2 flocks for Salmonella Hadar.

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

During rearing, the number of positive flocks (all Salmonella spp.) decreased from 6 in 2008 to 3 in 2009 and increased to 7 in 2010. The total number of rearing flocks was also higher in 2010 compared to 2009. During production, the number of positive flocks for Salmonella serotypes for which a target is set increased from 0 in 2009 to 3 in 2010. The source of infection could not be traced. The number of positive flocks of other serotypes has increased slightly compared to 2009 (from 16 to 19).

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

The total number of reported human Salmonella isolates increased in 2010 to 3.461 (3.344 in 2009) with a slight increase of Salmonella Enteritidis to 790 (587 in 2009).

B. Salmonella spp. in Gallus Gallus - broiler flocks

Monitoring system

Sampling strategy

Broiler flocks

The official surveillance program for broilers in accordance with Regulations (EC) 2160/2003 and 646/2007 started in 2009. It is compulsory to sample all flocks on farms with more than 200 birds in the last three weeks before slaughter. Sampling of day-old chicks in the framework of the sanitary qualification is optional.

Frequency of the sampling

Broiler flocks: Day-old chicks

Other: not compulsory

Broiler flocks: Before slaughter at farm

Every flock is sampled in the last 3 weeks before slaughter.

Broiler flocks: At slaughter (flock based approach)

Sampling distributed evenly throughout the year

Type of specimen taken

Broiler flocks: Day-old chicks

Internal linings of delivery boxes

Broiler flocks: Before slaughter at farm

Socks/ boot swabs

Broiler flocks: At slaughter (flock based approach)

Organs: caeca

Methods of sampling (description of sampling techniques)

Broiler flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner in the same way as for breeding flocks. The samples have to reach an accredited laboratory within 48 hours of sampling.

Broiler flocks: Before slaughter at farm

All flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling is performed conform Regulation (EC) n° 646/2007. Samples have to reach an accredited laboratory within 48 hours.

Case definition

Broiler flocks: Day-old chicks

A sample is considered positive if a Salmonella spp. is isolated. A flock is considered positive as soon as one sample is positive.

Broiler flocks: Before slaughter at farm

A sample is considered positive if a Salmonella spp. is isolated. A flock is considered positive as soon as one sample is positive.

Diagnostic/analytical methods used

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2002 annex D

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002 annex D

Broiler flocks: At slaughter (flock based approach)

Bacteriological method: ISO 6579:2002 annex D

Vaccination policy

Broiler flocks

There is no vaccination policy for broiler flocks.

Other preventive measures than vaccination in place

Broiler flocks

Minimal requirements are laid down for holdings with at least 200 broilers on infrastructure, management and bio-security issues in the framework of the sanitary qualification.

Control program/mechanisms

The control program/strategies in place

Broiler flocks

The sanitary qualification for farms with more than 200 birds contains preventive measures (infrastructure, management and biosecurity) for the control of Salmonella.
Following measures are taken when a flock is positive for Salmonella spp:
1° logistic slaughter of the flock at the end of production.
2° mandatory cleaning and disinfection.
3° hygienogram after disinfection and after the house has dried up.
4° swab control on the presence of Salmonella before restocking the house.
If the following flock is positive for the same serotype of Salmonella, the disinfection must be performed by an external company.
When the same serotype of Salmonella is found at three consecutive times, the farm must be evaluated on biosecurity and hygiene by the farm veterinarian and necessary measures must be taken. An epidemiological investigation and/or tests are performed to find the source of the infection.
It is at all times prohibited to treat for Salmonella with antibiotics.

Measures in case of the positive findings or single cases

Broiler flocks: Day-old chicks

It is prohibited to treat the flock for Salmonella with antibiotics.

Broiler flocks: Before slaughter at farm

See 'the control program/strategies' in place.

Notification system in place

Zoonotic Salmonella is notifiable since the first of January 2004. Notification is done by phone, fax or by e-mail to the Federal Agency for the Safety of the Food Chain. Farmers and laboratories are obliged to notify.

Results of the investigation

5560 batches of day old chicks were sampled, 15 were positive for Salmonella spp. of which 7 were positive for S. Typhimurium. This is an increase compared to 2009.
8.481 flocks of broilers were sampled in the last 3 weeks of production. 315 were positive for Salmonella spp of which 3 for S. Enteritidis and 42 for S. Typimurium.

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

The prevalence of all serotypes has slightly increased compared to 2009, the prevalence of Salmonella Enteritidis and Salmonella Typhimurium is comparable with the result of 2009. The main concern is an increase in the prevalence of Salmonella Paratyphi B (var. Java).

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

At the level of the slaughterhouse (carcasses) and cutting plants (meat) Salmonella Paratyphi B (var Java) was also the main serotype found. The total number of reported human Salmonella isolates increased in 2010 to 3.626 (3.208 in 2009) with a slight increase of Salmonella Enteritidis to 820 (587 in 2009). The increase of Salmonella Paratyphi B var Java in the poultry sector was not translated into an increase of the number of human cases. The number of human Salmonella Paratyphi B (var Java) cases decreased compared to the results of 2009.

C. Salmonella spp. in Gallus Gallus - flocks of laying hens

Monitoring system

Sampling strategy

Laying hens flocks

All laying hen flocks on farms with at least 200 laying hens are under a Salmonella control program. Flocks are sampled by the owner at the age of day old chicks, 16, 24, 39 and 54 weeks and in the last 3 weeks of production.

Frequency of the sampling

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

At the age of 16 weeks

Laying hens: Production period

Every 15 weeks

Laying hens: Before slaughter at farm

Every flock is sampled

Laying hens: At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Rearing period

Socks/ boot swabs

Laying hens: Production period

Socks/ boot swabs

Laying hens: Before slaughter at farm

Socks/ boot swabs

Laying hens: At slaughter

Other: caeca

Methods of sampling (description of sampling techniques)

Laying hens: Day-old chicks

At the farm, 20 pieces (5 by 5 cm) of the inner linnings of delivery boxes are taken of each batch. On voluntary basis, 20 living hen-chicks are brought to the laboratory for serological testing.
The samples have to reach an accredited laboratory within 48 hours of sampling.

Laying hens: Rearing period

Samples are taken in accordance with Regulation (EC) No. 1168/2006.

Laying hens: Production period

Samples are taken in accordance with Regulation (EC) No. 1168/2006.

Laying hens: Before slaughter at farm

Samples are taken in accordance with Regulation (EC) No. 1168/2006.

Case definition

Laying hens: Day-old chicks

A sample is considered positive if S. Enteritidis or S. Typhimurium is isolated. A flock is considered positive as soon as one sample is positive.

Laying hens: Rearing period

A sample is considered positive if S. Enteritidis or S. Typhimurium is isolated. A flock is considered positive as soon as one sample is positive.

Laying hens: Production period

A sample is considered positive if S. Enteritidis or S. Typhimurium is isolated. A flock is considered positive as soon as one sample is positive.

Laying hens: Before slaughter at farm

A sample is considered positive if Salmonella is isolated. A flock is considered positive as soon as one sample is positive.

Diagnostic/analytical methods used

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002 annex D

Laying hens: Rearing period

Bacteriological method: ISO 6579:2002 annex D

Laying hens: Production period

Bacteriological method: ISO 6579:2002 annex D

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2002 annex D

Vaccination policy

Laying hens flocks

Vaccination against Salmonella Enteritidis is compulsory and vaccination against Salmonella Typhimurium is strongly recommended.

Other preventive measures than vaccination in place

Laying hens flocks

Minimal requirements for infrastructure, management and bio-security issues are laid down under health qualification B.

Control program/mechanisms

The control program/strategies in place

Laying hens flocks

The national control program for Salmonella in laying hens is based on Regulations (EC) No. 2160/2003, 1177/2006 and 1168/2006.

Measures in case of the positive findings or single cases

Laying hens flocks

1) Pasteurization of eggs before human consumption.

2) Cleaning and disinfection of housing after removal of the positive flock.
3) Swab sampling of housing before entering new flock. If result is positive for Salmonella, cleaning and disinfection has to be repeated.

Notification system in place

Zoonotic Salmonella is notifiable by the farmer and the laboratory since the first of January 2004. Notification is done by phone, fax or electronic to the Federal Agency for the Safety of the Food Chain.

Results of the investigation

Of the 245 batches of day old chicks sampled, one was found positive for a Salmonella spp (rare serogroup).
During rearing, 398 flocks were sampled of which 2 were positive for Salmonella spp (no S. Typhimurium or S. Enteritidis).
During production, 579 flocks were sampled of which 55 were positive for Salmonella (24 for S. Enteritidis and 2 for S. Typhimurium).

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

The prevalence for all Salmonella serotypes and specific for S. Enteritidis and S. Typimurium has decreased compared to 2009.

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

The total number of reported human Salmonella isolates increased in 2010 to 3.626 (3.208 in 2009) with a slight increase of Salmonella Enteritidis to 820 (587 in 2009). The decrease of the prevalence of Salmonella Enteritidis and Salmonella Typhimurium in layers is not translated in a decrease of human cases. At the level of the slaughterhouse and cutting plants, Salmonella Enteritidis is the main serotype found. In Belgium, all layers are vaccinated against Salmonella Enteritidis. The period given protection by the vaccine may be too short to cover the stress during transport.

D. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

There was no official monitoring of cattle in 2010 in Belgium. Isolates were diagnostic samples sent to the NRL Salmonella, animal health, for serotyping.

Vaccination policy

In 2010, no vaccine was authorized for the vaccination of cattle against salmonellosis.

Results of the investigation

The number of Salmonella isolates from cattle (n=50) has further decreased as compared to 2008 (n=112) and 2009 (n=81). Most frequently found serotype is Dublin (42.0%), followed by serotype Typhimurium (34.0%), which are similar figures as in 2009

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

In cattle, S. Dublin continues to be the principal serotype since 2002, although it reached in 2010 a proportion close to that of S. Typhimurium strains: 42% and 34%, respectively.

E. Salmonella spp. in ducks - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks

Health Qualification A is mandatory for all commercial breeding flocks. They are at least sampled as day-old chicks, when entering the production unit if this is on a different farm than the rearing unit, at one point during production and within the last 3 weeks before slaughter.

Meat production flocks

On voluntary basis (Health Qualification A), day-old chicks are sampled.
On farms with a capacity of 5000 or more birds (Health Qualification B), all flocks are sampled within 3 weeks before slaughter.

Frequency of the sampling

Breeding flocks: Day-old chicks

Every flock is sampled

Breeding flocks: Production period

Every flock is sampled

Meat production flocks: Day-old chicks

Control 'at entry' is not mandatory.

Meat production flocks: Before slaughter at farm

Other: ____meat production flocks are sampled within 3 weeks before slaughter on a voluntary basis.

Type of specimen taken

Breeding flocks: Day-old chicks

Internal linings of delivery boxes

Breeding flocks: Production period

Blood

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

Breeding flocks: Day-old chicks

At the farm, pieces (5 by 5 cm) of the inner linings of delivery boxes are taken of each flock. 2 samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of inner lining. The two samples are analyzed separately.

Breeding flocks: Production period

Faeces samples are taken by the owner from the delivery boxes at time of delivery. A sample made of 60 X 5-10g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited laboratory within 48 hours of sampling.
Once during production, 60 blood samples are taken of each flock. If one or more blood sample is positive, additional faeces samples are taken to confirm the result.

Within 3 weeks before slaughter, a pooled faeces sample consisting of 60 X 1g subsamples is taken of each flock.

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A) in the same way as for breeding flocks.

Meat production flocks: Before slaughter at farm

On farms with more than 5000 birds (Health Qualification B), all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overshoes, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

Breeding flocks: Day-old chicks

A flock is positive if Salmonella is found.

Breeding flocks: Production period

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Breeding flocks: Production period

Serological method: ELISA, if positive followed by bacteriological confirmation ISO 6579:2002.

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Breeding flocks

There is no vaccination policy.

Meat production flocks

There is no vaccination policy.

Other preventive measures than vaccination in place

Breeding flocks

Health Qualification A is mandatory. Hygienic infrastructural and management obligations are included.

Meat production flocks

If the holding has a capacity of 5000 birds or more, Health Qualification B is mandatory, A is optional. Both include hygienic infrastructural and management obligations.

Measures in case of the positive findings or single cases

Samples are taken for monitoring purposes only. Flocks are slaughtered at the end of the day (logistic slaughter) if samples taken before slaughter are positive.

Notification system in place

A notification system for zoonotic Salmonella is in place since 1 January 2004. The notification can be done by e-mail, fax or phone.

Results of the investigation

There were no breeding flocks sampled in 2010.
Two of the 3 meat production flocks sampled were positive for Salmonella spp.

F. Salmonella spp. in geese - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Breeding flocks

Health Qualification A is mandatory for all commercial breeding flocks. They are at least sampled as day-old chick, when entering the production unit if this is on a different farm than the rearing unit, at one point during production and within the last 3 weeks before slaughter.

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): Production period

Once a year

Meat production flocks: Day-old chicks

Control 'at entry' is not mandatory.

Meat production flocks: Before slaughter at farm

within 3 weeks prior to slaughter. This is not mandatory in all cases.

Type of specimen taken

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

Internal linings of delivery boxes

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

Blood

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Faeces

Methods of sampling (description of sampling techniques)

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

At the farm, pieces of the inner linings of delivery boxes are taken of each flock. Two samples are taken, one for the hen-chicks and one for the cock-chicks. Each sample consists of 20 pieces of inner lining. The two samples are analyzed separately.

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

Faeces samples are taken by the owner from the delivery boxes at time of delivery. A sample made of 60 X 5-10g subsamples is taken of every flock with different origin of rearing. The samples have to reach an accredited and validated laboratory within 48 hours of sampling.
Once during production, 60 blood samples are taken of each flock. If one or more blood sample is positive, additional feaces samples are taken to confirm the result.
Within 3 weeks before slaughter, a pooled faeces sample consisting of 60 X 1g subsamples is taken of each flock.

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A) in the same way as for breeding flocks.

Meat production flocks: Before slaughter at farm

On farms with more than 5000 birds, all flocks are sampled, by the owner, within 3 weeks before slaughter. The sampling can be performed in 3 ways. 1) A pooled faeces sample (60 X 1g) taken with swabs. 2) A pooled faeces sample (60 X 1g) taken by hand. 3) Two pair of overshoes, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

Breeding flocks: Day-old chicks

A flock is positive if Salmonella is found.

Breeding flocks: Production period

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Breeding flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Breeding flocks: Production period

Serological method: ELISA, if positive, followed by bacteriological confirmation.

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

Breeding flocks

There is no vaccination policy for breeding flocks.

Meat production flocks

There is no vaccination policy for meat production flocks.

Other preventive measures than vaccination in place

Breeding flocks

Health Qualification A is mandatory for breeding flocks, hygienic infrastructural and management obligations are included.

Meat production flocks

If the holding has a capacity of 5000 birds or more, Health Qualification B is mandatory, A optional for meat production flocks. Both include hygienic infrastructural and management obligations.

Measures in case of the positive findings or single cases

Breeding flocks

The samples are taken for monitoring purposes only. At this moment, no measures are implemented in case of a positive finding. At time of slaughter, poultry positive for Salmonella is slaughtered at the end of the day (logistic slaughter).

Meat Production flocks

If samples taken within 3 weeks before slaughter are positive for Salmonella, the flock is slaughtered at the end of the day (logistic slaughter).

Notification system in place

A notification system for zoonotic Salmonella is in place since 1 January 2004. The notification can be done by e-mail, fax or post.

Results of the investigation

No breeding flocks or meat production flocks were tested in 2010.

G. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Breeding herds

For diagnostic purposes and in the framework of research projects, pigs are sampled and isolates are sent to the NRL Salmonella, Animal Health for serotyping and resistance analysis.

Multiplying herds

For diagnostic purposes and in the framework of research projects, pigs are sampled and isolates are sent to the NRL Salmonella, AH for serotyping and resistance analysis.

Fattening herds

Every 4 months, 12 blood samples are taken for the serological surveillance of Salmonella in farms with at least 31 fattening pigs.
Samples are taken for bacteriological detection on farms that are considered risk herds for Salmonella.

For diagnostic purposes and in the framework of research projects, pigs are sampled and isolates are sent to the NRL Salmonella, AH for serotyping and resistance analysis.

Frequency of the sampling

Fattening herds at farm

4

Type of specimen taken

Fattening herds at farm

Blood

Methods of sampling (description of sampling techniques)

Fattening herds at farm

Depending on the capacity of the farm, 10 to 12 blood samples are taken of the fattening pigs. The blood samples are taken of all ages.

Case definition

Fattening herds at farm

Risk farms are identified as farms with a mean S/P ratio higher than 0.6 for 3 consecutive sampling rounds.

Diagnostic/analytical methods used

Fattening herds at farm

indirect LPS--Salmonella ELISA

Vaccination policy

Breeding herds

No vaccine is authorized in Belgium for the vaccination of pigs against Salmonellosis.

Multiplying herds

No vaccine is authorized in Belgium for the vaccination of pigs against salmonellosis.

Fattening herds

No vaccine is authorized in Belgium for the vaccination of pigs against salmonellosis.

Control program/mechanisms

The control program/strategies in place

Fattening herds

Risk farms are identified as farms with a mean S/P ratio equal or higher than 0.6 for 3 consecutive sampling rounds. Following mandatory measures are applied on risk farms:
1) completion of a checklist on bio-security and other measures;
2) formulating and implementing a herd specific salmonella action plan, based on the result of the checklist;
3) bacteriological evaluation of the farm.

Measures in case of the positive findings or single cases

The measures are explained under control strategy in place.

Notification system in place

Zoonotic Salmonella is notifiable by operators and laboratories since the first of January 2004. Notification is done by phone, fax or electronic to the Federal Agency of the Safety of the Food Chain.

Results of the investigation

4.461 herds with fattening pigs were sampled in 2010. 859 farms had at least once a mean S/P ratio of more than 0.6. 97 herds were classified as Salmonella risk herds of which 53 herds were classified as a Salmonella risk herd for the second time.

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

Laboratory findings from the NRL Salmonella, AH concerning isolates that were sent in for serotyping in 2010 are available. The number of pig strains tested in 2010 was somewhat lower compared to 2009 (n=465 and 536, respectively). Mostly S. Typhimurium isolates were found (67.5%; 63.8% in 2009), but also S. Derby (7.3%; 13.4% in 2009).

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

The main serotype found on Salmonella risk farms (fattening pigs), on carcasses and in pig meat is Salmonella Typhimurium. The decrease of Salmonella positive carcasses and pig meat did not translate in a decrease of the number of human cases. At the level of the slaughter house and cutting plant, an relative increase in Salmonella Typhimurium var Copenhagen was found. This also was not translated in an increase of the number of human cases for this serotype.

H. Salmonella spp. in turkey - breeding flocks and meat production flocks

Monitoring system

Sampling strategy

Meat production flocks

All flocks are sampled within three weeks of slaughter.

Frequency of the sampling

Meat production flocks: Day-old chicks

Control 'at entry' is not mandatory.

Meat production flocks: Before slaughter at farm

Every flock is sampled

Type of specimen taken

Meat production flocks: Day-old chicks

Internal linings of delivery boxes

Meat production flocks: Before slaughter at farm

Socks/ boot swabs

Methods of sampling (description of sampling techniques)

Meat production flocks: Day-old chicks

Pieces of inner linings of the delivery boxes are sampled by the owner on a voluntary basis (Health Qualification A). The samples have to reach an accredited laboratory within 48 hours of sampling.

Meat production flocks: Before slaughter at farm

All flocks are sampled, by the owner, within 3 weeks before slaughter conform Regulation (EC) n° 584/2008.

Case definition

A flock is positive if Salmonella is found.

Monitoring system

Case definition

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

A flock is positive if Salmonella is found.

Meat production flocks: Day-old chicks

A flock is positive if Salmonella is found.

Meat production flocks: Before slaughter at farm

A flock is positive if Salmonella is found.

Diagnostic/analytical methods used

Meat production flocks: Day-old chicks

Bacteriological method: ISO 6579:2002 annex D.

Meat production flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002 annex D.

Vaccination policy

Meat production flocks

There is no vaccination policy for meat production flocks.

Other preventive measures than vaccination in place

Meat production flocks

Health Qualification B: infrastructural and management obligations.

Measures in case of the positive findings or single cases

Following measures are taken when a flock is positive for Salmonella spp:
1° logistic slaughter of the flock at the end of production.
2° mandatory cleaning and disinfection.
3° hygienogram after disinfection and after the house has dried up.
4° swab control on the presence of Salmonella before restocking the house.
If the following flock is positive for the same serotype of Salmonella, the disinfection must be performed by an external company.
When the same serotype of Salmonella is found at three consecutive times, the farm must be evaluated on biosecurity and hygiene by the farm veterinarian and necessary measures must be taken. An epidemiological investigation and/or tests are performed to find the source of the infection.
It is at all times prohibited to treat for Salmonella with antibiotics.

Notification system in place

Zoonotic Salmonella is notifiable since 1 January 2004. Notification is done by phone, fax or e-mail.

Results of the investigation

There are no turkey breeding flocks in Belgium.
146 meat production flocks were tested in 2010. 1 flock was positive for Salmonella spp (S. Paratyphi B var. Java).

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

There is a low incidence of Salmonella in turkey meat production flocks. Finding S. Paratyphi B var. Java, a serotype that has been found in broilers for several years, is a cause for concern.

Table Salmonella in breeding flocks of Gallus gallus

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Hadar	S. Infantis	S. Typhimurium	S. Virchow	S. 1,4,[5],12:i:-
Gallus gallus (fowl) - parent breeding flocks, unspecified - day-old chicks [1)]	265	DGZ, ARSIA, CODA	Flock	265	1	1					
Gallus gallus (fowl) - parent breeding flocks, unspecified - during rearing period	330	DGZ, ARSIA, CODA	Flock	330	7	1			1		
Gallus gallus (fowl) - parent breeding flocks, unspecified - adult	564		Flock	564	22	1	1		1		
Gallus gallus (fowl) - grandparent breeding flocks, unspecified - adult	4		Flock	4	0						

	Salmonella spp., unspecified	S. Agona	S. Anatum	S. Brandenburg	S. Cubana	S. Derby	S. Goldcoast	S. Livingstone	S. Mbandaka	S. Minnesota	S. Paratyphi B var. Java
Gallus gallus (fowl) - parent breeding flocks, unspecified - day-old chicks [1)]											
Gallus gallus (fowl) - parent breeding flocks, unspecified - during rearing period								1			2
Gallus gallus (fowl) - parent breeding flocks, unspecified - adult		1	1	1	1	1	1		1	6	
Gallus gallus (fowl) - grandparent breeding flocks, unspecified - adult											

Table Salmonella in breeding flocks of Gallus gallus

	S. Rissen	S. Senftenberg
Gallus gallus (fowl) - parent breeding flocks, unspecified - day-old chicks [1)]		
Gallus gallus (fowl) - parent breeding flocks, unspecified - during rearing period		2
Gallus gallus (fowl) - parent breeding flocks, unspecified - adult	1	6
Gallus gallus (fowl) - grandparent breeding flocks, unspecified - adult		

Comments:

[1)] Information regarding each production line is not available.

Footnote:

Gallus gallus - parent breeding flocks - unspecified adult:
* 22 flocks were positive for Salmonella spp of which one flock was positive for 2 serotypes (S. Agona and S. Derby).
* In addition to the 22 positive flocks, 4 flocks were negative for S. Enteritidis after confirmation sampling; 3 for S. Typhimurium and 2 for S. Infantis.

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Other serovars	S. 1,4,[5],12:i:-	S. Agona	S. Anatum
Poultry, unspecified (NRL, AH data. Strains were sent in for serotyping.)	NRL, AH	Flock	1550	1550	302	124	95	108	2	20	12

	S. Infantis	S. Livingstone	S. Mbandaka	S. Minnesota	S. Paratyphi B	S. Rissen	S. Senftenberg	S. Virchow
Poultry, unspecified (NRL, AH data. Strains were sent in for serotyping.)	46	26	32	94	565	53	51	20

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Other serovars	S. 4,5:i:-	S. 6,7:-:-
Cattle (bovine animals) [1]	NRL, AH	Animal	50	50	6	17	0	3	1	0	
Pigs [2]	NRL, AH	Animal	465	465	2	314		5	10	29	1
Pigs - fattening pigs [3]	DGZ and ARSIA	Herd	112	59		46			4	1	1

	S. Agama	S. Anatum	S. Bovismorbificans	S. Brandenburg	S. Derby	S. Dublin	S. Essen	S. Goldcoast	S. Infantis	S. Lagos	S. Livingstone
Cattle (bovine animals) [1]		1				21					
Pigs [2]	1	3	3	7	34	0	3	3	7	3	16
Pigs - fattening pigs [3]	1	1	1	1	3		2	1	1	2	1

	S. London	S. Mbandaka	S. Paratyphi B var. Java	S. Rissen	S. Senftenberg
Cattle (bovine animals) [1]				1	
Pigs [2]	1	11	3	7	2
Pigs - fattening pigs [3]	1	1	1	2	2

Comments:

Table Salmonella in other animals

Comments:

[1)] Strains sent in for serotyping

[2)] Strains sent in for serotyping

[3)] Samples taken on farms with high seroprevelance in fattening pigs

Footnote:

Fattening pigs:
* All herds sampled are herds with a high seroprevalence. Several herds were positive for more than one serotype.

Table Salmonella in other poultry

	Number of existing flocks	Source of information	Sampling unit	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	S. 1,4,[5],12:i:-	Salmonella spp., unspecified	Not typeable	Other serovars
Gallus gallus (fowl) - laying hens - day-old chicks	398		Flock	245	1				1		
Gallus gallus (fowl) - laying hens - during rearing period	398	approved laboratories	Flock	398	2						
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	810	approved laboratories	Flock	810	55	24	2		1		1
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	810	approved laboratories	Flock	765	40	18	1		1		
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling	810	FASFC	Flock	287	13	4	1				1
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling	810		Flock	12	2	2					
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	8481	approved laboratories	Flock	8481	315	3	42		6	5	5
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes - official and industry sampling	146		Flock	146	1						
Ducks - meat production flocks	3		Flock	3	2	1					

Table Salmonella in other poultry

	S. 3,10:-:-	S. 3,19:-:-	S. 4,5:i:-	S. Agama	S. Agona	S. Anatum	S. Banana	S. Blockley	S. Braenderup	S. Brandenburg	S. California
Gallus gallus (fowl) - laying hens - day-old chicks											
Gallus gallus (fowl) - laying hens - during rearing period											
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling									3		
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry									2		
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling									1		
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling											
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	1	2	2	1	12	7	1	3		1	1
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes - official and industry sampling											
Ducks - meat production flocks											

Table Salmonella in other poultry

	S. Cerro	S. Coeln	S. Essen	S. Give	S. Hadar	S. Havana	S. Infantis	S. Jerusalem	S. Kentucky	S. Livingstone	S. Madelia
Gallus gallus (fowl) - laying hens - day-old chicks											
Gallus gallus (fowl) - laying hens - during rearing period							1	1			
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling					1	1	5	1		2	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry					1	1	2			2	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling							3	1			
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling											
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	5	1	1	1	1		12	2	1	8	2
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes - official and industry sampling											
Ducks - meat production flocks											

Table Salmonella in other poultry

	S. Mbandaka	S. Meleagridis	S. Minnesota	S. Ohio	S. Omifisan	S. Ouakam	S. Paratyphi B	S. Paratyphi B var. Java	S. Rissen	S. Senftenberg	S. Tennessee
Gallus gallus (fowl) - laying hens - day-old chicks											
Gallus gallus (fowl) - laying hens - during rearing period											
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	1		2	1					5	3	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	1		2	1					5	2	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling										1	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling											
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	12	3	38	1	1	1	20	45	29	38	2
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes - official and industry sampling								1			
Ducks - meat production flocks	1										

Table Salmonella in other poultry

	S. Virchow
Gallus gallus (fowl) - laying hens - day-old chicks	
Gallus gallus (fowl) - laying hens - during rearing period	
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official and industry sampling	2
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - sampling by industry	1
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - objective sampling	1
Gallus gallus (fowl) - laying hens - adult - at farm - Control and eradication programmes - official sampling - suspect sampling	
Gallus gallus (fowl) - broilers - before slaughter - at farm - Control and eradication programmes - official and industry sampling	5
Turkeys - fattening flocks - before slaughter - at farm - Control and eradication programmes - official and industry sampling	
Ducks - meat production flocks	

Footnote:

Gallus gallus - laying hens - adult - at farm - control and eradication programmes - official and industry sampling:
* In addition to the 55 positive flocks, 2 flocks were negative after confirmation sampling for Salmonella Enteritidis.
Gallus gallus - broiler - before slaughter - at farm:

Table Salmonella in other poultry

* There were 6 flocks that were positive for 2 different serotypes of Salmonella (2 flocks for S. Minnesota and S. Rissen, 1 flock each for S. Meleagridis and S. Senftenberg, S. Minnesota and S. O4:B, S. Senftenberg and S. Cerro, S. Minnesota and S Non-typable).

The following amendments were made:

Date of Modification	Row name	Column name	Old value	New value
2011-12-06		Footnote	Gallus gallus - laying hens - adult - at farm - control and eradication programmes - official and industry sampling: * In addition to the 55 positive flocks, 2 flocks were negative after confirmation sampling for Salmonella Enteritidis. Gallus gallus - broiler - before slaughter - at farm: * There were 6 flocks that were positive for 2 different serotypes of Salmonella.	Gallus gallus - laying hens - adult - at farm - control and eradication programmes - official and industry sampling: * In addition to the 55 positive flocks, 2 flocks were negative after confirmation sampling for Salmonella Enteritidis. Gallus gallus - broiler - before slaughter - at farm: * There were 6 flocks that were positive for 2 different serotypes of Salmonella (2 flocks for S. Minnesota and S. Rissen, 1 flock each for S. Meleagridis and S. Senftenberg, S. Minnesota and S. O4:B, S. Senftenberg and S. Cerro, S. Minnesota and S Non-typable).

2.1.4 Salmonella in feedingstuffs

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Anatum	S. Cubana	S. Dabou
Compound feedingstuffs for cattle - final product	TRA 055	Batch	25g	34	0						
Compound feedingstuffs for pigs - final product	TRA 055	Batch	25g	84	2				1		
Compound feedingstuffs for poultry - laying hens - final product	TRA 055	Batch	25g	119	1						
Compound feedingstuffs for poultry - breeders - final product	TRA 055	Batch	25g	119	1					1	
Compound feedingstuffs for poultry - broilers - final product	TRA 055	Batch	25g	119	2						
Pet food - dog snacks (pig ears, chewing bones) [1)]	TRA 055/IEC 401/TRA 082	Batch	25g	165	4		2			1	1
Compound feedingstuffs for sheep - final product	TRA 055	Batch	25g	2	0						

	S. Jerusalem	S. Livingstone	S. Mbandaka	S. Rissen
Compound feedingstuffs for cattle - final product				
Compound feedingstuffs for pigs - final product		1		
Compound feedingstuffs for poultry - laying hens - final product			1	

Table Salmonella in compound feedingstuffs

	S. Jerusalem	S. Livingstone	S. Mbandaka	S. Rissen
Compound feedingstuffs for poultry - breeders - final product				
Compound feedingstuffs for poultry - broilers - final product	1			1
Pet food - dog snacks (pig ears, chewing bones) [1)]			2	
Compound feedingstuffs for sheep - final product				

Comments:

[1)] One sample with two serotypes: S.Mbandaka and S.Typhimurium and One sample with S.Cubana and S.Dabou

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Not typeable	Other serovars	S. 6,7:d:-
Feed material of land animal origin - animal fat	TRA 055	Batch	25g	27	0						
Feed material of land animal origin - bone meal	TRA 055	Batch	25g	2	0						
Feed material of land animal origin - meat and bone meal [1)]	TRA 055	Batch	25g	15	1						1
Feed material of land animal origin - poultry offal meal	TRA 055	Batch	25g	6	0						
Feed material of marine animal origin - fish meal	TRA 055	Batch	25g	10	0						
Feed material of land animal origin	TRA 055	Batch	25g	2	0						
Feed material of land animal origin - blood products	TRA 055	Batch	25g	6	0						
Feed material of land animal origin - egg powder	IEC 401	Batch	25g	40	0						
Feed material of land animal origin - protein meal [2)]	IEC 402 / IEC 401 / IEC 402/ IEC 404	Batch	25g	103	4				1	1	

	S. Anatum	S. Cerro	S. Isangi	S. Mississippi	S. Senftenberg
Feed material of land animal origin - animal fat					
Feed material of land animal origin - bone meal					
Feed material of land animal origin - meat and bone meal [1)]			1		

Table Salmonella in feed material of animal origin

	S. Anatum	S. Cerro	S. Isangi	S. Mississippi	S. Senftenberg
Feed material of land animal origin - poultry offal meal					
Feed material of marine animal origin - fish meal					
Feed material of land animal origin					
Feed material of land animal origin - blood products					
Feed material of land animal origin - egg powder					
Feed material of land animal origin - protein meal [2)]	1	1		1	1

Comments:

[1)] One sample with two serotypes: S.Isangi and S.6,7:d:-

[2)] One sample with multiple serotypes : S. Cerro / S. Senftenberg / S. 4:d:-

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of oil seed or fruit origin - groundnut derived	IEC 207	Batch	25g	10	0			
Feed material of oil seed or fruit origin - linseed derived	TRA 055/ IEC 207	Batch	25g	24	0			
Feed material of oil seed or fruit origin - other oil seeds derived	IEC 207	Batch	25g	1	0			
Feed material of oil seed or fruit origin - palm kernel derived	TRA 055/ IEC 207	Batch	25g	4	0			
Feed material of oil seed or fruit origin - rape seed derived	TRA 055/ IEC 207	Batch	25g	21	0			
Feed material of oil seed or fruit origin - soya (bean) derived	TRA 055/ IEC 207	Batch	25g	48	0			
Feed material of oil seed or fruit origin - sunflower seed derived	TRA 055/ IEC 207	Batch	25g	12	0			
Other feed material - other plants	IEC 207	Batch	25g	3	0			

2.1.5 Antimicrobial resistance in Salmonella isolates

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the NRL Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Diagnostic samples sent to NRL.

See: "Antimicrobial resistance of Salmonella spp. in animals - All animals" for more details.

Control program/mechanisms

The control program/strategies in place

There was no monitoring programme for Salmonella in cattle in 2010.

Results of the investigation

A total of 18 Salmonella isolates were tested for their susceptibility. Eight were S. Dublin, six S. Typhimurium, two S. Enteritidis and one each of S. Anatum and S. Rissen.

Six strains were fully susceptible, which represents 33,3%. Most resistance was found against sulfonamides (50,0%), ampicillin (44,4%), nalidixic acid (38,9%), streptomycin and tetracycline (both 33,3%), but also against chloramphenicol (16,7%), florphenicol (11,1%) and ceftiofur (11.1%).

B. Antimicrobial resistance in Salmonella in foodstuff derived from pigs

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.

Antimicrobial	Breakpoints (µg / ml)
Ampicillin	4
Cefotaxime	0.5
Ceftazidim	2
Chloramphenicol	16
Ciprofloxacin	0.06
Florfenicol	16
Gentamicin	2
Kanamycin	8
Nalidixic acid	16
Streptomycin	16
Sulphamethoxazole	256
Tetracycline	8
Trimethoprim	2

Minimum Inhibitory Concentrations were determined using broth microdilution (Sensititre EUMVS2 panel) following the NCCLS standards.

Results of the investigation

In total, 62 Salmonella strains from pork were tested for their antibiotic susceptibility. This included strains from carcasses and cut meats. High resistance was observed to streptomycine (60%), ampicillin (47%), sulphamethoxazole (45%) and tetracycline (39%). Resistance to more than four antibiotics was observed in 19% of the tested isolates. The percentage of strains sensitive to all antibiotics tested significantly decreased from 39% in 2009 to 14,5% in 2010. All strains were sensitive to cefotaxim, ceftazidim, ciprofloxacin and gentamycin. Low resistance was observed for kanamycin (3%), nalidixic acid (3%) and florfenicol (3%).

Salmonella Typhimurium was the most dominantly isolated serotype (30%) from pork. The observed trends are similar as described above, with high resistance to ampicillin (63%), tetracycline (31%), sulphamethoxazole (31%) and streptomycin (37%). Ten percent of all Typhimurium strains were sensitive to all antibiotics.

C. Antimicrobial resistance in Salmonella in foodstuff derived from poultry

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.

Antimicrobial	Breakpoints (µg / ml)
Ampicillin	4
Cefotaxime	0.5
Ceftazidim	2
Chloramphenicol	16
Ciprofloxacin	0.06
Florfenicol	16
Gentamicin	2
Kanamycin	8
Nalidixic acid	16
Streptomycin	16
Sulphamethoxazole	256
Tetracycline	8
Trimethoprim	2

Minimum Inhibitory Concentrations were determined using broth microdilution method (Sensititre EUMVS2 panel) following the NCCLS standards.

Results of the investigation

In 2010, 331 Salmonella isolates from poultry meats were tested for their antimicrobial susceptibility. A total of 39% were sensitive to all tested antibiotics, which is 10% less than in 2009. However, in general resistance levels were lower compared to 2009. Resistance to streptomycin (30%), ampicillin (23%), trimethoprim (20,5%) and sulfamethoxazol (16%) were most prevalent. Multiresistance (resistance to more than four antibiotics) was observed in 19% of all isolates. Little or no resistance was found for gentamicin (1%), florfenicol (0,6%), chloramphenicol (0,6%) and kanamycin (1,5%).

The resistance to ciprofloxacin further decreased from 33% in 2008 to 20% in 2009 to 16% in 2010, but remains high compared to previous years. Resistance to trimethoprim significantly decreased from 47% in 2008 to 39% in 2009 to 20,5% in 2010. The differences in ciprofloxacin and trimethoprim resistance compared to earlier years can be attributed to a serious lowering of the breakpoint values since 2008.

Compared to these general results, higher resistances were observed in chicken meat for cooked consumption, with 50% resistant to streptomycin, 45% to trimethoprim and sulphamethoxazole. Fourty-five percent of these isolates showed multiresistance. On the other hand, Salmonella isolates from spent hens showed little antibiotic resistance, with only 1,5% showing multiresistance.

In total, 47 Salmonella Paratyphi B isolates from poultry-derived food products were tested for their antibiotic susceptibility. The resistance of this serotype was very high, with 100% of the isolates being resistant to trimethoprim and streptomycin. Ampicillin and sulphamethoxazole resistance was found in 85% and 75%, respectively. The degree of multiresistance observed was reincreased from 73% in 2008 to 49% in 2009 to 80% in 2010.

Apart from one isolate, all 120 isolates from Salmonella Enteritidis showed full susceptibility against all tested antibiotics.

D. Antimicrobial resistance in Salmonella in pigs

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the NRL Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Diagnostic samples sent to the NRL Salmonella, animal health.

See: "Antimicrobial resistance of Salmonella spp. in animals - All animals" for more details.

Results of the investigation

A total of 103 Salmonella isolates from pigs were tested for their susceptibility. Most of the strain tested were S. Typhimurium (n=68), S. Derby (n=8) and S. Livingstone (n=3).
18.4 % of strains were fully susceptible. Most resistance was found against sulfonamides (68.9%), ampicillin (64.1%), tetracycline (62.1%) and streptomycin (55.3%).

E. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the NRL Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Analysis of diagnostic samples sent to the NRL Salmonella, animal health.

See: "Antimicrobial resistance of Salmonella spp. in animals - All animals" for more details.

Results of the investigation

Three hundred fifty-six poultry Salmonella isolates were tested for their susceptibility. Of these, 56 were S. Enteritidis, 93 Paratyphi B, 42 S. Typhimurium and 30 S. Minnesota.
Hundred ninety-six strains were fully susceptible, which represents 55.1%. Most resistance was found against ampicillin (36.8%), sulfonamides (28.4%), nalidixic acid (27.8%), trimetoprim-sulfonamides (22.5%), streptomycin (20.5%) and tetracyclines (17.1%).

F. Antimicrobial resistance of Salmonella spp. in food

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated during the zoonosis monitoring program were sent to the Institute of Public Health for serotyping and determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested are listed in the following table.

Antimicrobial
Ampicillin
Cefotaxim
Ceftazidim
Streptomycin
Kanamycin
Tetracycline
Sulfamethoxazole
Trimethoprim
Nalidixic acid
Ciprofloxacin
Chloramphenicol
Florfenicol
Gentamicin

Cut-off values used in testing

Minimum Inhibitory Concentrations (MIC) were determined by the use of broth microdilution (Sensititre EUMVS2 panel) according to the NCCLS standards.

The antimicrobials tested and the breakpoints used are listed in the following table.

AntimicrobialBreakpoints(microg / ml)
Ampicillin8
Cefotaxim0,5
Streptomycin16
Kanamycin8
Tetracycline8
Sulfamethoxazole256
Trimethoprim2
Nalidixic acid16 - 32
Ciprofloxacin0.06
Chloramphenicol16
Florfenicol 16
Ceftazidim 2

G. Antimicrobial resistance of Salmonella spp. in animal - All animals - farmed

Sampling strategy used in monitoring

Methods used for collecting data

All requests to CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). Subsequently, the analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance as presented in this document were extracted from the LIMS files that were closed in 2010.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella at CODA - CERVA was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme (see http://www.pasteur.fr/ip/portal/action/WebdriveActionEvent/oid/01s-000036-089 for information). About one quarter of the strains were serotyped at the Scientific Institute for Public Health (www.iph.be) in Brussels, which is the National Reference centre for Salmonella and Shigella for Public Health. Both isolation and serotyping at CODA - CERVA and the serotyping at IPH were done under Belac (www.belac.fgov.be) accreditation conditions (ISO 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

List of the antimicrobials tested

Abbreviation	Antimicrobial	Amount of antimicrobial
Ap	Ampicillin	33microg
Cef	Ceftiofur	30microg
Sm	Streptomycin	100microg
Ne	Neomycin	120microg
Gm	Gentamicin	40microg
Tc	Tetracycline	80microg
Su	Sulfonamides	240microg
Tsu	Trimethoprim - sulfonamides	5,2microg + 240microg
Nal	Nalidixic acid	130microg
Enr	Enrofloxacin	10microg
Cm	Chloramphenicol	60microg
Ff	Florfenicol	30microg

Susceptibility tests were performed by the disk diffusion test, using Neo-Sensitabs (Rosco). Tests and interpretation were done according to the manufacturers guidelines using the methodology as described by CLSI. Internal control was performed with quality control strain E. coli ATCC25922. Results were only accepted when results with the QC strain were within the limits as proposed by Rosco.

Cut-off values used in testing

Agar diffuSion tests are used (ROSCO), with the following limits (in mm):

ampicillin: 17-19
ceftiofur: 20-22
streptomycin: 23-25
neomycin: 20-22
gentamicin: 20-22
tetracyclin: 20-22

sulfonamides: 20-22
trimethoprim + sulfonamides: 27-31
nalidixic acid: /
enrofloxacin: 20-22
chloramphenicol: 21-24
florfenicol: 15-18

Results of the investigation

The susceptibility of 580 Salmonella isolates was tested in 2010. In order to reduce bias due to multiple strains from the same origin at the same sampling time and belonging to the same serotype, only one isolate per serotype and per origin was selected for susceptibility testing. Therefore, tested strains were likely to be independent from each other.
A total of 296 Salmonella isolates (51.0%) were fully susceptible to all antimicrobial drugs tested. In 2008 and 2009, 62.6% and 54.3% of strains were susceptible, respectively, indicating an overall increase of resistant strains during this three-year period. Resistance was mainly found against Ap (39.0%) and Su (34.8%), but also against St (26.2%), Tc (25.3%), TSu (22.9%) and Nal (20.2%). Resistance against Cef, Enr, Cm and Ff in 2010 was at 9.5%, 3.8%, 5.3% and 2.6%, respectively. Isolates were less resistant against Ne and Gm (0.3% and 0.5%, respectively).
Salmonella strains from poultry were found to be less resistant (44.9%) as compared to those from cattle (66.7%) and pigs (81.6%), which corresponds with the higher proportion of serotype Enteritidis in this population. In general, pig isolates were more resistant against Ap, St, Tc, Su and TSu than cattle and poultry strains. On the other hand, Nal and Cef resistance were predominant in poultry and cattle strains; Cm and Ff resistance were primarily detected in Salmonella from cattle and pigs. Poultry strains showed remarkably more Enr resistance.

Due to the importance of cephalosporin resistance in human therapy, and its raise in important Salmonella serotypes we looked a bit closer to these data. Cef resistance was found in 10 different serotypes, i.e. S. Enteriditis (n=1), S. Typhimurium O5+ (n=4) and O5- (n=7), S. Rissen (n=2), S. Cerro (n=1), S. Infantis (n=1), S. Livingstone (n=1), S. Virchow, S. Paratyphi B var Java (n=30) and the tartrate negative variant (n=3). Three strains were non typable. A total of 55 different strains were Cef resistant, representing almost 10% of the tested strains. Nineteen different susceptibility profiles were found, indicating a high grade of diffusion into different genetic backgrounds. This was studied in closer detail in S. Typhimurium by PFGE on recent and older strains, and indeed, the spread of the resistance is certainly not clonal (data not shown). This may have major public health implications.
Also fluoroquinolones are important antibiotics in the treatment of human salmonellosis. Resistance against these antibiotics is mediated by an accumulation of point mutations, though recently plasmid mediated quinolone resistance has been described (the methodology used in this report does not allow to find this type of resistance). One mutation represents resistance to quinolones (here Nal was tested), an extra mutation gives resistance to fluoroquinolones (here Enr was tested). There is still debate about the breakpoints and criteria used to determine resistance, and depending on the method and criteria used, quinolone resistant strains are regarded also as fluoroquinolone resistant strains. Here we did not use this method, allowing us to follow the evolution in mutations in the strains. Resistance against Nal (20,2%) was found in a multitude of serotypes and origins. Resistance against Enr (3,8%) was restricted to 7 serotypes, however the majority of the resistance strains were S. Paratyphy B and S. Typhimurium. Strains originated mainly from poultry. Also here major public health implications should be taken into account when resistance raises.

Additional information

Information per Salmonella serotype.

Most of S. Agona isolates (n=12, mainly from feed) were fully susceptible (75.0%) for all antimicrobials tested. Three strains showed resistance, two from poultry (ApSt and SuTcTSu) and one from pigs (Tc)
Also the S. Anatum (n=17) strains were mainly susceptible to all antibiotics tested (87.5%). Two strains from poultry showed resistance (one with profile CmSuTc and one with profile ApCmStSuTc).
Only three susceptible S. Derby (n=10) isolates were found, including one with profile ApStSuTcTSu
As for S. Dublin isolates (n=8; all from cattle), 5 strains were Nal resistant. Only three were fully susceptible.
Of the 61 S. Enteritidis isolates, 52 were fully susceptible (85.2%). Eight different resistance profiles were found, of which one strain showed resistance to 6 different antibiotics and one to 5. One strain was found to be resistant to cephalosprines. Seven of the 10 resistant strains showed Su resistance. Compared to previous years, it seems that resistance in S. Enteritidis is increasing, which urges for a firm follow up.
Most of the S. Infantis strains (n=16) were susceptible (93.8%). Only one strain showed resistance, notably also against cephalosporins.
Sixteen S. Livinstone isolates were tested, and four were resistant (75.0% susceptible). All these strains were resistant to Su and TSu; three strains were even StSuTcTSu. One of the isolates was also resistant to Cm, one to Ap and one to Cef.
Thirteen S. Mbandaka isolates (n=21) were fully susceptible to all antimicrobials tested (61.9%). While last year the resistance profile ApCefSuTsu was most frequent, this year the dominant profile is ApSuTcTSu (4 strains). Cephalosporin resistance was not detected anymore.
All but two of the 32 S. Minnesota isolates were fully susceptible (93.8%).
Only 11,6% of S. Paratyphi B (n=95) strains were fully susceptible. Resistance to Cm and Ff was absent. Thirty five per cent of these strains are resistant to cephalosporins and 80% to penicillins. Also resistance against Nal was high with a little more than 70% of the strains being resistant. Of these 11.5% were also Enr resistant.
Of the 38 S. Rissen strains, 34 were fully susceptible (89.5%). Two of the resistant strains were resistant to Cef.
Sixteen S. Senftenberg strains were investigated and two of the strains were resistant.
Only 16.1% of S. Typhimurium isolates (n=137) were found susceptible. The typical pentaresistance ApStTcSuCm was encountered in 8,5 % of the strains. Additional resistances detected in this background were resistance against Ne, TSu, Gm and Cef. Cef resistance was seen in nearly 8% of the strains, while 3,6% were Enr resistant. Two strains were resistant to both Cef and Enr. Cef resistant strain originated from poultry, bovines and pigs. Enr resistance was only seen in strains of poultry.
Strains belonging to other serotypes were also tested, but to a lesser extent. Most of these isolates were fully sensitive for all the antimicrobials tested.

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

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Dublin	
Isolates out of a monitoring program (yes/no)								
Number of isolates available in the laboratory	6		17				21	
Antimicrobials:	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	2	0	6	3			8	0
Amphenicols - Florfenicol	2	0	6	2			8	0
Cephalosporins - 3rd generation cephalosporins	2	0	6	1			8	0
Fluoroquinolones - Ciprofloxacin	0	0						
Fluoroquinolones - Enrofloxacin	2	0	6	0			8	0
Quinolones - Nalidixic acid	2	0	6	1			8	5
Sulphonamides - Sulfonamide	2	0	6	6			8	2
Aminoglycosides - Streptomycin	2	0	6	5			8	1
Aminoglycosides - Gentamicin	2	0	6	0			8	0
Aminoglycosides - Neomycin	2	0	6	1			8	0
Trimethoprim + Sulphonamides	2	0	6	3			8	1
Penicillins - Ampicillin	2	0	6	5			8	2
Tetracyclines - Tetracycline	2	0	6	4			8	2
Fully sensitive	2	2	6	0			8	3
Resistant to 1 antimicrobial			6	0			8	3
Resistant to 2 antimicrobials			6	1			8	0
Resistant to 3 antimicrobials			6	0			8	0
Resistant to 4 antimicrobials			6	1			8	0
Resistant to >4 antimicrobials			6	4			8	2

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

Table Antimicrobial susceptibility testing of Salmonella in Pigs

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Derby		S. Livingstone	
Isolates out of a monitoring program (yes/no)										
Number of isolates available in the laboratory	2		314				34		16	
Antimicrobials:	N	n	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	0	0	68	16			8	0	5	1
Amphenicols - Florfenicol			68	10			8	0	5	0
Cephalosporins - 3rd generation cephalosporins			68	2			8	0	5	1
Fluoroquinolones - Enrofloxacin			68	0			8	0	5	0
Quinolones - Nalidixic acid			68	3			8	0	5	0
Sulphonamides - Sulfonamide			68	54			8	5	5	3
Aminoglycosides - Streptomycin			68	47			8	3	5	2
Aminoglycosides - Gentamicin			68	2			8	0	5	0
Aminoglycosides - Neomycin			68	0			8	0	5	0
Trimethoprim + Sulphonamides			68	25			8	2	5	3
Penicillins - Ampicillin			68	56			8	2	5	0
Tetracyclines - Tetracycline			68	47			8	5	5	2
Fully sensitive			68	5			8	2	5	2
Resistant to 1 antimicrobial			68	5			8	1	5	0
Resistant to 2 antimicrobials			68	4			8	1	5	1
Resistant to 3 antimicrobials			68	9			8	3	5	0
Resistant to 4 antimicrobials			68	18			8	0	5	0
Resistant to >4 antimicrobials			68	27			8	1	5	2

Table Antimicrobial susceptibility testing of Salmonella in Pigs

Table Antimicrobial susceptibility testing of Salmonella in meat from pig

Salmonella	Salmonella spp.		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	62		19	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	62	5	19	3
Amphenicols - Florfenicol	62	2	19	0
Fluoroquinolones - Ciprofloxacin	62	0	19	0
Quinolones - Nalidixic acid	62	2	19	0
Trimethoprim	62	11	19	3
Sulphonamides - Sulfonamide	62	28	19	6
Aminoglycosides - Streptomycin	62	37	19	7
Aminoglycosides - Gentamicin	62	0	19	0
Aminoglycosides - Kanamycin	62	2	19	1
Penicillins - Ampicillin	62	29	19	12
Tetracyclines - Tetracycline	62	24	19	6
Cephalosporins - Cefotaxim	62	0	19	0
Cephalosporins - Ceftazidim	62	0	19	0

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

Salmonella	S. Enteritidis		S. Typhimurium		Salmonella spp.		S. Infantis		S. Livingstone		S. Mbandaka		S. Minnesota		S. Paratyphi B		S. Rissen	
Isolates out of a monitoring program (yes/no)																		
Number of isolates available in the laboratory	302		124				46		26		32		94		565		53	
Antimicrobials:	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n	N	n
Amphenicols - Chloramphenicol	56	1	42	1			11	0	10	0	12	0	30	0	93	0	20	1
Amphenicols - Florfenicol	56	0	42	1			11	0	10	0	12	0	30	0	93	0	20	0
Cephalosporins - 3rd generation cephalosporins	56	1	42	8			11	1	10	0	12	0	30	0	93	32	20	1
Fluoroquinolones - Enrofloxacin	56	0	42	5			11	0	10	0	12	0	30	0	93	10	20	0
Quinolones - Nalidixic acid	56	2	42	16			11	0	10	0	12	0	30	0	93	65	20	0
Sulphonamides - Sulfonamide	56	4	42	24			11	1	10	0	12	3	30	1	93	56	20	1
Aminoglycosides - Streptomycin	56	1	42	22			11	0	10	0	12	0	30	0	93	37	20	1
Aminoglycosides - Gentamicin	56	0	42	0			11	0	10	0	12	0	30	0	93	1	20	0
Aminoglycosides - Neomycin	56	0	42	0			11	0	10	0	12	0	30	0	93	1	20	0
Trimethoprim + Sulphonamides	56	2	42	15			11	0	10	0	12	1	30	0	93	54	20	1
Penicillins - Ampicillin	56	2	42	30			11	1	10	0	12	2	30	2	93	74	20	2
Tetracyclines - Tetracycline	56	3	42	15			11	0	10	0	12	1	30	1	93	26	20	1
Fully sensitive	56	49	42	9			11	10	10	10	12	8	30	28	93	11	20	18
Resistant to 1 antimicrobial	56	3	42	0			11	0			12	2	30	1	93	2	20	0
Resistant to 2 antimicrobials	56	1	42	7			11	0			12	1	30	1	93	15	20	1
Resistant to 3 antimicrobials	56	2	42	5			11	1			12	1	30	0	93	12	20	0
Resistant to 4 antimicrobials	56	0	42	8			11	0			12	0	30	0	93	7	20	0
Resistant to >4 antimicrobials	56	1	42	13							12	0	30	0	93	46	20	1

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

Table Antimicrobial susceptibility testing of Salmonella in Meat from poultry, unspecified

Salmonella	S. Enteritidis		S. Paratyphi B		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes	
Number of isolates available in the laboratory	120		47		32	
Antimicrobials:	N	n	N	n	N	n
Amphenicols - Chloramphenicol	120	0	47	0	32	2
Amphenicols - Florfenicol	120	0	47	0	32	2
Tetracyclines - Tetracycline	120	0	47	6	32	4
Fluoroquinolones - Ciprofloxacin	120	0	47	26	32	4
Quinolones - Nalidixic acid	120	0	47	28	32	3
Trimethoprim	120	0	47	47	32	5
Aminoglycosides - Streptomycin	120	0	47	47	32	16
Aminoglycosides - Gentamicin	120	0	47	1	32	0
Aminoglycosides - Kanamycin	120	0	47	3	32	0
Penicillins - Ampicillin	120	1	47	40	32	8
Cephalosporins - Cefotaxim	118	0	47	13	32	0
Sulphonamides	120	0	47	35	32	5
Cephalosporins - Ceftazidim	120	0	47	12	32	0

Table Antimicrobial susceptibility testing of Salmonella in All foodstuffs

Salmonella	S. Enteritidis		S. Paratyphi B		S. Typhimurium	
Isolates out of a monitoring program (yes/no)	yes		yes		yes	
Number of isolates available in the laboratory	142		70		37	
Antimicrobials:	N	n	N	n	N	n
Amphenicols - Chloramphenicol	142	0	70	0	37	5
Amphenicols - Florfenicol	142	0	70	0	37	1
Tetracyclines - Tetracycline	142	1	70	7	37	13
Fluoroquinolones - Ciprofloxacin	142	2	70	47	37	0
Quinolones - Nalidixic acid	142	1	70	49	37	0
Trimethoprim	142	1	70	67	37	6
Aminoglycosides - Streptomycin	142	3	70	67	37	9
Aminoglycosides - Gentamicin	142	0	70	1	37	0
Aminoglycosides - Kanamycin	142	0	70	3	37	1
Penicillins - Ampicillin	142	4	70	59	37	16
Cephalosporins - Cefotaxim	140	2	70	19	37	0
Sulphonamides	142	3	70	44	37	11
Cephalosporins - Ceftazidim	142	2	70	18	37	0

Table Antimicrobial susceptibility testing of Salmonella in Meat from broilers (Gallus gallus) - carcass - spent hens

Salmonella	S. Enteritidis	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	108	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	108	0
Amphenicols - Florfenicol	108	0
Tetracyclines - Tetracycline	108	0
Fluoroquinolones - Ciprofloxacin	108	0
Quinolones - Nalidixic acid	108	0
Trimethoprim	108	0
Aminoglycosides - Streptomycin	108	0
Aminoglycosides - Gentamicin	108	0
Aminoglycosides - Kanamycin	108	0
Penicillins - Ampicillin	108	1
Cephalosporins - Cefotaxim	108	0
Sulphonamides	108	0
Cephalosporins - Ceftazidim	108	0

Table Antimicrobial susceptibility testing of Salmonella in Meat from broilers (Gallus gallus) - carcass

Salmonella	S. Paratyphi B	
Isolates out of a monitoring program (yes/no)	yes	
Number of isolates available in the laboratory	23	
Antimicrobials:	N	n
Amphenicols - Chloramphenicol	23	0
Amphenicols - Florfenicol	23	0
Tetracyclines - Tetracycline	23	5
Fluoroquinolones - Ciprofloxacin	23	17
Quinolones - Nalidixic acid	23	17
Trimethoprim	23	23
Aminoglycosides - Streptomycin	23	23
Aminoglycosides - Gentamicin	23	1
Aminoglycosides - Kanamycin	23	1
Penicillins - Ampicillin	23	20
Cephalosporins - Cefotaxim	23	5
Sulphonamides	23	16
Cephalosporins - Ceftazidim	23	4

Table Antimicrobial susceptibility testing of S. Enteritidis in All foodstuffs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	All foodstuffs																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	142																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	142	0			0	0	0	0	0	0	2	76	63	1	0	0	0	0	0	0	0	0	2	16
Amphenicols - Florfenicol	16	142	0			0	0	0	0	0	0	3	134	5	0	0	0	0	0	0	0	0	0	2	8
Tetracyclines - Tetracycline	8	142	1			0	0	0	0	0	90	51	0	0	0	0	1	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	142	2			137	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.25
Quinolones - Nalidixic acid	16	142	1			0	0	0	0	0	0	0	137	3	1	0	1	0	0	0	0	0	0	4	64
Trimethoprim	2	142	1			0	0	0	0	140	1	0	0	0	0	1	0	0	0	0	0	0	0	0.5	32
Aminoglycosides - Streptomycin	16	142	3			0	0	0	0	0	0	2	97	36	4	0	1	2	0	0	0	0	0	2	128
Aminoglycosides - Gentamicin	2	142	0			0	0	0	19	110	12	1	0	0	0	0	0	0	0	0	0	0	0	0.25	2
Aminoglycosides - Kanamycin	8	142	0			0	0	0	0	0	0	0	139	3	0	0	0	0	0	0	0	0	0	4	8
Penicillins - Ampicillin	8	142	4			0	0	0	0	8	119	10	1	0	0	4	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	140	2			0	97	38	3	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0.06	4
Sulphonamides	256	142	3			0	0	0	0	0	0	0	0	1	6	61	68	3	0	0	3	0	0	8	1024
Cephalosporins - Ceftazidim	2	142	2			0	0	0	134	6	0	0	0	0	2	0	0	0	0	0	0	0	0	0.25	16

Table Antimicrobial susceptibility testing of S. Paratyphi B in All foodstuffs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	All foodstuffs																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	70																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	70	0			0	0	0	0	0	0	0	40	25	5	0	0	0	0	0	0	0	0	4	16
Amphenicols - Florfenicol	16	70	0			0	0	0	0	0	0	18	42	9	1	0	0	0	0	0	0	0	0	2	16
Tetracyclines - Tetracycline	8	70	7			0	0	0	0	0	47	12	3	1	0	0	7	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	70	47			20	3	0	17	26	4	0	0	0	0	0	0	0	0	0	0	0	0	0.03	1
Quinolones - Nalidixic acid	16	70	49			0	0	0	0	0	0	0	20	1	0	0	49	0	0	0	0	0	0	4	64
Trimethoprim	2	70	67			0	0	0	0	3	0	0	0	0	0	67	0	0	0	0	0	0	0	0.5	32
Aminoglycosides - Streptomycin	16	70	67			0	0	0	0	0	0	0	1	1	1	9	42	16	0	0	0	0	0	4	128
Aminoglycosides - Gentamicin	2	70	1			0	0	0	22	41	6	0	0	0	0	1	0	0	0	0	0	0	0	0.25	32
Aminoglycosides - Kanamycin	8	70	3			0	0	0	0	0	0	0	66	1	0	0	0	3	0	0	0	0	0	4	128
Penicillins - Ampicillin	8	70	59			0	0	0	0	2	7	2	0	0	1	58	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	70	19			0	20	28	2	1	0	0	19	0	0	0	0	0	0	0	0	0	0	0.06	4
Sulphonamides	256	70	44			0	0	0	0	0	0	0	0	1	15	8	1	0	1	0	44	0	0	8	1024
Cephalosporins - Ceftazidim	2	70	18			0	0	0	31	20	0	1	10	5	3	0	0	0	0	0	0	0	0	0.25	16

Table Antimicrobial susceptibility testing of S. Typhimurium in All foodstuffs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	All foodstuffs																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	37																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	37	5			0	0	0	0	0	0	0	7	24	1	1	4	0	0	0	0	0	0	4	64
Amphenicols - Florfenicol	16	37	1			0	0	0	0	0	0	1	32	1	2	1	0	0	0	0	0	0	0	2	32
Tetracyclines - Tetracycline	8	37	13			0	0	0	0	0	15	8	1	0	0	4	9	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	37	0			35	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.06
Quinolones - Nalidixic acid	16	37	0			0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0	4	4
Trimethoprim	2	37	6			0	0	0	0	29	2	0	0	0	0	6	0	0	0	0	0	0	0	0.5	32
Aminoglycosides - Streptomycin	16	37	15			0	0	0	0	0	0	0	1	1	20	6	0	9	0	0	0	0	0	4	128
Aminoglycosides - Gentamicin	2	37	0			0	0	0	1	25	9	2	0	0	0	0	0	0	0	0	0	0	0	0.25	2
Aminoglycosides - Kanamycin	8	37	1			0	0	0	0	0	0	0	34	2	0	0	0	1	0	0	0	0	0	4	128
Penicillins - Ampicillin	8	37	16			0	0	0	0	3	17	1	0	0	0	16	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	37	0			0	31	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.12
Sulphonamides	256	37	11			0	0	0	0	0	0	0	0	2	2	15	6	1	0	0	11	0	0	8	1024
Cephalosporins - Ceftazidim	2	37	0			0	0	0	31	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0.5

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from poultry, unspecified - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Meat from poultry, unspecified																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	120																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	120	0			0	0	0	0	0	0	2	63	55	0	0	0	0	0	0	0	0	0	2	8
Amphenicols - Florfenicol	16	120	0			0	0	0	0	0	0	3	112	5	0	0	0	0	0	0	0	0	0	2	8
Tetracyclines - Tetracycline	8	120	0			0	0	0	0	0	80	40	0	0	0	0	0	0	0	0	0	0	0	1	2
Fluoroquinolones - Ciprofloxacin	0.06	120	0			117	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.06
Quinolones - Nalidixic acid	16	120	0			0	0	0	0	0	0	0	117	2	1	0	0	0	0	0	0	0	0	4	16
Trimethoprim	2	120	0			0	0	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0.5	0.5
Aminoglycosides - Streptomycin	16	120	0			0	0	0	0	0	0	2	84	30	4	0	0	0	0	0	0	0	0	2	16
Aminoglycosides - Gentamicin	2	120	0			0	0	0	19	95	5	1	0	0	0	0	0	0	0	0	0	0	0	0.25	2
Aminoglycosides - Kanamycin	8	120	0			0	0	0	0	0	0	0	118	2	0	0	0	0	0	0	0	0	0	4	8
Penicillins - Ampicillin	8	120	1			0	0	0	0	8	107	4	0	0	0	1	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	118	0			0	85	31	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25
Sulphonamides	256	120	0			0	0	0	0	0	0	0	0	1	6	53	60	0	0	0	0			8	64
Cephalosporins - Ceftazidim	2	120	0			0	0	0	117	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0.5

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from poultry, unspecified - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	Meat from poultry, unspecified																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	47																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	47	0			0	0	0	0	0	0	0	26	19	2	0	0	0	0	0	0	0	0	4	16
Amphenicols - Florfenicol	16	47	0			0	0	0	0	0	0	14	29	3	1	0	0	0	0	0	0	0	0	2	16
Tetracyclines - Tetracycline	8	47	6			0	0	0	0	0	33	7	1	0	0	0	6	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	47	26			20	1	0	10	13	3	0	0	0	0	0	0	0	0	0	0	0	0	0.03	1
Quinolones - Nalidixic acid	16	47	28			0	0	0	0	0	0	0	19	0	0	0	28	0	0	0	0	0	0	4	64
Trimethoprim	2	47	47			0	0	0	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	32	32
Aminoglycosides - Streptomycin	16	47	47			0	0	0	0	0	0	0	0	0	0	6	28	13	0	0	0	0	0	32	128
Aminoglycosides - Gentamicin	2	47	1			0	0	0	17	26	3	0	0	0	0	1	0	0	0	0	0	0	0	0.25	32
Aminoglycosides - Kanamycin	8	47	3			0	0	0	0	0	0	0	43	1	0	0	0	3	0	0	0	0	0	4	128
Penicillins - Ampicillin	8	47	40			0	0	0	0	2	5	0	0	0	0	40	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	47	13			0	17	16	0	1	0	0	13	0	0	0	0	0	0	0	0	0	0	0.06	4
Sulphonamides	256	47	35			0	0	0	0	0	0	0	0	0	6	6	0	0	0	0	35	0	0	16	1024
Cephalosporins - Ceftazidim	2	47	12			0	0	0	23	11	0	1	8	2	2	0	0	0	0	0	0	0	0	0.25	16

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from poultry, unspecified - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Meat from poultry, unspecified																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	32																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	32	2			0	0	0	0	0	0	0	3	26	1	0	2	0	0	0	0	0	0	4	64
Amphenicols - Florfenicol	16	32	2			0	0	0	0	0	0	0	29	1	0	2	0	0	0	0	0	0	0	4	32
Tetracyclines - Tetracycline	8	32	4			0	0	0	0	0	16	11	1	0	0	2	2	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	32	4			27	1	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.5
Quinolones - Nalidixic acid	16	32	3			0	0	0	0	0	0	0	27	2	0	0	3	0	0	0	0	0	0	4	64
Trimethoprim	2	32	5			0	0	0	0	26	1	0	0	0	0	5	0	0	0	0	0	0	0	0.5	32
Aminoglycosides - Streptomycin	16	32	16			0	0	0	0	0	0	0	1	0	15	9	3	4	0	0	0	0	0	4	128
Aminoglycosides - Gentamicin	2	32	0			0	0	0	2	22	7	1	0	0	0	0	0	0	0	0	0	0	0	0.25	2
Aminoglycosides - Kanamycin	8	32	0			0	0	0	0	0	0	0	32	0	0	0	0	0	0	0	0	0	0	4	4
Penicillins - Ampicillin	8	32	8			0	0	0	0	0	23	1	0	0	0	8	0	0	0	0	0	0	0	1	32
Cephalosporins - Cefotaxim	0.5	32	0			0	24	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.25
Sulphonamides	256	32	5			0	0	0	0	0	0	0	0	2	1	14	10	0	0	0	5	0	0	8	1024
Cephalosporins - Ceftazidim	2	32	0			0	0	0	27	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0.5

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Meat from pig																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	19																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	19	3			0	0	0	0	0	0	0	6	10	0	1	2	0	0	0	0	0	0	4	64
Amphenicols - Florfenicol	16	19	0			0	0	0	0	0	0	1	17	0	1	0	0	0	0	0	0	0	0	2	16
Tetracyclines - Tetracycline	8	19	6			0	0	0	0	0	7	5	1	0	0	2	4	0	0	0	0	0	0	1	64
Fluoroquinolones - Ciprofloxacin	0.06	19	0			18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.03	0.06
Quinolones - Nalidixic acid	16	19	0			0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	4	4
Trimethoprim	2	19	3			0	0	0	0	16	0	0	0	0	0	3	0	0	0	0	0	0	0	0.5	32
Aminoglycosides - Streptomycin	16	19	7			0	0	0	0	0	0	0	0	1	11	2	0	5	0	0	0	0	0	8	128
Aminoglycosides - Gentamicin	2	19	0			0	0	0	1	12	6	0	0	0	0	0	0	0	0	0	0	0	0	0.25	1
Aminoglycosides - Kanamycin	8	19	1			0	0	0	0	0	0	0	18	0	0	0	0	1	0	0	0	0	0	4	128
Penicillins - Ampicillin	8	19	12			0	0	0	0	2	4	1	0	0	0	12	0	0	0	0	0	0	0	0.5	32
Cephalosporins - Cefotaxim	0.5	19	0			0	14	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06	0.12
Sulphonamides	256	19	6			0	0	0	0	0	0	0	0	2	2	6	3	0	0	0	6	0	0	8	1024
Cephalosporins - Ceftazidim	2	19	0			0	0	0	17	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0.25	0.5

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	Meat from broilers (Gallus gallus) - carcass																							
Isolates out of a monitoring program (yes/no)																								
Number of isolates available in the laboratory	301																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	1	0											1									2	64
Amphenicols - Florfenicol	16	1	0											1									2	64
Tetracyclines - Tetracycline	8	1	0										1										1	64
Fluoroquinolones - Ciprofloxacin	0.06	1	1							1													0.008	8
Quinolones - Nalidixic acid	16	1	1														1						4	64
Trimethoprim	2	1	1													1							0.5	32
Aminoglycosides - Streptomycin	16	1	1													1							2	128
Aminoglycosides - Gentamicin	2	1	0							1													0.25	32
Aminoglycosides - Kanamycin	8	1	0										1										4	128
Penicillins - Ampicillin	8	1	1													1							0.5	32
Cephalosporins - Cefotaxim	0.5	1	1										1										0.06	4
Sulphonamides	256	1	0												1								8	1024
Cephalosporins - Ceftazidim	2	1	1										1										0.25	16
Polymyxins - Colistin	2	1	0									1											2	4

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Meat from broilers (Gallus gallus) - carcass - spent hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	102	0									2	57	43										2	64
Amphenicols - Florfenicol	16	102	0									3	97	2										2	64
Tetracyclines - Tetracycline	8	102	0								70	32												1	64
Fluoroquinolones - Ciprofloxacin	0.06	102	0		19	81	2																	0.008	8
Quinolones - Nalidixic acid	16	102	0										98	3	1									4	64
Trimethoprim	2	102	0							101	1													0.5	32
Aminoglycosides - Streptomycin	16	102	0									2	70	27	3									2	128
Aminoglycosides - Gentamicin	2	102	0						17	79	5	1												0.25	32
Aminoglycosides - Kanamycin	8	102	0										101	1										4	128
Penicillins - Ampicillin	8	102	1							8	91	2				1								0.5	32
Cephalosporins - Cefotaxim	0.5	102	0				73	28	1															0.06	4
Sulphonamides	256	102	0											3	6	48	45							8	1024
Cephalosporins - Ceftazidim	2	102	0						99	3														0.25	16
Polymyxins - Colistin	2	48	16									32	16											2	4

Table Antimicrobial susceptibility testing of S. Derby in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	12	0																					12		
Amphenicols - Florfenicol	16	12	0																			4		8		
Tetracyclines - Tetracycline	8	12	3															7		2						
Fluoroquinolones - Ciprofloxacin	0.06	12	0			6		6																		
Quinolones - Nalidixic acid	16	12	0																			12				
Trimethoprim	2	12	1													11										
Aminoglycosides - Streptomycin	16	12	8																	1		1				2
Aminoglycosides - Gentamicin	2	12	1													7		4						1		
Aminoglycosides - Kanamycin	8	12	0													1						11				
Penicillins - Ampicillin	8	12	1													4		6		1						
Cephalosporins - Cefotaxim	0.5	12	0							5		7														
Sulphonamides	256	12	3																					1		2
Cephalosporins - Ceftazidim	2	12	0											3		9										
Polymyxins - Colistin	2	6	0																	6						

Table Antimicrobial susceptibility testing of S. Derby in Meat from pig - carcass - quantitative data [Dilution method]

S. Derby	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				3														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim				1														0.5	32
Aminoglycosides - Streptomycin		4		1		3												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		3		2		1						3						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Derby in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	2	0																			1		1		
Amphenicols - Florfenicol	16	2	0																			2				
Tetracyclines - Tetracycline	8	2	1															1								
Fluoroquinolones - Ciprofloxacin	0.06	2	0			2																				
Quinolones - Nalidixic acid	16	2	0																			2				
Trimethoprim	2	2	1													1										
Aminoglycosides - Streptomycin	16	2	2																							
Aminoglycosides - Gentamicin	2	2	0															2								
Aminoglycosides - Kanamycin	8	2	0																			2				
Penicillins - Ampicillin	8	2	1															1								
Cephalosporins - Cefotaxim	0.5	2	0							2																
Sulphonamides	256	2	1																							
Cephalosporins - Ceftazidim	2	2	0											1		1										
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Derby in Other food - quantitative data [Dilution method]

S. Derby	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin		1		1														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				1								1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																			2		5		
Amphenicols - Florfenicol	16	7	0																			7				
Tetracyclines - Tetracycline	8	7	0															6		1						
Fluoroquinolones - Ciprofloxacin	0.06	7	2					5						1		1										
Quinolones - Nalidixic acid	16	7	2																			5				
Trimethoprim	2	7	1													6										
Aminoglycosides - Streptomycin	16	7	0																					2		5
Aminoglycosides - Gentamicin	2	7	0											1		5		1								
Aminoglycosides - Kanamycin	8	7	0																			6		1		
Penicillins - Ampicillin	8	7	3															4								
Cephalosporins - Cefotaxim	0.5	7	2									5										2				
Sulphonamides	256	7	1																							
Cephalosporins - Ceftazidim	2	7	2											1		4										2
Polymyxins - Colistin	2	7	0																	7						

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Infantis	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				2														4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		3																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		4		2								1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Minnesota in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Minnesota	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																					7		
Amphenicols - Florfenicol	16	7	0																					7		
Tetracyclines - Tetracycline	8	7	0															2		5						
Fluoroquinolones - Ciprofloxacin	0.06	7	0					6		1																
Quinolones - Nalidixic acid	16	7	0																			7				
Trimethoprim	2	7	1													6										
Aminoglycosides - Streptomycin	16	7	1																							6
Aminoglycosides - Gentamicin	2	7	0													3		4								
Aminoglycosides - Kanamycin	8	7	0																			6		1		
Penicillins - Ampicillin	8	7	1															6								
Cephalosporins - Cefotaxim	0.5	7	0							5		2														
Sulphonamides	256	7	1																							
Cephalosporins - Ceftazidim	2	7	0											4		3										
Polymyxins - Colistin	2	7	0																	7						

Table Antimicrobial susceptibility testing of S. Minnesota in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Minnesota	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin		1																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				5		1						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	3	0																			1		2		
Amphenicols - Florfenicol	16	3	0																			3				
Tetracyclines - Tetracycline	8	3	1															1		1						
Fluoroquinolones - Ciprofloxacin	0.06	3	0			1		2																		
Quinolones - Nalidixic acid	16	3	0																			3				
Trimethoprim	2	3	0													3										
Aminoglycosides - Streptomycin	16	3	1																					1		1
Aminoglycosides - Gentamicin	2	3	0											1		2										
Aminoglycosides - Kanamycin	8	3	0																			3				
Penicillins - Ampicillin	8	3	3																							
Cephalosporins - Cefotaxim	0.5	3	0							3																
Sulphonamides	256	3	0																					1		1
Cephalosporins - Ceftazidim	2	3	0											3												
Polymyxins - Colistin	2	2	0																	2						

Table Antimicrobial susceptibility testing of S. Typhimurium in Meat from pig - carcass - quantitative data [Dilution method]

S. Typhimurium	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin		1																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		3																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		1																8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Meat from broilers (Gallus gallus) - carcass - spent hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	6	0																					5		1
Amphenicols - Florfenicol	16	6	0																			6				
Tetracyclines - Tetracycline	8	6	0															5		1						
Fluoroquinolones - Ciprofloxacin	0.06	6	0			5		1																		
Quinolones - Nalidixic acid	16	6	0																			6				
Trimethoprim	2	6	0													6										
Aminoglycosides - Streptomycin	16	6	1																							5
Aminoglycosides - Gentamicin	2	6	0													2		4								
Aminoglycosides - Kanamycin	8	6	0																			5		1		
Penicillins - Ampicillin	8	6	0													1		5								
Cephalosporins - Cefotaxim	0.5	6	0							2		4														
Sulphonamides	256	6	0																							
Cephalosporins - Ceftazidim	2	6	0											1		4		1								
Polymyxins - Colistin	2	4	0																	4						

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

S. Mbandaka	Meat from broilers (Gallus gallus) - carcass - spent hens																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin		1																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		5		1														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Infantis in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	5	0																			3		2		
Amphenicols - Florfenicol	16	5	0															1				4				
Tetracyclines - Tetracycline	8	5	0															4		1						
Fluoroquinolones - Ciprofloxacin	0.06	5	0			3		2																		
Quinolones - Nalidixic acid	16	5	0																			5				
Trimethoprim	2	5	0													5										
Aminoglycosides - Streptomycin	16	5	0																							5
Aminoglycosides - Gentamicin	2	5	0											1		4										
Aminoglycosides - Kanamycin	8	5	0																			5				
Penicillins - Ampicillin	8	5	0															5								
Cephalosporins - Cefotaxim	0.5	5	0							2		3														
Sulphonamides	256	5	0																							
Cephalosporins - Ceftazidim	2	5	0											2		3										

Table Antimicrobial susceptibility testing of S. Infantis in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

S. Infantis	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		3		2														8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from broilers (Gallus gallus) - carcass - spent hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																				4		
Amphenicols - Florfenicol	16	4	0																			4				
Tetracyclines - Tetracycline	8	4	0															4								
Fluoroquinolones - Ciprofloxacin	0.06	4	0			4																				
Quinolones - Nalidixic acid	16	4	0																			4				
Trimethoprim	2	4	0													4										
Aminoglycosides - Streptomycin	16	4	0																					1		3
Aminoglycosides - Gentamicin	2	4	0													3		1								
Aminoglycosides - Kanamycin	8	4	0																			4				
Penicillins - Ampicillin	8	4	0													1		3								
Cephalosporins - Cefotaxim	0.5	4	0									4														
Sulphonamides	256	4	0																							1
Cephalosporins - Ceftazidim	2	4	0													4										
Polymyxins - Colistin	2	3	0																	3						

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

S. Infantis	Meat from broilers (Gallus gallus) - carcass - spent hens																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		2		1														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Agona in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																					1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0															1								
Fluoroquinolones - Ciprofloxacin	0.06	1	0					1																		
Quinolones - Nalidixic acid	16	1	1																							
Trimethoprim	2	1	0													1										
Aminoglycosides - Streptomycin	16	1	0																							1
Aminoglycosides - Gentamicin	2	1	0															1								
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	0															1								
Cephalosporins - Cefotaxim	0.5	1	0									1														
Sulphonamides	256	1	0																							
Cephalosporins - Ceftazidim	2	1	0													1										

Table Antimicrobial susceptibility testing of S. Agona in Meat from pig - carcass - quantitative data [Dilution method]

S. Agona	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				1														4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		1																8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Typhimurium - Other in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

Other	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	20	1																			3		15		1
Amphenicols - Florfenicol	16	20	1																			18		1		
Tetracyclines - Tetracycline	8	20	2															8		9		1				
Fluoroquinolones - Ciprofloxacin	0.06	20	4			3		12		1		1		1		2										
Quinolones - Nalidixic acid	16	20	3																			15		2		
Trimethoprim	2	20	4													16										
Aminoglycosides - Streptomycin	16	20	12																							8
Aminoglycosides - Gentamicin	2	20	0											2		11		6		1						
Aminoglycosides - Kanamycin	8	20	0																			20				
Penicillins - Ampicillin	8	20	6															13		1						
Cephalosporins - Cefotaxim	0.5	20	0							13		6		1												
Sulphonamides	256	20	3																					2		1
Cephalosporins - Ceftazidim	2	20	0											15		5										
Polymyxins - Colistin	2	20	0																	20						

Table Antimicrobial susceptibility testing of S. Typhimurium - Other in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Other	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol				1														2	64
Amphenicols - Florfenicol		1																2	64
Tetracyclines - Tetracycline		1		1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				3														4	64
Trimethoprim		4																0.5	32
Aminoglycosides - Streptomycin		6		3		3												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		6																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		8		6								3						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Enteritidis in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	21	0																			13		7		1
Amphenicols - Florfenicol	16	21	0																			21				
Tetracyclines - Tetracycline	8	21	1															9		11						
Fluoroquinolones - Ciprofloxacin	0.06	21	2			4		15				1		1												
Quinolones - Nalidixic acid	16	21	1																			19		1		
Trimethoprim	2	21	1													19		1								
Aminoglycosides - Streptomycin	16	21	2																			13		6		
Aminoglycosides - Gentamicin	2	21	0													15		6								
Aminoglycosides - Kanamycin	8	21	0																			20		1		
Penicillins - Ampicillin	8	21	2															12		6		1				
Cephalosporins - Cefotaxim	0.5	21	2							11		7		1				1				1				
Sulphonamides	256	21	2																							
Cephalosporins - Ceftazidim	2	21	2											16		3										2
Polymyxins - Colistin	2	16	11																	5		11				

Table Antimicrobial susceptibility testing of S. Enteritidis in Other food - quantitative data [Dilution method]

S. Enteritidis	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				1														4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin				1		1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		2																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		8		8		3						2						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																					1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0															1								
Fluoroquinolones - Ciprofloxacin	0.06	1	0					1																		
Quinolones - Nalidixic acid	16	1	0																			1				
Trimethoprim	2	1	0													1										
Aminoglycosides - Streptomycin	16	1	1																							
Aminoglycosides - Gentamicin	2	1	0															1								
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	1																							
Cephalosporins - Cefotaxim	0.5	1	0							1																
Sulphonamides	256	1	1																							
Cephalosporins - Ceftazidim	2	1	0											1												
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from pig - carcass - quantitative data [Dilution method]

S. Enteritidis	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin						1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides												1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Typhimurium in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Typhimurium	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	2	0																			1				1
Amphenicols - Florfenicol	16	2	0																			1		1		
Tetracyclines - Tetracycline	8	2	1																	1						
Fluoroquinolones - Ciprofloxacin	0.06	2	0					1		1																
Quinolones - Nalidixic acid	16	2	0																			2				
Trimethoprim	2	2	0													1		1								
Aminoglycosides - Streptomycin	16	2	2																							
Aminoglycosides - Gentamicin	2	2	0																	2						
Aminoglycosides - Kanamycin	8	2	0																			1		1		
Penicillins - Ampicillin	8	2	1															1								
Cephalosporins - Cefotaxim	0.5	2	0							1		1														
Sulphonamides	256	2	1																							
Cephalosporins - Ceftazidim	2	2	0											1		1										

Table Antimicrobial susceptibility testing of S. Typhimurium in Other food - quantitative data [Dilution method]

S. Typhimurium	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin		1				1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides						1						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Typhimurium - Other in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

Other	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	17	0																			3		13		1
Amphenicols - Florfenicol	16	17	0																			16		1		
Tetracyclines - Tetracycline	8	17	5															3		8				1		
Fluoroquinolones - Ciprofloxacin	0.06	17	6					11								6										
Quinolones - Nalidixic acid	16	17	7																			10				
Trimethoprim	2	17	8													8		1								
Aminoglycosides - Streptomycin	16	17	16																							1
Aminoglycosides - Gentamicin	2	17	0											1		7		8		1						
Aminoglycosides - Kanamycin	8	17	1																			15		1		
Penicillins - Ampicillin	8	17	8															4		4		1				
Cephalosporins - Cefotaxim	0.5	17	3							5		8		1				1				2				
Sulphonamides	256	17	10																							
Cephalosporins - Ceftazidim	2	17	3											5		9						1		2		
Polymyxins - Colistin	2	17	2																	15		2				

Table Antimicrobial susceptibility testing of S. Typhimurium - Other in Other food - quantitative data [Dilution method]

Other	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				5														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid		1		6														4	64
Trimethoprim		8																0.5	32
Aminoglycosides - Streptomycin		4		5		7												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin						1												4	128
Penicillins - Ampicillin		8																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		3		1		2		1				10						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B var. Java	Meat from broilers (Gallus gallus) - meat products																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																			1		3		
Amphenicols - Florfenicol	16	4	0																			4				
Tetracyclines - Tetracycline	8	4	0															4								
Fluoroquinolones - Ciprofloxacin	0.06	4	1			1		2								1										
Quinolones - Nalidixic acid	16	4	1																			3				
Trimethoprim	2	4	4																							
Aminoglycosides - Streptomycin	16	4	4																							
Aminoglycosides - Gentamicin	2	4	0											1		2		1								
Aminoglycosides - Kanamycin	8	4	2																			2				
Penicillins - Ampicillin	8	4	2															2								
Cephalosporins - Cefotaxim	0.5	4	2							1		1										2				
Sulphonamides	256	4	4																							
Cephalosporins - Ceftazidim	2	4	2											2								2				
Polymyxins - Colistin	2	4	0																	4						

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

S. Paratyphi B var. Java	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				1														4	64
Trimethoprim		4																0.5	32
Aminoglycosides - Streptomycin				1		3												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin						2												4	128
Penicillins - Ampicillin		2																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides												4						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	9	0																			2		7		
Amphenicols - Florfenicol	16	9	0																			8		1		
Tetracyclines - Tetracycline	8	9	0															3		6						
Fluoroquinolones - Ciprofloxacin	0.06	9	0			3		6																		
Quinolones - Nalidixic acid	16	9	0																			9				
Trimethoprim	2	9	0													9										
Aminoglycosides - Streptomycin	16	9	0																			6		2		1
Aminoglycosides - Gentamicin	2	9	0													9										
Aminoglycosides - Kanamycin	8	9	0																			9				
Penicillins - Ampicillin	8	9	0															8		1						
Cephalosporins - Cefotaxim	0.5	9	0							4		5														
Sulphonamides	256	9	0																							
Cephalosporins - Ceftazidim	2	9	0											9												
Polymyxins - Colistin	2	9	2																	7		2				

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Enteritidis	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		2		7														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Agona in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																					7		
Amphenicols - Florfenicol	16	7	0																			6		1		
Tetracyclines - Tetracycline	8	7	1															4		2						
Fluoroquinolones - Ciprofloxacin	0.06	7	0			3		4																		
Quinolones - Nalidixic acid	16	7	0																			7				
Trimethoprim	2	7	1													6										
Aminoglycosides - Streptomycin	16	7	1																							6
Aminoglycosides - Gentamicin	2	7	0													7										
Aminoglycosides - Kanamycin	8	7	0																			7				
Penicillins - Ampicillin	8	7	1													1		5								
Cephalosporins - Cefotaxim	0.5	7	0							1		6														
Sulphonamides	256	7	1																							
Cephalosporins - Ceftazidim	2	7	0											1		6										
Polymyxins - Colistin	2	7	0																	7						

Table Antimicrobial susceptibility testing of S. Agona in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Agona	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin						1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				5		1						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Derby in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																					4		
Amphenicols - Florfenicol	16	4	0																			2		2		
Tetracyclines - Tetracycline	8	4	0															3		1						
Fluoroquinolones - Ciprofloxacin	0.06	4	0			4																				
Quinolones - Nalidixic acid	16	4	0																			4				
Trimethoprim	2	4	0													4										
Aminoglycosides - Streptomycin	16	4	1																							3
Aminoglycosides - Gentamicin	2	4	0													3		1								
Aminoglycosides - Kanamycin	8	4	0																			4				
Penicillins - Ampicillin	8	4	0													1		3								
Cephalosporins - Cefotaxim	0.5	4	0							4																
Sulphonamides	256	4	0																							
Cephalosporins - Ceftazidim	2	4	0													4										
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Derby in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

S. Derby	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin				1														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides						4												8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B var. Java	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	9	0																			8		1		
Amphenicols - Florfenicol	16	9	0																	4		4		1		
Tetracyclines - Tetracycline	8	9	0															9								
Fluoroquinolones - Ciprofloxacin	0.06	9	8							1				2		6										
Quinolones - Nalidixic acid	16	9	8																					1		
Trimethoprim	2	9	8													1										
Aminoglycosides - Streptomycin	16	9	8																							1
Aminoglycosides - Gentamicin	2	9	0													8		1								
Aminoglycosides - Kanamycin	8	9	0																			9				
Penicillins - Ampicillin	8	9	8																	1						
Cephalosporins - Cefotaxim	0.5	9	0							1		8														
Sulphonamides	256	9	2																							6
Cephalosporins - Ceftazidim	2	9	0											4		5										
Polymyxins - Colistin	2	7	0																	7						

Table Antimicrobial susceptibility testing of S. Paratyphi B var. Java in Other food - quantitative data [Dilution method]

S. Paratyphi B var. Java	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				8														4	64
Trimethoprim		8																0.5	32
Aminoglycosides - Streptomycin				8														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		8																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		1										2						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																					1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0															1								
Fluoroquinolones - Ciprofloxacin	0.06	1	0			1																				
Quinolones - Nalidixic acid	16	1	1																							
Trimethoprim	2	1	1																							
Aminoglycosides - Streptomycin	16	1	1																							
Aminoglycosides - Gentamicin	2	1	0													1										
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	1																							
Cephalosporins - Cefotaxim	0.5	1	0							1																
Sulphonamides	256	1	1																							
Cephalosporins - Ceftazidim	2	1	0											1												

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from poultry, unspecified - minced meat - intended to be eaten cooked - quantitative data [Dilution method]

S. Paratyphi B	Meat from poultry, unspecified - minced meat - intended to be eaten cooked																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				1														4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin				1														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides												1						8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Enteritidis	Meat from broilers (Gallus gallus) - meat products																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	3	0																			2		1		
Amphenicols - Florfenicol	16	3	0																			3				
Tetracyclines - Tetracycline	8	3	0															2		1						
Fluoroquinolones - Ciprofloxacin	0.06	3	0					3																		
Quinolones - Nalidixic acid	16	3	0																			3				
Trimethoprim	2	3	0													3										
Aminoglycosides - Streptomycin	16	3	0																			2		1		
Aminoglycosides - Gentamicin	2	3	0													3										
Aminoglycosides - Kanamycin	8	3	0																			3				
Penicillins - Ampicillin	8	3	0															3								
Cephalosporins - Cefotaxim	0.5	3	0							3																
Sulphonamides	256	3	0																							
Cephalosporins - Ceftazidim	2	3	0											3												

Table Antimicrobial susceptibility testing of S. Enteritidis in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

S. Enteritidis	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		3																8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Minnesota in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Minnesota	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	9	1																					7		1
Amphenicols - Florfenicol	16	9	0																					9		
Tetracyclines - Tetracycline	8	9	0															5		4						
Fluoroquinolones - Ciprofloxacin	0.06	9	0					8		1																
Quinolones - Nalidixic acid	16	9	0																			9				
Trimethoprim	2	9	1													7		1								
Aminoglycosides - Streptomycin	16	9	2																					1		6
Aminoglycosides - Gentamicin	2	9	0													6		2		1						
Aminoglycosides - Kanamycin	8	9	1																			7		1		
Penicillins - Ampicillin	8	9	0															8		1						
Cephalosporins - Cefotaxim	0.5	9	0							3		6														
Sulphonamides	256	9	1																							
Cephalosporins - Ceftazidim	2	9	0											6		2		1								
Polymyxins - Colistin	2	7	0																	7						

Table Antimicrobial susceptibility testing of S. Minnesota in Other food - quantitative data [Dilution method]

S. Minnesota	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		1																2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin		1				1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin						1												4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		5		1		2						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	8	0																				8		
Amphenicols - Florfenicol	16	8	0																			8				
Tetracyclines - Tetracycline	8	8	1															4		3						
Fluoroquinolones - Ciprofloxacin	0.06	8	0			6		2																		
Quinolones - Nalidixic acid	16	8	0																			8				
Trimethoprim	2	8	1													7										
Aminoglycosides - Streptomycin	16	8	3																							5
Aminoglycosides - Gentamicin	2	8	0													6		2								
Aminoglycosides - Kanamycin	8	8	0																			6		2		
Penicillins - Ampicillin	8	8	1													2		5								
Cephalosporins - Cefotaxim	0.5	8	0							4		4														
Sulphonamides	256	8	1																							
Cephalosporins - Ceftazidim	2	8	0											1		7										
Polymyxins - Colistin	2	8	0																	8						

Table Antimicrobial susceptibility testing of S. Mbandaka in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Mbandaka	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin		3																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		4		3								1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Infantis in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	2	0																					2		
Amphenicols - Florfenicol	16	2	0																			2				
Tetracyclines - Tetracycline	8	2	0															2								
Fluoroquinolones - Ciprofloxacin	0.06	2	0			1		1																		
Quinolones - Nalidixic acid	16	2	0																			2				
Trimethoprim	2	2	0													2										
Aminoglycosides - Streptomycin	16	2	0																							2
Aminoglycosides - Gentamicin	2	2	0													1		1								
Aminoglycosides - Kanamycin	8	2	0																			1		1		
Penicillins - Ampicillin	8	2	0													1		1								
Cephalosporins - Cefotaxim	0.5	2	0							1		1														
Sulphonamides	256	2	0																					1		
Cephalosporins - Ceftazidim	2	2	0											1		1										
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Infantis in Meat from pig - carcass - quantitative data [Dilution method]

S. Infantis	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		1																8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Infantis in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	5	1																					4		
Amphenicols - Florfenicol	16	5	0																			3		1		1
Tetracyclines - Tetracycline	8	5	1															3		1						
Fluoroquinolones - Ciprofloxacin	0.06	5	0			2		3																		
Quinolones - Nalidixic acid	16	5	0																			5				
Trimethoprim	2	5	0													5										
Aminoglycosides - Streptomycin	16	5	1																							4
Aminoglycosides - Gentamicin	2	5	0													2		3								
Aminoglycosides - Kanamycin	8	5	0																			5				
Penicillins - Ampicillin	8	5	0													1		4								
Cephalosporins - Cefotaxim	0.5	5	0									5														
Sulphonamides	256	5	1																							1
Cephalosporins - Ceftazidim	2	5	0													5										
Polymyxins - Colistin	2	5	0																	5						

Table Antimicrobial susceptibility testing of S. Infantis in Other food - quantitative data [Dilution method]

S. Infantis	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol				1														2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin		1																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		2				1						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Agona in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	7	0																			1		6		
Amphenicols - Florfenicol	16	7	0																			5		2		
Tetracyclines - Tetracycline	8	7	1															4		2						
Fluoroquinolones - Ciprofloxacin	0.06	7	0			2		5																		
Quinolones - Nalidixic acid	16	7	0																			7				
Trimethoprim	2	7	0													7										
Aminoglycosides - Streptomycin	16	7	3																					1		3
Aminoglycosides - Gentamicin	2	7	0													5		1		1						
Aminoglycosides - Kanamycin	8	7	0																			7				
Penicillins - Ampicillin	8	7	0													2		5								
Cephalosporins - Cefotaxim	0.5	7	0							2		5														
Sulphonamides	256	7	1																							
Cephalosporins - Ceftazidim	2	7	0											2		5										
Polymyxins - Colistin	2	3	0																	3						

Table Antimicrobial susceptibility testing of S. Agona in Other food - quantitative data [Dilution method]

S. Agona	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin		3																2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		4				2						1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Agona in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Agona	Meat from broilers (Gallus gallus) - carcass - spent hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																				1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0																	1						
Fluoroquinolones - Ciprofloxacin	0.06	1	0					1																		
Quinolones - Nalidixic acid	16	1	0																			1				
Trimethoprim	2	1	0													1										
Aminoglycosides - Streptomycin	16	1	0																					1		
Aminoglycosides - Gentamicin	2	1	0													1										
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	0															1								
Cephalosporins - Cefotaxim	0.5	1	0							1																
Sulphonamides	256	1	0																							
Cephalosporins - Ceftazidim	2	1	0											1												
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Agona in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

S. Agona	Meat from broilers (Gallus gallus) - carcass - spent hens																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				1														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Paratyphi B in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	14	0																			6		5		3
Amphenicols - Florfenicol	16	14	0																	1		8		5		
Tetracyclines - Tetracycline	8	14	1															5		5		2		1		
Fluoroquinolones - Ciprofloxacin	0.06	14	11					2		1				4		6		1								
Quinolones - Nalidixic acid	16	14	11																			3				
Trimethoprim	2	14	12													1		1								
Aminoglycosides - Streptomycin	16	14	12																			1		1		
Aminoglycosides - Gentamicin	2	14	0											4		8		2								
Aminoglycosides - Kanamycin	8	14	0																			14				
Penicillins - Ampicillin	8	14	11															2		1						1
Cephalosporins - Cefotaxim	0.5	14	6							2		4		2								6				
Sulphonamides	256	14	8																					1		1
Cephalosporins - Ceftazidim	2	14	6											4		4						2		3		1
Polymyxins - Colistin	2	14	2																	12		2				

Table Antimicrobial susceptibility testing of S. Paratyphi B in Other food - quantitative data [Dilution method]

S. Paratyphi B	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid				11														4	64
Trimethoprim		12																0.5	32
Aminoglycosides - Streptomycin		4		5		3												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		10																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides		2		1				1				8						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Paratyphi B	Meat from broilers (Gallus gallus) - meat products																									
Isolates out of a monitoring program (yes/no)																										
Number of isolates available in the laboratory	301																									
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																							1
Amphenicols - Florfenicol	16	1	0																					1		
Tetracyclines - Tetracycline	8	1	0																	1						
Fluoroquinolones - Ciprofloxacin	0.06	1	0							1																
Quinolones - Nalidixic acid	16	1	0																			1				
Trimethoprim	2	1	1																							
Aminoglycosides - Streptomycin	16	1	1																							
Aminoglycosides - Gentamicin	2	1	0													1										
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	1																							
Cephalosporins - Cefotaxim	0.5	1	1																			1				
Sulphonamides	256	1	1																							
Cephalosporins - Ceftazidim	2	1	1																							1

Table Antimicrobial susceptibility testing of S. Paratyphi B in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

S. Paratyphi B	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin						1												2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides												1						8	1024
Cephalosporins - Ceftazidim																		0.25	16

Table Antimicrobial susceptibility testing of S. Derby in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Derby	Meat from broilers (Gallus gallus) - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																					1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0															1								
Fluoroquinolones - Ciprofloxacin	0.06	1	0					1																		
Quinolones - Nalidixic acid	16	1	0																			1				
Trimethoprim	2	1	0													1										
Aminoglycosides - Streptomycin	16	1	0																							1
Aminoglycosides - Gentamicin	2	1	0													1										
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	0															1								
Cephalosporins - Cefotaxim	0.5	1	0							1																
Sulphonamides	256	1	0																							
Cephalosporins - Ceftazidim	2	1	0											1												
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Derby in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

S. Derby	Meat from broilers (Gallus gallus) - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin																		0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				1														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Mbandaka in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Mbandaka	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																			1		3		
Amphenicols - Florfenicol	16	4	0																			4				
Tetracyclines - Tetracycline	8	4	1															1		2						
Fluoroquinolones - Ciprofloxacin	0.06	4	0			3		1																		
Quinolones - Nalidixic acid	16	4	0																			4				
Trimethoprim	2	4	1													3										
Aminoglycosides - Streptomycin	16	4	2																					1		1
Aminoglycosides - Gentamicin	2	4	0													1		3								
Aminoglycosides - Kanamycin	8	4	0																			4				
Penicillins - Ampicillin	8	4	1													1		2								
Cephalosporins - Cefotaxim	0.5	4	0							1		3														
Sulphonamides	256	4	1																							1
Cephalosporins - Ceftazidim	2	4	0											1		2		1								
Polymyxins - Colistin	2	3	0																	3						

Table Antimicrobial susceptibility testing of S. Mbandaka in Other food - quantitative data [Dilution method]

S. Mbandaka	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline				1														1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim		1																0.5	32
Aminoglycosides - Streptomycin		1		1														2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				2								1						8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

S. Infantis	Meat from broilers (Gallus gallus) - meat products																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	301																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	1	0																					1		
Amphenicols - Florfenicol	16	1	0																			1				
Tetracyclines - Tetracycline	8	1	0															1								
Fluoroquinolones - Ciprofloxacin	0.06	1	0			1																				
Quinolones - Nalidixic acid	16	1	0																			1				
Trimethoprim	2	1	0													1										
Aminoglycosides - Streptomycin	16	1	0																							1
Aminoglycosides - Gentamicin	2	1	0													1										
Aminoglycosides - Kanamycin	8	1	0																			1				
Penicillins - Ampicillin	8	1	1																							
Cephalosporins - Cefotaxim	0.5	1	0									1														
Sulphonamides	256	1	0																							
Cephalosporins - Ceftazidim	2	1	0													1										
Polymyxins - Colistin	2	1	0																	1						

Table Antimicrobial susceptibility testing of S. Infantis in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

S. Infantis	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	301																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	64
Amphenicols - Florfenicol																		2	64
Tetracyclines - Tetracycline																		1	64
Fluoroquinolones - Ciprofloxacin																		0.008	8
Quinolones - Nalidixic acid																		4	64
Trimethoprim																		0.5	32
Aminoglycosides - Streptomycin																		2	128
Aminoglycosides - Gentamicin																		0.25	32
Aminoglycosides - Kanamycin																		4	128
Penicillins - Ampicillin		1																0.5	32
Cephalosporins - Cefotaxim																		0.06	4
Sulphonamides				1														8	1024
Cephalosporins - Ceftazidim																		0.25	16
Polymyxins - Colistin																		2	4

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

Test Method Used	Standard methods used for testing
Disc diffusion	NCCLS/CLSI

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol	60	21	24
	Florfenicol	30	15	18
Tetracyclines	Tetracycline	80	20	22
Fluoroquinolones	Ciprofloxacin		0.06	
	Enrofloxacin	10	20	22
Quinolones	Nalidixic acid	130	21	24
Sulphonamides	Sulfonamide	240	20	22
Aminoglycosides	Streptomycin	100	23	25
	Gentamicin	40	20	22
	Neomycin	120	20	22
Trimethoprim + Sulphonamides	Trimethoprim + Sulphonamides	5.2+240	27	31
Cephalosporins	3rd generation cephalosporins	30	20	22
Penicillins	Ampicillin	33	17	19

Table Cut-off values for antibiotic resistance testing of Salmonella in Animals

Table Cut-off values for antibiotic resistance testing of Salmonella in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.06	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		32	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.5	
Penicillins	Ampicillin		4	

Table Cut-off values for antibiotic resistance testing of Salmonella in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
	Florfenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.06	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
	Kanamycin		8	
Cephalosporins	Cefotaxim		0.5	
	Ceftazidim		2	
Penicillins	Ampicillin		8	

Table Cut-off values for antibiotic resistance testing of Salmonella in Food

2.2 CAMPYLOBACTERIOSIS

2.2.1 General evaluation of the national situation

A. Thermophilic Campylobacter general evaluation

History of the disease and/or infection in the country

Campylobacteriosis is a leading bacterial foodborne gastrointestinal disease in humans in all parts of the world. It can also cause post-infectious complications as Guillain-Barré syndrome.
In 80% of the cases, the infection route of campylobacteriosis is food, but domestic animals including pets can also be involved. The transmission of this pathogen to humans is mostly due to consumption of undercooked poultry, pork and beef, unpasteurized milk, contaminated drinking water, or contacts with the faeces of infected pets. This report will focus on Campylobacter jejuni and Campylobacter coli that are the principal strains causing enteritis in humans.
The contamination with Campylobacter of poultry carcasses and meat is monitored since 2000 by the Federal Agency for the Safety of the Food Chain. The rate of positive poultry samples is stable, but high. Chicken and layer meat have to be well cooked and cross-contamination should be avoided during preparation.

2.2.2 Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring program was organized by FASFC to evaluate the level of Campylobacter spp. contamination of broiler meat in Belgian slaughterhouses and cutting plants. Campylobacters is counted on carcasses and cuts of poultry because it is especially the quantitative load of Campylobacter which plays a role in the stake in danger of the consumers.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

At meat processing plant

Sampling distributed evenly throughout the year

At retail

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Neck skin samples and cuts of broilers with and without skin

At meat processing plant

Meat, minced meat, sausages and other

At retail

Meat, minced meat, sausages and other

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

The matrices were carcasses, cuts and meat preparation of broilers. The Campylobacter spp. contamination levels were analyzed : 1g carcasses, 1g cutting meat and 1g meat preparation.

At meat processing plant

The samples were about 200 g of meat. The amount of Campylobacter has been assessed in 1g of sample.

At retail

The amount of Campylobacter has been assessed in 1g of sample.

Definition of positive finding

At slaughterhouse and cutting plant

A sample is considered positive in case of detection of more than 100 cfu Campylobacter in the sample.

At meat processing plant

A sample is considered positive in case of detection of more than 100 cfu Campylobacter in the sample.

At retail

A sample is considered positive in case of detection of more than 100 cfu Campylobacter in the sample.

Diagnostic/analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 10272:1995

B. C.,thermophilic in food

Monitoring system

Sampling strategy

A monitoring program was organized by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 100 retail trades representative of the Belgian production of carcasses and meat, were selected for this study. The samples assayed were carcasses and minced meat from pork, carcasses, cuts and meat preparation from chicken, and layer carcasses. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, except during the 30th week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of pork carcasses was done by means of swabs (4 areas from the same half carcass constituting 600 cm2 were putted in the same stomacher bag).
The carcass samples of broiler and layer consisted of 10g of neck skin. The other samples were about 200g of meat. 10g to 25g representative of the whole sample were weighted in the laboratory, and the detection of Campylobacter has been assessed in these quantities or dilutions: 25g for pork minced meat, 600 cm2 (pork carcasses), 0,01g for chicken carcasses and layer carcasses, 1g for chicken meat preparation, and for chicken cuts, 0,1g and 25g.
No pooling has been done.

Definition of positive finding

A sample is considered to be positive after biochemical or genetic confirmation of one Campylobacter in the sample.

Diagnostic/analytical methods used

For detection of Campylobacter in meat samples or swabs the official Belgian SP-VG-M003 method was used following :
- selective enrichment on Preston at 42°C for 48 h,
- isolation on mCCDA at 42°C for 24 h - 120 h,
- confirmation of minimum 1 colony with miniaturised biochemical tests or by PCR typing.

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

The results showed that, even if the contamination by Campylobacter spp. of pig carcasses is zero, the pork represents a relatively low risk for the consumer seen the evolution of this contamination during the operations of cut.

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Live bivalve molluscs - at retail	FASFC DIS806	Batch	1g	88	0					
Meat from bovine animals - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	1g	21	0					
Meat from pig - fresh - at slaughterhouse	FASFC DPA 002	Single	1g	847	88					88
Meat from pig - fresh - at processing plant	FASFC TRA 306	Batch	1g	268	1					1
Meat from pig - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	1g	22	0					
Cheeses made from cows' milk - unspecified - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS849	Batch	1g	49	2					2
Meat from bovine animals - minced meat - intended to be eaten cooked - at retail	FASFC DIS823	Batch	1g	21	0					
Meat from bovine animals and pig - minced meat - intended to be eaten cooked - at retail	FASFC DIS823	Batch	1g	12	0					
Meat from bovine animals and pig - minced meat - intended to be eaten raw - at retail	FASFC DIS823	Batch	1g	12	0					
Meat from pig - minced meat - intended to be eaten cooked - at retail	FASFC DIS823	Batch	1g	22	0					

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus) - fresh - at slaughterhouse	FASFC DPA003	Single	1g	388	147					147
Meat from broilers (Gallus gallus) - fresh - at processing plant	FASFC TRA200	Batch	1g	358	32					32
Meat from broilers (Gallus gallus) - fresh - at retail	FASFC DIS819 DIS821 DIS822	Batch	1g	439	53					53
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA202	Batch	1g	38	0					
Meat from broilers (Gallus gallus) - meat preparation - intended to be eaten cooked - at retail	FASFC DIS863	Batch	1g	39	0					
Meat from broilers (Gallus gallus) - minced meat - intended to be eaten cooked - at retail	FASFC DIS880	Batch	1g	46	0					
Meat from duck - at retail	FASFC DIS821	Batch	1g	4	1					1
Meat from turkey - fresh - at retail	FASFC DIS821	Batch	1g	19	0					
Meat from turkey - meat preparation - intended to be eaten cooked - at processing plant	FASFC TRA202	Batch	1g	7	0					
Meat from turkey - meat preparation - intended to be eaten cooked - at retail	FASFC DIS863	Batch	1g	7	0					
Meat from turkey - minced meat - intended to be eaten cooked - at retail	FASFC DIS880	Batch	1g	1	0					

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Campylobacter	C. coli	C. jejuni	C. lari	C. upsaliensis	Thermophilic Campylobacter spp., unspecified
Meat from other poultry species - fresh - at slaughterhouse (laying hens)	FASFC DPA004	Single	1g	300	106					106

2.2.3 Campylobacter in animals

A. Thermophilic Campylobacter in Gallus gallus

Monitoring system

Frequency of the sampling

At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughter

caeca

Methods of sampling (description of sampling techniques)

At slaughter

10 caeca pairs are pooled to one sample. 6 samples are taken of each examined flock. The caeca are emptied at the laboratory. The content is examined for Cambylobacter.

Case definition

At slaughter

A sample is positive if Campylobacter is detected.

Measures in case of the positive findings or single cases

Samples are taken for monitoring purposes only. No measures are taken in case of positive findings.

2.2.4 Antimicrobial resistance in Campylobacter isolates

A. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from pigs

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated in the zoonosis monitoring program and originating from pork were sent to the Institute of Public Health for determination of antimicrobial resistance.

Laboratory methodology used for identification of the microbial isolates

Specification (coli/jejuni) with PCR (Debruyn et al, Res Microbiol, 2008)

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.

Antimicrobial	Breakpoints (g / ml)	
	Jejuni	coli
Chloramphenicol	16	16
Tetracycline	2	2
Nalidixic acid	16	32
Ciprofloxacin	1	1
Erytromycin	4	16
Gentamicin	1	2
Streptomycin	2	4

Minimum Inhibitory Concentrations were determined following the NCCLS guidelines.

Results of the investigation

In total, 52 Campylobacter isolates were analysed, of which 47 belonged to C. coli and 5 to C. jejuni. The number of isolates that were sensitive to all tested antibiotics further decreased from 7% in 2009 to only one isolate (2%) in 2010. The resistance against streptomycin (91%) and tetracyclin (81%) was high, and 46% of all isolates showed resistance to three or more antibiotics tested. Complete resistance was not observed.

B. Antimicrobial resistance in Campylobacter jejuni and coli in foodstuff derived from poultry

Sampling strategy used in monitoring

Procedures for the selection of isolates for antimicrobial testing

All strains isolated in the zoonosis monitoring program and originating from poultry were sent to the Institute Public Health for determination of antimicrobial resistance.

Laboratory used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.

Antimicrobial	Breakpoints (g / ml)	
	Jejuni	coli
Chloramphenicol	16	16
Tetracycline	2	2
Nalidixic acid	16	32
Ciprofloxacin	1	1
Erytromycin	4	16
Gentamicin	1	2
Streptomycin	2	4

Minimum Inhibitory Concentrations were determined following the NCCLS guidelines.

Results of the investigation

397 Campylobacter strains were isolated in poultry meat and carcasses and tested for antimicrobial susceptibility (277 C. jejuni and 120 C. coli strains).
In total 29% of all campylobacter strains from poultry meat were sensitive to all tested antibiotics. Tetracycline resistance was most dominantly present (53,6%), followed closely by resistance to Nalidixic acid (51,4%) and ciprofloxacin (50,6%).
Overall antibiotic resistance was more prevalent in C. coli than in C. jejuni (see graph), with only 20 strains sensitive to all antibiotics. The number of multiresistant strains, resistant to three or more antibiotics, remained similar as in 2009 with 62,5%. A high resistance was observed for tetracycline (74%), ciprofloxacin (69%) and nalidixic acid (62%), though which is significantly less compared to 2008. For C. jejuni, 34% of all strains were sensitive to all antibiotics tested, which is significantly more as in 2009 (21%. Fourty-one percent was resistant to three or more antibiotics. High resistance was observed for nalidixic acid (46,6%), tetracycline (44,7%) and ciprofloxacin (42,6%).

Table Antimicrobial susceptibility testing of Campylobacter in Meat from pig

Campylobacter	Campylobacter spp., unspecified		C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)	no		yes		yes	
Number of isolates available in the laboratory			47		5	
Antimicrobials:	N	n	N	n	N	n
Fluoroquinolones - Ciprofloxacin			47	17	5	2
Quinolones - Nalidixic acid			47	17	5	3
Aminoglycosides - Gentamicin			47	0	5	0
Macrolides - Erythromycin			47	10	5	1
Tetracyclines - Tetracycline			47	38	5	3
Aminoglycosides - Streptomycin			47	43	5	3
Amphenicols - Chloramphenicol			47	2	5	0

Table Antimicrobial susceptibility testing of Campylobacter in Meat from broilers (Gallus gallus)

Campylobacter	Campylobacter spp., unspecified		C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)			yes		yes	
Number of isolates available in the laboratory			51		92	
Antimicrobials:	N	n	N	n	N	n
Fluoroquinolones - Ciprofloxacin			51	36	92	43
Quinolones - Nalidixic acid			51	32	92	47
Aminoglycosides - Gentamicin			51	0	92	2
Macrolides - Erythromycin			51	13	92	2
Tetracyclines - Tetracycline			51	41	92	46
Aminoglycosides - Streptomycin			51	0	92	9
Amphenicols - Chloramphenicol			51	0	92	2

Table Antimicrobial susceptibility testing of Campylobacter in All foodstuffs

Campylobacter	C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	176		302	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	176	2	302	5
Tetracyclines - Tetracycline	176	132	302	141
Fluoroquinolones - Ciprofloxacin	176	104	302	129
Quinolones - Nalidixic acid	176	96	302	141
Aminoglycosides - Streptomycin	176	79	302	31
Aminoglycosides - Gentamicin	176	0	302	5
Macrolides - Erythromycin	176	33	302	13

Table Antimicrobial susceptibility testing of Campylobacter in Meat from poultry, unspecified

Campylobacter	C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	120		276	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	120	2	276	20
Tetracyclines - Tetracycline	120	89	276	124
Fluoroquinolones - Ciprofloxacin	120	83	276	118
Quinolones - Nalidixic acid	120	75	276	129
Aminoglycosides - Streptomycin	120	32	276	28
Aminoglycosides - Gentamicin	120	0	276	5
Macrolides - Erythromycin	120	22	276	12

Table Antimicrobial susceptibility testing of Campylobacter in Meat from broilers (Gallus gallus) - carcass - spent hens

Campylobacter	C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	48		117	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	48	0	117	2
Tetracyclines - Tetracycline	48	33	117	46
Fluoroquinolones - Ciprofloxacin	48	31	117	42
Quinolones - Nalidixic acid	48	29	117	47
Aminoglycosides - Streptomycin	48	4	117	12
Aminoglycosides - Gentamicin	48	0	117	3
Macrolides - Erythromycin	48	3	117	4

Table Antimicrobial susceptibility testing of Campylobacter in Meat from poultry, unspecified - meat products

Campylobacter	C. coli		C. jejuni	
Isolates out of a monitoring program (yes/no)	yes		yes	
Number of isolates available in the laboratory	18		53	
Antimicrobials:	N	n	N	n
Amphenicols - Chloramphenicol	18	0	53	0
Tetracyclines - Tetracycline	18	13	53	25
Fluoroquinolones - Ciprofloxacin	18	15	53	26
Quinolones - Nalidixic acid	18	14	53	27
Aminoglycosides - Streptomycin	18	8	53	2
Aminoglycosides - Gentamicin	18	0	53	0
Macrolides - Erythromycin	18	4	53	3

Table Antimicrobial susceptibility testing of C. coli in All foodstuffs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	All foodstuffs																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	176																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	176	2			0	0	0	0	0	0	125	44	5	0	2	0	0	0	0	0	0	0	2	32
Tetracyclines - Tetracycline	2	176	132			0	0	0	38	5	1	0	0	0	132	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	176	104			0	25	42	5	0	0	1	103	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	32	176	96			0	0	0	0	0	0	2	43	25	4	6	96	0	0	0	0	0	0	2	64
Aminoglycosides - Streptomycin	4	176	79			0	0	0	0	0	28	48	21	2	77	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	2	176	0			0	0	5	14	84	71	2	0	0	0	0	0	0	0	0	0	0	0	0.12	2
Macrolides - Erythromycin	16	176	33			0	0	0	0	91	35	15	2	0	0	33	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in All foodstuffs - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	All foodstuffs																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	302																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	302	5			0	0	0	0	0	0	254	36	7	0	5	0	0	0	0	0	0	0	2	32
Tetracyclines - Tetracycline	2	302	141			0	0	0	145	14	1	1	2	3	136	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	302	129			0	55	86	21	10	1	3	126	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	16	302	141			0	0	0	0	0	0	14	108	24	15	12	129	0	0	0	0	0	0	2	64
Aminoglycosides - Streptomycin	2	302	31			0	0	0	0	0	228	43	12	4	15	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	1	302	5			0	0	46	152	92	7	3	1	1	0	0	0	0	0	0	0	0	0	0.12	8
Macrolides - Erythromycin	4	302	13			0	0	0	0	276	12	1	0	0	0	13	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from poultry, unspecified - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from poultry, unspecified																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	276																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol		276	276			0	0	0	0	0	0	231	34	6	0	5	0	0	0	0	0	0	0	2	32
Tetracyclines - Tetracycline	2	276	124			0	0	0	136	14	1	1	2	3	119	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	276	118			0	47	80	20	10	1	3	115	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	16	276	129			0	0	0	0	0	0	12	98	22	15	11	118	0	0	0	0	0	0	2	64
Aminoglycosides - Streptomycin	2	276	28			0	0	0	0	0	208	40	12	4	12	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	1	276	5			0	0	40	142	84	5	3	1	1	0	0	0	0	0	0	0	0	0	0.12	8
Macrolides - Erythromycin	4	276	12			0	0	0	0	254	9	1	0	0	0	12	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from poultry, unspecified - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from poultry, unspecified																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	120																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	120	0			0	0	0	0	0	0	91	27	2	0	0	0	0	0	0	0	0	0	2	8
Tetracyclines - Tetracycline	2	120	89			0	0	0	31	0	0	0	0	0	89	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	120	83			0	11	24	2	0	0	1	82	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	32	120	75			0	0	0	0	0	0	2	25	9	3	6	75	0	0	0	0	0	0	2	64
Aminoglycosides - Streptomycin	4	120	32			0	0	0	0	0	27	46	15	0	32	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	2	120	0			0	0	5	14	67	32	2	0	0	0	0	0	0	0	0	0	0	0	0.12	2
Macrolides - Erythromycin	16	120	22			0	0	0	0	70	20	8	0	0	0	22	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from pig - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from pig																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	47																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	47	2			0	0	0	0	0	0	28	15	2	0	2	0	0	0	0	0	0	0	2	32
Tetracyclines - Tetracycline	2	47	38			0	0	0	5	4	0	0	0	0	38	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	47	17			0	13	14	3	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	32	47	17			0	0	0	0	0	0	0	17	12	1	0	17	0	0	0	0	0	0	4	64
Aminoglycosides - Streptomycin	4	47	43			0	0	0	0	0	0	0	4	2	41	0	0	0	0	0	0	0	0	4	16
Aminoglycosides - Gentamicin	2	47	0			0	0	0	0	13	34	0	0	0	0	0	0	0	0	0	0	0	0	0.5	1
Macrolides - Erythromycin	16	47	10			0	0	0	0	17	12	6	2	0	0	10	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from pig - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from pig																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	5																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	5	0			0	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	2	4
Tetracyclines - Tetracycline	2	5	3			0	0	0	2	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	4	1			0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.12	4
Quinolones - Nalidixic acid	16	5	3			0	0	0	0	0	0	0	1	1	0	1	2	0	0	0	0	0	0	4	64
Aminoglycosides - Streptomycin	2	5	3			0	0	0	0	0	1	1	0	0	3	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	1	5	0			0	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0.25	1
Macrolides - Erythromycin	4	5	1			0	0	0	0	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from broilers (Gallus gallus) - carcass - spent hens																							
Isolates out of a monitoring program (yes/no)																								
Number of isolates available in the laboratory	479																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	115	2									98	12	3		2								2	32
Tetracyclines - Tetracycline	2	115	46						63	5	1		1	1	44									0.25	16
Fluoroquinolones - Ciprofloxacin	1	115	42				22	38	8	5		2	40											0.06	4
Quinolones - Nalidixic acid	16	115	47									6	46	10	6	2	45							2	64
Aminoglycosides - Streptomycin	2	115	12								89	14	4	2	6									1	16
Aminoglycosides - Gentamicin	1	115	3					17	59	34	2	2		1										0.12	16
Macrolides - Erythromycin	4	115	4							109	1	1				4								0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from broilers (Gallus gallus) - carcass																							
Isolates out of a monitoring program (yes/no)																								
Number of isolates available in the laboratory	479																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	91	2									78	9	2		2								2	32
Tetracyclines - Tetracycline	2	91	45						41	5			1	2	42									0.25	16
Fluoroquinolones - Ciprofloxacin	1	91	43				17	22	7	1	1		43											0.06	4
Quinolones - Nalidixic acid	16	91	47									4	30	6	4	3	44							2	64
Aminoglycosides - Streptomycin	2	91	9								70	12	5		4									1	16
Aminoglycosides - Gentamicin	1	91	2					9	48	30	2	1	1											0.12	16
Macrolides - Erythromycin	4	91	2							82	7					2								0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from poultry, unspecified - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from poultry, unspecified - meat products																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	53																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	53	0			0	0	0	0	0	0	44	9	0	0	0	0	0	0	0	0	0	0	2	4
Tetracyclines - Tetracycline	2	53	25			0	0	0	24	3	0	1	0	0	25	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	53	26			0	7	13	5	2	0	1	25	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	16	53	27			0	0	0	0	0	0	2	16	4	4	4	23	0	0	0	0	0	0	2	64
Aminoglycosides - Streptomycin	2	53	2			0	0	0	0	0	44	7	1	0	1	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	1	53	0			0	0	10	28	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0.12	0.5
Macrolides - Erythromycin	4	53	3			0	0	0	0	49	1	0	0	0	0	3	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - carcass - spent hens - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from broilers (Gallus gallus) - carcass - spent hens																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	46	0									41	5											2	32
Tetracyclines - Tetracycline	2	46	31						15						31									0.25	16
Fluoroquinolones - Ciprofloxacin	1	46	29				7	10				1	28											0.06	4
Quinolones - Nalidixic acid	32	46	28										14	3	1		28							2	64
Aminoglycosides - Streptomycin	4	46	4								14	25	3		4									1	16
Aminoglycosides - Gentamicin	2	46	0					3	6	33	4													0.12	16
Macrolides - Erythromycin	16	46	2							32	10	2				2								0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from broilers (Gallus gallus) - carcass																							
Isolates out of a monitoring program (yes/no)																								
Number of isolates available in the laboratory	479																							
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	51	0									35	14	2									2	32
Tetracyclines - Tetracycline	2	51	41						10						41								0.25	16
Fluoroquinolones - Ciprofloxacin	1	51	36				3	11	1				36										0.06	4
Quinolones - Nalidixic acid	32	51	32									2	9	3	1	4	32						2	64
Aminoglycosides - Streptomycin	4	51	19								9	14	9		19								1	16
Aminoglycosides - Gentamicin	2	51	0					2	6	22	20	1											0.12	16
Macrolides - Erythromycin	16	51	13							29	5	4				13							0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from poultry, unspecified - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from poultry, unspecified - meat products																								
Isolates out of a monitoring program (yes/no)	yes																								
Number of isolates available in the laboratory	18																								
Antimicrobials:	Cut-off value	N	n	<=0.008	0.015	0.03	0.06	0.12	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048	>2048	lowest	highest
Amphenicols - Chloramphenicol	16	18	0			0	0	0	0	0	0	12	6	0	0	0	0	0	0	0	0	0	0	2	4
Tetracyclines - Tetracycline	2	18	13			0	0	0	5	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0.25	16
Fluoroquinolones - Ciprofloxacin	1	18	15			0	1	2	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0.06	4
Quinolones - Nalidixic acid	32	18	14			0	0	0	0	0	0	0	2	1	1	0	14	0	0	0	0	0	0	4	64
Aminoglycosides - Streptomycin	4	18	8			0	0	0	0	0	5	4	1	0	8	0	0	0	0	0	0	0	0	1	16
Aminoglycosides - Gentamicin	2	18	0			0	0	0	2	9	6	1	0	0	0	0	0	0	0	0	0	0	0	0.25	2
Macrolides - Erythromycin	16	18	4			0	0	0	0	8	4	2	0	0	0	4	0	0	0	0	0	0	0	0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - fresh - skinned - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from broilers (Gallus gallus) - fresh - skinned																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	14	1																	8		4		1		
Tetracyclines - Tetracycline	2	14	7											6		1										7
Fluoroquinolones - Ciprofloxacin	1	14	7									5				2						7				
Quinolones - Nalidixic acid	16	14	8																			4		1		1
Aminoglycosides - Streptomycin	2	14	5															5		4		2		2		1
Aminoglycosides - Gentamicin	1	14	0									3		6		4		1								
Macrolides - Erythromycin	4	14	3													11										

C. jejuni	Meat from broilers (Gallus gallus) - fresh - skinned																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		1																2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid		2		6														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - fresh - skinned - quantitative data [Dilution method]

C. jejuni	Meat from broilers (Gallus gallus) - fresh - skinned																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		3																0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from broilers (Gallus gallus) - meat products																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	54	0																	44		10				
Tetracyclines - Tetracycline	2	54	25											24		4				1						25
Fluoroquinolones - Ciprofloxacin	1	54	26							7		13		5		3				1		25				
Quinolones - Nalidixic acid	16	54	27																	2		16		4		5
Aminoglycosides - Streptomycin	2	54	2															45		7		1				1
Aminoglycosides - Gentamicin	1	54	0									10		28		16										
Macrolides - Erythromycin	4	54	3													49		2								

C. jejuni	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid		4		23														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

C. jejuni	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		3																0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from broilers (Gallus gallus) - meat products																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	18	0																	12		6				
Tetracyclines - Tetracycline	2	18	13											5												13
Fluoroquinolones - Ciprofloxacin	1	18	15							1		2										15				
Quinolones - Nalidixic acid	32	18	14																			2		1		1
Aminoglycosides - Streptomycin	4	18	8															5		4		1				8
Aminoglycosides - Gentamicin	2	18	0											2		9		6		1						
Macrolides - Erythromycin	16	18	4											1		7		4		2						

C. coli	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid				14														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - meat products - quantitative data [Dilution method]

C. coli	Meat from broilers (Gallus gallus) - meat products																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		4																0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	21	0																	19		1		1		
Tetracyclines - Tetracycline	2	21	14											7												14
Fluoroquinolones - Ciprofloxacin	1	21	9							8		3		1								9				
Quinolones - Nalidixic acid	16	21	9																	2		9		1		
Aminoglycosides - Streptomycin	2	21	0															19		2						
Aminoglycosides - Gentamicin	1	21	0									6		9		6										
Macrolides - Erythromycin	4	21	0													20		1								

C. jejuni	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid				9														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Other food - quantitative data [Dilution method]

C. jejuni	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin																		0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	47	2																	28		15		2		
Tetracyclines - Tetracycline	2	47	38											6		3										38
Fluoroquinolones - Ciprofloxacin	1	47	17							13		14		3								17				
Quinolones - Nalidixic acid	32	47	17																			17		12		1
Aminoglycosides - Streptomycin	4	47	43																			4		2		41
Aminoglycosides - Gentamicin	2	47	0													13		34								
Macrolides - Erythromycin	16	47	10													17		12		6		2				

C. coli	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol		2																2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid				17														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. coli in Meat from pig - carcass - quantitative data [Dilution method]

C. coli	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		10																0.5	32

Table Antimicrobial susceptibility testing of C. coli in Other food - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Other food																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	9	0																	6		2		1		
Tetracyclines - Tetracycline	2	9	5											2		1		1								5
Fluoroquinolones - Ciprofloxacin	1	9	4							1		4										4				
Quinolones - Nalidixic acid	32	9	4																			1		4		
Aminoglycosides - Streptomycin	4	9	4															1		2		2				4
Aminoglycosides - Gentamicin	2	9	0													4		5								
Macrolides - Erythromycin	16	9	1													4		3		1						

C. coli	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid				4														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. coli in Other food - quantitative data [Dilution method]

C. coli	Other food																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		1																0.5	32

Table Antimicrobial susceptibility testing of C. jejuni in Meat from pig - carcass - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. jejuni	Meat from pig - carcass																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	4	0																	3		1				
Tetracyclines - Tetracycline	2	4	2											2												2
Fluoroquinolones - Ciprofloxacin	1	4	1									3										1				
Quinolones - Nalidixic acid	16	4	2																			1		1		
Aminoglycosides - Streptomycin	2	4	2															1		1						2
Aminoglycosides - Gentamicin	1	4	0											1		2		1								
Macrolides - Erythromycin	4	4	0													2		2								

C. jejuni	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid		1		1														2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. jejuni in Meat from pig - carcass - quantitative data [Dilution method]

C. jejuni	Meat from pig - carcass																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin																		0.5	32

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - fresh - skinned - quantitative data [Dilution method]

Concentration (µg/ml), number of isolates with a concentration of inhibition equal to

C. coli	Meat from broilers (Gallus gallus) - fresh - skinned																								
Isolates out of a monitoring program (yes/no)																									
Number of isolates available in the laboratory	479																								
Antimicrobials:	Cut-off value	N	n	<=0.008	>0.008	0.015	>0.016	0.03	>0.03	0.06	>0.06	0.12	>0.12	0.25	>0.25	0.5	>0.5	1	>1	2	>2	4	>4	8	>8	16
Amphenicols - Chloramphenicol	16	3	0																	1		2				
Tetracyclines - Tetracycline	2	3	2											1												2
Fluoroquinolones - Ciprofloxacin	1	3	1									1		1								1				
Quinolones - Nalidixic acid	32	3	0																					2		
Aminoglycosides - Streptomycin	4	3	1																	2						1
Aminoglycosides - Gentamicin	2	3	0													2		1								
Macrolides - Erythromycin	16	3	2													1										

C. coli	Meat from broilers (Gallus gallus) - fresh - skinned																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Amphenicols - Chloramphenicol																		2	32
Tetracyclines - Tetracycline																		0.25	16
Fluoroquinolones - Ciprofloxacin																		0.06	4
Quinolones - Nalidixic acid		1																2	64
Aminoglycosides - Streptomycin																		1	16
Aminoglycosides - Gentamicin																		0.12	16

Table Antimicrobial susceptibility testing of C. coli in Meat from broilers (Gallus gallus) - fresh - skinned - quantitative data [Dilution method]

C. coli	Meat from broilers (Gallus gallus) - fresh - skinned																		
Isolates out of a monitoring program (yes/no)																			
Number of isolates available in the laboratory	479																		
Antimicrobials:	>16	32	>32	64	>64	128	>128	256	>256	512	>512	1024	>1024	2048	>2048	4096	>4096	lowest	highest
Macrolides - Erythromycin		2																0.5	32

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Macrolides	Erythromycin		16	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Macrolides	Erythromycin		16	

Table Cut-off values used for antimicrobial susceptibility testing of C. coli in Food

Test Method Used	Standard methods used for testing
Broth dilution	

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Quinolones	Nalidixic acid		32	
Aminoglycosides	Gentamicin		2	
	Streptomycin		4	
Macrolides	Erythromycin		16	
Amphenicols	Chloramphenicol		16	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Macrolides	Erythromycin		4	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Macrolides	Erythromycin		4	

Table Cut-off values used for antimicrobial susceptibility testing of C. jejuni in Food

Test Method Used	Standard methods used for testing
Broth dilution	

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Tetracyclines	Tetracycline		2	
Fluoroquinolones	Ciprofloxacin		1	
Quinolones	Nalidixic acid		16	
Aminoglycosides	Gentamicin		1	
	Streptomycin		2	
Macrolides	Erythromycin		4	
Amphenicols	Chloramphenicol			16

2.3 LISTERIOSIS

2.3.1 General evaluation of the national situation

A. Listeriosis general evaluation

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

Listeria monocytogenes has become a major concern of the food industry and public health authorities. Ingestion of food contaminated with Listeria monocytogenes may cause either a serious invasive illness affecting people with altered or deficient immune responses, or a non-invasive febrile gastro-enteritis. Although the incidence of listeriosis is low, the high mortality rate, which often reaches as high as 30-40%, requires early diagnosis and appropriate antimicrobial therapy.
Listeriosis is transmitted to humans via contact with animals, cross-infection of foetus or newborn babies and foodborne infection . Listeria is ubiquitous and widely distributed in the environment (soil, vegetables, meat, milk, fish). All food associated with Listeria monocytogenes outbreaks were consumed without further processing or after minimal heat treatment, and many of them had a suitable environment for growth.

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

A monitoring program was organized by the Federal Agency for the Safety of the Food chain. More than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of meat, were selected for this study.
The matrices were minced meat of pork, beef and poultry, cooked ham, paté, salami, smoked salmon and other foodstuff.

Recent actions taken to control the zoonoses

General food hygiene rules are essential for the prevention of human listeriosis. As some persons are at high risk (pregnant women, immunocompromised people), they are advised not to eat certain categories of food with proven elevated risk of Listeria monocytogenes contamination, such as unpasteurized milk and butter, soft cheeses and ice cream made from unpasteurized milk, any soft cheese crust, smoked fish, paté, cooked ham, salami, cooked meat in jelly, raw minced meat from beef, pork and poultry, steak tartar, raw fish and shellfish (oysters, mussels, shrimps), fish, meat and surimi salads, insufficiently rinsed raw vegetables, unpeeled fruit.

2.3.2 Listeriosis in humans

A. Listeriosis in humans

History of the disease and/or infection in the country

2.3.3 Listeria in foodstuffs

A. L. monocytogenes in food

Monitoring system

Sampling strategy

A monitoring program was organized by the Federal Agency for the Safety of the Food Chain. More than 100 meat cutting plants and more than 100 retail trades, were selected for this study. The samples assayed were minced meat from beef and pork, chicken meat preparation, cheeses, smoked salmon and other foodstuffs. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

At the production plant

every week

At retail

every week

Type of specimen taken

At the production plant

Minced meat of pork, beef, chicken, cooked ham, salami, pate, smoked salmon, cheeses and other

At retail

Minced meat of pork, beef, chicken, cooked ham, salami, pate, smoked salmon, chicken meat preparation, cheeses and other

Methods of sampling (description of sampling techniques)

At the production plant

The detection of Listeria monocytogenes has been assessed in 1g for beef and pork minced meat and in 25g for ready-to-eat foods. Enumeration was done in 1g of sample.

At retail

Listeria monocytogenes was quantified in ready-to-eat foods at retail level through enumeration of colony forming units.

Definition of positive finding

At the production plant

A sample is considered to be positive after confirmation of Listeria monocytogenes on chromogenic medium.

At retail

A sample is considered to be positive after confirmation of Listeria monocytogenes on chromogenic medium.

Diagnostic/analytical methods used

At the production plant

Afnor validated VIDAS LMO2 followed by a chromogenic medium (Rapid L. mono or ALOA)

At retail

Afnor validated VIDAS LMO2 followed by a chromogenic medium (Rapid L. mono or ALOA)

Control program/mechanisms

The control program/strategies in place

Controls are realized by the Federal Agency in case of notification.

Notification system in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For Listeria monocytogenes, the criterion of 100 cfu/g in ready-to-eat food putted on the market may not be exceeded. Laboratories have to inform the Federal Agency for the Safety of the Food Chain in case of a positive sample.

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes - L. monocytogenes serovar 1/2a
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant	FASFC TRA134	Batch	1g or 25g	110	1	72	1	38	0	0	1
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail	FASFC DIS818	Batch	1g	77	1			77	1	0	
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant	FASFC TRA133	Batch	1g or 25g	76	7	46	1	30	6	0	
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS849	Batch	1g	52	5			52	5	0	
Dairy products (excluding cheeses) - butter - at retail	FASFC DIS858	Batch	1g	23	0			23	0	0	
Cheeses made from cows' milk - fresh - made from pasteurised milk - at processing plant	FASFC TRA134	Batch	1g or 25g	58	0	31	0	27	0	0	
Cheeses made from cows' milk - fresh - made from pasteurised milk - at retail	FASFC DIS818	Batch	1g	38	1			38	1	0	
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA026	Batch	1g or 25g	32	1	11	1	21	0	0	1
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS849	Batch	1g	50	0			50	0	0	
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA026	Batch	1g or 25g	55	5	23	2	32	3	0	

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes - L. monocytogenes serovar 1/2a
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at processing plant	FASFC TRA134	Batch	1g or 25g	82	0	35	0	47	0	0	
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at retail	FASFC DIS818 DIS878	Batch	1g	57	0			57	0	0	
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA011 DPA023	Batch	1g	32	1	11	0	21	1	0	
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at processing plant	FASFC TRA133	Batch	1g or 25g	56	2	34	2	22	0	0	
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS851	Batch	1g	43	1			43	1	0	
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at retail	FASFC DIS818 DIS879	Batch	1g or 25g	114	4			114	3	1	
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at farm	FASFC DPA008 DPA024	Batch	1g or 25g	24	1	14	0	10	1	0	
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at processing plant	FASFC TRA133	Batch	25g	4	1	4	1				
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at retail	FASFC DIS818 DIS850	Batch	1g	84	4			84	4	0	
Dairy products (excluding cheeses) - butter - at farm	FASFC DPA009	Batch	1g or 25g	131	13	46	4	85	9	0	3
Dairy products (excluding cheeses) - cream - at farm	FASFC DPA025	Batch	1g or 25g	59	2	19	0	40	2	0	

Table Listeria monocytogenes in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes - L. monocytogenes serovar 1/2a
Dairy products (excluding cheeses) - yoghurt - at farm	FASFC DPA007	Batch	1g	31	1			31	1	0	
Dairy products (excluding cheeses) - yoghurt - at processing plant	FASFC TRA142	Batch	1g	68	0			68	0	0	
Dairy products (excluding cheeses) - yoghurt - at retail	FASFC DIS858 DIS870	Batch	1g	148	0			148	0	0	

	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 4b
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at processing plant		
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk - at retail		
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at processing plant		1
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at retail		
Dairy products (excluding cheeses) - butter - at retail		
Cheeses made from cows' milk - fresh - made from pasteurised milk - at processing plant		

Table Listeria monocytogenes in milk and dairy products

	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 4b
Cheeses made from cows' milk - fresh - made from pasteurised milk - at retail		
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - at farm		
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk - at retail		
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk - at farm	2	
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at processing plant		
Cheeses made from goats' milk - unspecified - made from pasteurised milk - at retail		
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at farm		
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at processing plant		1
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk - at retail		
Cheeses made from sheep's milk - unspecified - made from pasteurised milk - at retail	1	
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at farm		

Table Listeria monocytogenes in milk and dairy products

	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 4b
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at processing plant		1
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk - at retail		
Dairy products (excluding cheeses) - butter - at farm	1	
Dairy products (excluding cheeses) - cream - at farm		
Dairy products (excluding cheeses) - yoghurt - at farm		
Dairy products (excluding cheeses) - yoghurt - at processing plant		
Dairy products (excluding cheeses) - yoghurt - at retail		

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes - L. monocytogenes serovar 1/2a
Foodstuffs intended for special nutritional uses	FASFC DIS862	Batch	25g	146	0	146	0				
Infant formula	FASFC TRA127 DIS803 DIS843	Batch	25g	300	0	300	0				
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	FASFC TRA416	Batch	1g or 25g	165	6	106	4	59	2	0	1
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail	FASFC DIS801 DIS877	Batch	1g	148	4			148	4	0	1
Fish - raw - at retail	FASFC DIS873	Batch	1g	294	4			294	4	0	
Fishery products, unspecified - cooked - at processing plant	FASFC TRA416	Batch	1g or 25g	158	5	117	4	41	0	1	4
Fishery products, unspecified - cooked - at retail	FASFC DIS808	Batch	1g	148	0			148	0	0	
Meat from bovine animals - minced meat - intended to be eaten raw	FASFC DIS823	Batch	1g	21	1			21	1	0	1
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at retail	FASFC DIS815 DIS816	Batch	1g	591	12			591	9	3	1
Meat from bovine animals and pig - meat products - at processing plant	FASFC TRA300 TRA301 TRA302 TRA317 TRA416	Batch	1g or 25g	716	38	423	36	293	2	0	25

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L. monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/g	L. monocytogenes > 100 cfu/g	L. monocytogenes - L. monocytogenes serovar 1/2a
Meat from bovine animals and pig - meat products - at retail	FASFC DIS801 DIS817 DIS824 DIS827	Batch	1g	601	18			601	18	0	2
Meat from bovine animals and pig - minced meat - intended to be eaten raw	FASFC DIS823	Batch	1g	12	0			12	0	0	
Meat from pig - minced meat - intended to be eaten raw	FASFC DIS823	Batch	1g	22	0			22	0	0	

	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 1/2c	L. monocytogenes - L. monocytogenes serovar 3a	L. monocytogenes - L. monocytogenes serovar 4b
Foodstuffs intended for special nutritional uses				
Infant formula				
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at processing plant	2		1	
Meat from broilers (Gallus gallus) - meat products - cooked, ready-to-eat - at retail				
Fish - raw - at retail				
Fishery products, unspecified - cooked - at processing plant	1			
Fishery products, unspecified - cooked - at retail				

Table Listeria monocytogenes in other foods

	L. monocytogenes - L. monocytogenes serovar 1/2b	L. monocytogenes - L. monocytogenes serovar 1/2c	L. monocytogenes - L. monocytogenes serovar 3a	L. monocytogenes - L. monocytogenes serovar 4b
Meat from bovine animals - minced meat - intended to be eaten raw				
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at retail	1		1	1
Meat from bovine animals and pig - meat products - at processing plant	3	4	1	4
Meat from bovine animals and pig - meat products - at retail		1		
Meat from bovine animals and pig - minced meat - intended to be eaten raw				
Meat from pig - minced meat - intended to be eaten raw				

2.4 E. COLI INFECTIONS

2.4.1 General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

History of the disease and/or infection in the country

E. coli O157 is the only VTEC that is looked for at a regular basis in the official monitoring plan. Swabs are taken from cattle carcasses in the slaughterhouse. However, there is no tracing back to the farm of origin in case of detection of contaminated carcasses.

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

Although sporadically VTEC infections were recognised in humans, no large outbreaks have been detected. Data on the prevalence of VTEC among cattle are scarce.

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

Zoonotic verotoxin producing E. coli may cause life-threatening diseases in young children or in immunocompromized or elderly people, i.e. hemorrhagic colitis, hemorrhagic uremic syndrome (HUS) and even death. E. coli O157 is the best known and most studied VTEC. Cattle are often indicated as the principal reservoir of VTEC, but are mostly not clinically affected by zoonotic VTEC infection.
Infection of humans takes place via consumption of contaminated food, through contact with contaminated water, or by direct transmission of VTEC from infected humans or animals. Therefore, prevention mainly relies on hygienic measures.

2.4.2 Escherichia coli, pathogenic in foodstuffs

A. Verotoxigenic E. coli (VTEC) in food

Monitoring system

Sampling strategy

A monitoring program was organized by the Federal Agency for the Safety of the Food Chain. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 100 retail trades representative of the Belgian production, were selected for this study. The samples assayed were carcasses, cuts and minced meat from beef and other foodstuffs. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, except during the 30th week.

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of beef carcasses was done by means of swabs (4 areas from the same half carcass constituting 1600 cm2 were putted in the same stomacher bag).
The samples were putted in a cool box and transported to a dispatching center of the Federal Agency for the Safety of the Food Chain and the laboratory take the samples at the dispatching center for analyses.
The other samples were about 200g of meat. The detection of enterohemorrhagic E. coli has been assessed in 1600 cm2 for beef carcasses and in 25g for beef minced meat and beef cuts.
No pooling has been done.

Definition of positive finding

A sample is considered positive after isolation and genetic confirmation of the pathogenicity of the 0157 E. coli strain in the sample.

Diagnostic/analytical methods used

For detection of Escherichia coli O157, the Belgian official SP-VG-M001 method, according to the ISO 16654 (2001) was used :
- pre-enrichment in m-TSB + novobiocin at 42°C for 7 hours,
- enrichment in CT-Mac Conkey at 37°C for 16-18 hours;
- immunoassay O157 (VIDAS ECO, bioMÃ©rieux),
- selective immunomagnetic enrichment (Dynabeads, Dynal or VIDAS ICE, bioMérieux),
- isolation on sorbitol-Mac Conkey and incubation at 42°C for 18 h,
- isolation and confirmation (agglutination of latex particles, Oxoid),
- search for genes encoding for virulence factors in national reference laboratory.

Preventive measures in place

Controls are in place by the Federal Agency in case of notification.

Control program/mechanisms

The control program/strategies in place

Notification is mandatory since 1/3/2004 (Ministerial Decree on mandatory notification in the food chain of 22/1/2004). For enterohemorrhagic E. coli, absence in 25g in ready-to-eat food putted on the market is mandatory. Laboratories have to inform the Federal Agency in case of positive sample.

Measures in case of the positive findings or single cases

Meat from positive carcasses is traced back, destroyed or transformed into cooked meat products.

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from bovine animals - fresh - at slaughterhouse	FASFC DPA001	Single	1600cm2	375	6	0	6	
Meat from bovine animals - fresh - at processing plant	FASFC TRA305	Batch	25g	271	0			
Meat from bovine animals - minced meat - intended to be eaten raw - at processing plant	FASFC TRA304	Batch	25g	267	0			
Vegetables	FASFC DIS802 DIS841 DIS866 TRA508	Batch	25g	288	2	2		
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk	FASFC DPA009 DPA026 DIS818	Batch	25g	75	0			
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk	FASFC TRA133 DPA008 DIS818 DIS849	Batch	25g	150	0			
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk	FASFC TRA133 DPA008 DPA011 DPA023 DIS818 DIS851	Batch	25g	113	0			

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk	FASFC TRA133 DPA008 DPA024 DIS850 DIS818	Batch	25g	109	0			
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk	FASFC DIS858 DPA009	Batch	25g	138	0			
Dairy products (excluding cheeses) - cream - made from raw or low heat-treated milk	FASFC DPA025	Batch	25g	45	0			
Meat from bovine animals and pig - meat preparation - intended to be eaten raw - at retail	FASFC DIS815 DIS816	Batch	25g	590	0			

2.5 TUBERCULOSIS, MYCOBACTERIAL DISEASES

2.5.1 General evaluation of the national situation

A. Tuberculosis general evaluation

History of the disease and/or infection in the country

Zoonotic tuberculosis (Mycobacterium bovis).
Tuberculosis in humans caused by M. bovis is clinically indistinguishable from tuberculosis caused by M. tuberculosis.
In the past, the most important way of transmission of M. bovis for humans was the consumption of raw milk or raw milk products from infected cattle. Industrial heat treated production methods or pasteurization of raw milk did stop this way of transmission to humans.
Nowadays tuberculosis in humans caused by M. bovis is rare. In regions were M. bovis infections in cattle are largely eliminated, only few residual cases occur among elderly persons as a result of the reactivation of dormant M. bovis within old lesions. Also among migrants from high-prevalence countries, infections with M. bovis are diagnosed.
Agricultural workers may acquire infection by M. bovis by inhaling cough aerosols from infected cattle and may subsequently develop typical pulmonary or genito-urinary tuberculosis. Cervical lymphadenopathy, intestinal lesions, chronic skin tuberculosis (lupus vulgaris) and other non-pulmonary forms are also particularly common as clinical symptoms.

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

In 2002, 2 human cases of bovine tuberculosis were identified. Both patients were farmers that were found positive after the epidemiological investigation of the M. bovis infections in their cattle.
In 2003, 5 human cases of bovine tuberculosis were diagnosed. Molecular typing of strains isolated from cattle and human cases is realized in order to evaluate the presence of similar strains in both species.
Also in 2004, 5 human cases of bovine tuberculosis were diagnosed.
In 2005, 3 human cases of bovine tuberculosis were identified.
In 2006, 1 human case of bovine tuberculosis was identified by the National Reference Laboratory.
In 2007, 3 human cases of bovine tuberculosis were reported to the Belgian Register and identified by molecular techniques in the NRL. No link between these patients and bovine tuberculosis in a Belgian herd could be detected.
One patient had a pulmonary disease and the two other ones (born in Morocco) had an extra- pulmonary form of the disease. Among them, one patient already detected in 2005 (abdominal tuberculosis), was infected by a multidrug resistant isolate. The MIRU-VNTR profile and spoligotype of this isolate were identical to the genetic profiles observed in 2005 and 2006, but the strain acquired resistance to isoniazid and to rifampicin in 2007.

Recent actions taken to control the zoonoses

The surveillance program of tuberculosis is based on Directive 64/432/EEC, which is implemented and adapted in National legislation since 1963 and last modified by Royal Decree of 17 October 2002.
The control implies skin testing of animals at the occasion of trade and intensive testing of infected and contact farms in consequence of a confirmation of a bovine TB suspicious case (tracing-on and tracing-back of all contact animals).

Systematic post mortem examinations at the slaughterhouse are performed with special attention.
The Federal Agency for the Safety of the Food chain is informed about any doubtful or positive result of the skin test of bovines and may decide to re-examine (additional tests e.g. comparative tuberculin test, interferon-gamma test) the animals or to kill them for additional analysis (test slaughter). In case a "TB suspicious" lesion is detected, a tissue sample is sent to the National Reference Laboratory for analysis. Consequently, if Mycobacterium bovis suspicion is confirmed by analysis, all animals in the herd of origin are skin tested and a complete epidemiological investigation is made. The total herd is considered as the 'epidemiological unit'.
Isolation of M. bovis and biochemical testing is exclusively performed in the National Reference Laboratory where also IFN-gamma, PCR and molecular typing by means of RFLP, spoligotyping or more recently MIRU-VNTR are done to support the epidemiological investigations and to eventually prove the link between different cases.

Suggestions to the Community for the actions to be taken

In case a holding is infected and if by epidemiological investigation and tracing-back, animals were found to be exported to another country, the Chief Veterinary Officer of the country of destination has to be informed about the outbreak in the country of origin. This alert can help to rapidly detect an infection in the concerned holding of destination.
Monitoring of the type of strains circulating in each country could have a valuable contribution to the understanding of the spread of specific strains among the community and could probably bear evidence of epidemiological links between outbreaks.

2.5.2 Tuberculosis, mycobacterial diseases in humans

A. Tuberculosis due to Mycobacterium bovis in humans

Results of the investigation

2.5.3 Mycobacterium in animals

A. Mycobacterium bovis in bovine animals

Status as officially free of bovine tuberculosis during the reporting year

The entire country free

Belgium is officially free of bovine tuberculosis since the 25th of June 2003 (Commission Decision 2003/467/EC)

Free regions

All regions are officially free of bovine tuberculosis for the reporting year.

Monitoring system

Sampling strategy

Surveillance system.
The control of tuberculosis is based on Council Directive 64/432/EEC, which is implemented and adapted in National legislation since 1963 and last modified by Royal Decree of 17 October 2002.

The surveillance program implies:
- skin testing of animals at purchase by the veterinarian responsible for the epidemiological surveillance of the holding (contract between farmer and veterinarian);
- skin testing in case of a suspected/infected bovine of all animals of the holding
- skin testing of all 'contact' animals and herds (tracing-on and tracing-back);
- systematic post-mortem examinations at the slaughterhouse, transmission to the National Reference Laboratory of all "TB suspicious" lesions for further analysis.

Isolation of M. bovis and biochemical testing is exclusively performed at the National Reference Laboratory where also IFN-gamma, PCR and molecular typing by means of RFLP, spoligotyping and more recently MIRU-VNTR are done.

Frequency of the sampling

Frequency of testing is depending on:
- the introduction of new animals into a herd (mandatory examination at purchase)
- the results of tuberculin testing
- the detection of suspected bovines
- the detection of infected bovines
- the epidemiological investigation related to suspected or infected animals or herds (tracing-on and tracing-back)
- the follow-up testing of infected and/or eradicated herds during 5 years.

Type of specimen taken

Organs/tissues: lesions, lymph nodes, lungs
Blood

Methods of sampling (description of sampling techniques)

Tuberculin skin testing: single (bovine tuberculin) or comparative (bovine/avian tuberculin) testing.
Blood sampling: interferon-gamma tests
Laboratory examination of all suspicious lesions

Organs: lymph nodes, lungs, ...

Case definition

- A 'bovine' is defined as infected with bovine tuberculosis if the animal is positive by skin testing or if Mycobacterium bovis is isolated by culture or confirmed by laboratory analysis (PCR).
- A 'holding' is defined as infected if Mycobacterium bovis was isolated from an animal of the holding.

Diagnostic/analytical methods used

- Simple skin test with bovine tuberculin
- Comparative skin test with bovine and avian tuberculin
- Ziehl-Neelsen coloration
- Culture for isolation
- Interferon-gamma
- PCR on lesions / organs
- PCR on culture
- RFLP typing
- Spoligotyping
- MIRU-VNTR

Vaccination policy

Vaccination is prohibited by Royal Decree of 17 October 2002.

Control program/mechanisms

The control program/strategies in place

National surveillance program by the Competent Authority (FASFC) on mandatory legal base.

Recent actions taken to control the zoonoses

In case of suspicion by tuberculin testing of live animals, complementary blood sampling is performed to improve the detection or to earlier confirm infection by gamma-Interferon test;

Draw special attention and focus on the post-mortem examination of slaughtered animals;

Transmission for further analysis of any lesion that could be 'suspected' of tuberculosis to the National Reference Laboratory;

Culture of M. bovis, biochemical testing, PCR are performed on these 'suspicious' lesions;

Molecular typing by means of RFLP, Spogilotyping and more recently MIRU-VNTR are done systematically on all isolates to support the epidemiological investigations and to eventually prove the link between different cases or outbreaks.

Suggestions to the Community for the actions to be taken

In case of export of bovines, inform the Chief Veterinary Officer of the Member state of destination if tuberculosis has been detected in a holding of the Member State of origin after the date of export. This information can result in an early detection or can avoid a possible further contamination in the Member State of destination.

Measures in case of the positive findings or single cases

If M. bovis is suspected, all animals in the herd of origin are skin tested, the herd is considered as the epidemiological unit. A complete epidemiological investigation is performed. By tracing-back and tracing-on all animals of 'contact' holdings are examined by skin testing. If any doubtful or positive result of the skin test is detected, the FASFC may decide to re-examine the animals(additional tests e.g. comparative skin testing with avian and bovine tuberculin and/or Interferon-gamma testing) or to kill the reactors (test

slaughter) for additional analysis. In case a suspicious lesion is detected at post-mortem examination, a sample is sent to the National reference laboratory for analysis. Consequently, if Mycobacterium bovis is isolated, all skin test positive animals during successive testing are mandatory slaughtered. If many bovines are reacting positive to skin testing, the FASFC can decide that all animals of the holding must be slaughtered compulsory. After stamping-out, new restocked animals are tested during 5 years by annually skin testing to prove the TB free status of the holding.

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases).

Results of the investigation

In 2001, a total of 23 infected holdings were notified. In total 792 animals reacted after tuberculinisation.
In 2002, a total of 13 infected holdings were notified. A total of 799 animals reacted after tuberculinisation. Stamping-out was performed in 6 herds.
In 2003, a total of 7 infected holdings were notified. Stamping out was done in 5 herds. A total of 409 animals reacted after tuberculinisation. This number corresponds to the intensive testing of infected and contact farms. In total 3.799 herds and 337.260 animals were included in epidemiological investigations. The Federal Agency for the Safety of the Food Chain, the Competent Authority, instructed the slaughter of 1014 animals.
In 2004, a total of 8 infected holdings were detected. In total 229 bovines were slaughtered in consequence of the stamping-out of 3 infected herds.
In 2005, a total of 5 infected holdings were detected. All these herds were eradicated by stamping-out in execution of a TB sanitation plan. In total 752 animals were slaughtered. The carcasses of only 2 animals did have to be destroyed due to general dispersed TB lesions.
In 2006, a total of 8 infected holdings were detected. Seven of these were eradicated by stamping out. In total 1102 animals were slaughtered. A follow-up of the other infected holding is performed after test-slaughter of a few positive reactors, since then all results of tuberculin tests on all the animals of the herd at regular intervals are negative.
In 2007, a total of 5 infected holdings were detected. Three of these were eradicated by stamping-out. In total 487 animals were slaughtered. In the other two infected holdings, partial slaughter and intense follow-up by tuberculin testing was performed.
In 2008, a total of 12 infected holdings were detected. In total 812 animals were slaughtered. Finally 66 animals were detected positive in bacteriological examination.
In 2009, 2 infected holdings were detected. One holding was eradicated by stamping-out. On the other holding, partial slaughter and intense follow-up by tuberculin testing was performed.
In 2010 no infected holding was detected.

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

Number of infected herds since 2000
2000 : 24
2001 : 23
2002 : 13
2003 : 7
2004 : 8
2005 : 5
2006 : 8
2007 : 5
2008 : 12
2009 : 2
2010 : 0

Additional information

B. Mycobacterium bovis in farmed deer

Monitoring system

Sampling strategy

Sampling in case of suspicious TB lesions during post-mortem examinations of "wild" and "farmed" deer at slaughterhouse/ at game handling establishment.

Frequency of the sampling

Depends on the number of hunted/slaughtered animals and the detection of suspicious lesions at post-mortem examination.

Type of specimen taken

Suspicious lesions of lungs, lymph nodes, ...

Methods of sampling (description of sampling techniques)

TB suspicious tissues: lymph nodes, lungs, ...

Case definition

An animal is positive if Mycobacterium bovis is isolated by culture or confirmed by laboratory analysis.

Diagnostic/analytical methods used

- Ziehl-Neelsen coloration
- Culture for isolation
- Interferon-gamma
- PCR on lesions / organs
- PCR on culture

Control program/mechanisms

The control program/strategies in place

Monitoring is done by:
- systematic post-mortem examination at the slaughterhouses/game handling establishment
- post-mortem examination at autopsy of hunted or killed "wild" deer by accident in the University Center of Liège, Veterinary Medicine Faculty.

In case of suspected TB lesions, tissue samples are sent to the National Reference Laboratory for additional analysis to confirm the suspicion.

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

No Mycobacterium bovis was detected in "hunted" or "farmed" deer.

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Land game mammals - wild - Surveillance	CODA CERVA	Animal	28	0			
Other mustelides - Surveillance	CODA CERVA	Animal	34	0			

Table Tuberculosis in farmed deer

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing farmed deer		Free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological examinations	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
Belgique-België	2717	9239	2717	100	0	0	no routine test	0	0	0	0
Total : [1)]	2717	9239	2717	100	0	0	N.A.	0	0	0	0

Comments:

[1)] N.A.

Footnote:

Surveillance of tuberculosis by post-mortem examination at slaughterhouse, at game handling establisment or at autopsy.

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

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing bovine		Officially free herds		Infected herds		Routine tuberculin testing		Number of tuberculin tests carried out before the introduction into the herds (Annex A(I)(2)(c) third indent (1) of Directive 64/432/EEC)	Number of animals with suspicious lesions of tuberculosis examined and submitted to histopathological and bacteriological	Number of animals detected positive in bacteriological examination
	Herds	Animals	Number of herds	%	Number of herds	%	Interval between routine tuberculin tests	Number of animals tested			
Belgique-België	35217	2721130	35217	100	0	0	no routine test	197978	395000	216	0
Total : [1)]	35217	2721130	35217	100	0	0	N.A.	197978	395000	216	0

Comments:

[1)] N.A.

Footnote:

Officially tuberculosis free status by Decision 2003/467/EC. No routine tests but annual intensive testing by tracing-back and tracing-on in case of an infected animal or herd and follow-up testing of infected herds.

2.6 BRUCELLOSIS

2.6.1 General evaluation of the national situation

2.6.2 Brucella in animals

A. Brucella abortus in bovine animals

Status as officially free of bovine brucellosis during the reporting year

The entire country free

Belgium is officially free from bovine brucellosis since the 25th of June 2003 (Commission Decision 2003/467/EC)

Free regions

Belgium remained officially free of bovine brucellosis during this reporting year.

Additional information

End 2010 a brucellosis breakdown herd was detected by analyzing an abortion. The infected herd was totally depopulated. Extensive epidemiological investigations and important serological follow-up of contact herds in 2010 and 2011 could not give any indication on the origin of the infection neither could detect any additional other infected herd.

Monitoring system

Sampling strategy

Since Belgium is officially free from bovine brucellosis, the eradication program has been changed in a surveillance program. Beef cattle older than 2 years were monitored once every three years by means of serological tests. The herds for serological sampling and examination were selected by their geographical localization. Dairy cattle were checked at least 4 times a year via tank milk (milk ring test).
Furthermore, all animals were tested at trade (purchase) on the herd of arrival.
Each abortion or premature birth in animals at risk must be subject to compulsory notification to the Federal Agency for the Safety of the Food Chain, and testing for brucellosis is obligatory. Aborting females should be kept in isolation until the results of the analysis and the investigation exclude a Brucella infection.
Pooled tank milk was examined by means of the milk ring test.
For animals older than 2 years, serology (i.e. micro-agglutination as screening test; in case of a positive result, an indirect ELISA test is performed) is used if no sufficient milk ring tests were performed (at least 4 ring tests a year).
Bacteriological examination is done when serological and/or epidemiological suspicion is present.
An animal is legally suspected of brucellosis in case of a positive ELISA. If, according to the epidemiology and the results of the blood test, an animal or herd is found to be at risk, a bacteriological investigation always takes place. Hence, a brucellosis animal is defined as an animal in which Brucella abortus has been isolated, and a cattle holding is considered as an outbreak herd if one of the animals is positive for brucellosis by bacteriological examination.

In 2009, a study was realized to evaluate the current national surveillance program of bovine brucellosis. If a Member State has maintained the officially free status of brucellosis for at least 5 consecutive years, the existing surveillance program can be re-evaluated and some modifications on the sampling design are allowed on condition of further proof of freedom of disease (Council Directive 64/432/EEC). The scientific

veterinary experts used risk-based models to evaluate different scenarios within the current surveillance program and the study was also based on a statistical confidence level approach. This methodology has underlined a few important features of the current brucellosis surveillance program. The study showed that in order to obtain a 99% confidence level to prove freedom of disease consistently an important decrease in total number of tested animals can be proposed (500.000 to 30.000 tests a year). The study also clearly indicated that the best approach is to test bovines imported from officially free or non-officially free Member States of Brucella spp., to test animals at purchase in consequence of national trade as well as to analyze aborting animals in order to early detect infection. Regarding the passive surveillance (abortions), the study indicated there is a need to increase the number of analyzed abortions. A new surveillance program will be applied for the winterscreening at the end of 2009.

In 2010 surveillance was focused on following risk categories:
- import of non officially free MSs or Third Countries at the moment of trade and follow-up testing during winterscreening
- at random selection of 1100 bovine herds for serological investigation
- bovines of national trade at purchase
- abortions

Frequency of the sampling

- import of non officially free MSs or Third Countries at the moment of trade: all imported animals over 12 months of age
- import of non officially free MSs or Third Countries follow-up testing during winterscreening for 3 consecutive years of all imported animals over 24 months of age
- at random selection of 1100 bovine herds: part of female animals over 24 months of age
- bovines of national trade at purchase: at random selection
- abortions

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood sampling

Case definition

An animal is defined as infected if Brucella abortus has been isolated and identified by culture.
A herd is defined as infected if one of its animals is positive by bacteriological examination for brucellosis.

Diagnostic/analytical methods used

- Micro agglutination test
- Indirect ELISA
- Culture for isolation
- Brucellin skin testing(BST)

Vaccination policy

Vaccination is prohibited in Belgium since 1992.

Control program/mechanisms

The control program/strategies in place

National mandatory surveillance program organized by the Competent Authority.

Measures in case of the positive findings or single cases

In case of a positive result in the micro-agglutination test the same blood sample is tested with an indirect ELISA. If this indirect ELISA is positive, this result has to be confirmed by a blocking ELISA at the NRL. If this last test is also positive, the animal is considered as infected and is compulsory slaughtered (test slaughter) for additional analysis to detect a possible Brucella infection.

Notification system in place

Animal Health Law of 24 March 1987 Chapter III, Royal Degree of 25 April 1988 (list of all notifiable diseases)

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

An intensified bovine brucellosis control program started in Belgium in 1988. In case of active brucellosis, i.e. excretion of Brucella, the plan consisted in the culling of all animals of the infected herd (total depopulation). Culled bovines were compensated for based on the replacement value of the animals.
In March 2000, the last case of bovine brucellosis was identified before obtaining the officially brucellosis free status in 2003.
In case of positive serological reactors the Federal Agency for the Safety of the Food Chain instruct follow-up testing or 'test slaughter' for additional analyses. These analyses could not confirm brucellosis. To reduce the number of FPSR (False positive serological reactors) to be slaughtered, the micro-agglutination test has been used as for routine testing whereas the indirect Elisa is accepted as a confirmatory test. This approach avoids the undeserved test slaughter of false positive reacting animals.
End november 2010 a breakdown of bovine brucellosis was detected at a herd in the province of Liège. Bovine brucellosis was detected by analysis of an abortion and serology. On 17 November 2010 a cow had aborted. Serological examination of the cow and bacteriological examination of the fetus indicated a Brucella infection that was confirmed and typed as Brucella abortus biovar 3 at the NRL on 30 November. Serological screening indicated 9 positive results on 68 sampled bovines. All 104 bovines were mandatory slaughtered. Culture of slaughtered animals was positive for 22 bovines.
Extensive epidemiological investigation designated 146 contact herds for follow-up by serology. Analyze of 12.917 samples by Agglutination and 9.285 samples by ELISA finally resulted in 13 suspected bovines of 12 different herds. All animals were mandatory slaughtered for supplementary bacteriological examination. None of the animals was positive by culture. Serological analyzes were realized partly in 2010 but mostly in 2011.
In addition to the follow-up of the contact herds, all Belgian dairy herds were tested by an ELISA of tank milk in 2011. Of 9.460 dairy herds, 13 were positive by this ELISA. These dairy herds were followed up by serological examination. In consequence of this surveillance, one bovine was mandatory slaughtered for examination by culture. Finally no positive case could be detected in the Belgian dairy herds. Despite all investigations and extensive follow-up by serology and culture, the origin of the infection could not be detected neither could be detected another brucellosis infected bovine or breakdown herd.

Additional information

B. Brucella melitensis in goats

Status as officially free of caprine brucellosis during the reporting year

The entire country free

Belgium is officially free of B. melitensis since 29 March 2001 (Commission Decision 2001/292/EC).

Free regions

Belgium is officially free of caprine brucellosis during the reporting year.

Monitoring system

Sampling strategy

Serum samples taken in the framework of a national monitoring program for Visna-Maedi/CAE and at export were examined for Brucella melitensis specific antibodies by means of an ELISA.
Sheep and goats were tested for brucellosis by indirect ELISA(iELISA) at the NRL (Veterinary and Agrochemical Research Center). All positive samples in the ELISA were supplementary tested by the Rose Bengal Test (RBT) and Complement Fixation Test (CFT) as confirmatory tests. Animals that where positive in the two confirmatory tests or that could not be analyzed and/or interpreted in RBT and/or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025).

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood samples

Case definition

A goat is defined as infected with brucellosis if positive in all three tests: iElisa, Rose Bengal test and Complement Fixation test and isolation of Brucella melitensis by culture after test slaughter.

Diagnostic/analytical methods used

Complement Fixation Test CFT
Rose Bengal Test RBT
Indirect ELISA
Culture for isolation

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of notifiable animal diseases)

Results of the investigation

At the National Reference Laboratory, 5.028 caprine/ovine serum samples were tested. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of caprine/ovine brucellosis in Belgium.

C. Brucella melitensis in sheep

Status as officially free of ovine brucellosis during the reporting year

The entire country free

Belgium is officially free from B. melitensis since 29 March 2001 (Commission Decision 2001/292/EC).

Free regions

Belgium is officially free of ovine brucellosis during the reporting year.

Monitoring system

Sampling strategy

Serum samples taken in the framework of a national monitoring program for Visna-Maedi/CAE and at export were examined for Brucella melitensis specific antibodies by means of an iELISA. Positive samples were subsequently tested in Rose Bengal and in complement fixation test.
Sheep and goats sera were tested for brucellosis by indirect ELISA (iELISA) at the National Reference Laboratory (Veterinary and Agrochemical Research Center). All positive samples in the ELISA were than tested by the Rose Bengal Test (RBT) and Complement Fixation Test (CFT) as confirmatory tests.
Animals that were positive in the two confirmatory tests or that could not be analyzed and/or interpreted in RBT and/or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025).

Type of specimen taken

Blood

Case definition

A sheep is defined as infected with brucellosis if positive in all three tests: the Elisa, the Rose Bengal test and the Complement Fixation test and isolation of Brucella melitensis by culture.

Diagnostic/analytical methods used

- Indirect ELISA
- Rose Bengal Test RBT
- Complement Fixation Test CFT
- Culture for isolation
- Brucellin skin test (BST)

Notification system in place

Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of notifiable animal diseases).

Results of the investigation

At the National Reference Laboratory, 5.028 caprine/ovine serum samples were tested. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of caprine/ovine brucellosis in Belgium.

D. B. suis in animal

Monitoring system

Sampling strategy

Serological screening for Brucella is done for breeding pigs that are gathered (at a fair for example), at artificial insemination centers and in animals intended for trade. The methods used are Rose Bengal test (RBT), Slow Agglutination test (SAT) according to Wright, Complement Fixation test (CFT) and ELISA. Bacteriological examination for Brucella and Yersinia is done in case of positive serology.
Regularly, false positive serological reactions are reported. These are due to a Yersinia enterocolitica O9 infection and are confirmed by Yersinia enterocolitica 09 isolation in the absence of Brucella spp. isolation.
B. suis biovar 2 may be isolated from wild boars (Sus scrofa). The infection seems to be enzootic in wild boar in Europe. B. suis biovar 2, circulating among wild boars, shows only limited pathogenicity for humans, if pathogenic at all.
The domestic pig population is free of brucellosis (last Brucella isolation in pigs in Belgium was in 1969). It is interesting to note that the Office International des Epizooties (http://www.oie.int) considers that the value of any brucellosis serological test in pigs is questionable.

Methods of sampling (description of sampling techniques)

Blood sampling
Tonsils
Spleen

Case definition

An animal is positive if Brucella suis is isolated by culture or typed by additional laboratory analysis.

Diagnostic/analytical methods used

Rose Bengal test RBT
Complement fixation test CFT
Indirect ELISA
Bacteriological examination

Control program/mechanisms

The control program/strategies in place

Regional monitoring program.
Since 2002, an annual surveillance program is organized by the veterinary faculty of the University of Liège (Walloon Region funds) in collaboration with the National Reference Laboratory (Veterinary and Agrochemical Research Center) with the aim to analyze brucellosis in wild boars (Sus scrofa) and lagomorphs in the south of Belgium. Blood samples and organs of hunted and/or dead animals were analysed in order to follow the seroprevalence and to identify bacteriological isolates of Brucella in these species.

Table Brucellosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Brucella	B. abortus	B. melitensis	B. suis	Brucella spp., unspecified
Pigs	VAR	Animal	179	0				
Alpacas	VAR	Animal	32	0				
Goats	VAR	Animal	28	0				
Sheep	VAR	Animal	226	0				

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

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing		Officially free herds		Infected herds		Surveillance			Investigations of suspect cases				
	Herds	Animals	Number of herds	%	Number of herds	%	Number of herds tested	Number of animals tested	Number of infected herds	Number of animals tested with serological blood tests	Number of animals positive serologically	Number of animals examined microbio logically	Number of animals positive microbio logically	Number of suspended herds
Belgique-België	41425	270016	41425	100	0	0		5028	0	9	0	0	0	0
Total : [1)]	41425	270016	41425	100	0	0	0	5028	0	9	0	0	0	0

Comments:

[1)] N.A.

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

If present, the row "Total -1" refers to analogous data of the previous year.

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk			Information about			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds	Number of bovine herds tested	Number of animals or pools tested	Number of infected herds	Number of notified abortions whatever cause	Number of isolations of Brucella infection	Number of abortions due to Brucella abortus	Number of animals tested with serological blood tests	Number of suspended herds	Number of positive animals		Number of animals examined microbio logically	Number of animals positive microbio logically
																		Sero logically	BST		
Belgique-België	35217	2721130	35216	100	1	0	7980	42378	1	0	0	0	6650	2	2	68	1	9	0	104	22
Total : [1)]	35217	2721130	35216	100	1	0	7980	42378	1	0	0	0	6650	2	2	68	1	9	0	104	22

Comments:

[1)] N.A.

Footnote:

One brucellosis breakdown herd was detected by analysis of an abortion end 2010. All 104 bovines of the herd were mandatory slaughtered. All sanitary restriction measures at the breakdown herd were lifted on 31 January 2011.
Epidemiological investigations indicated 146 'contact' herds. Serological follow-up in 2010 and 2011 by 12.917 Agglutination tests and 9.285 Elisa's resulted in 13 positive bovines belonging to 12 different herds. These 13 animals were test slaughtered for supplementary examination by culture. All animals were finally negative by bacteriological examination.
In consequence of this brucellosis breakdown in 2010, all dairy herds (9640) were tested by an ELISA of the tank milk in 2011. Finally 13 dairy herds had a positive result by analyze of tank milk and were subsequently further analyzed by serology. Finally only one bovine had to be test slaughtered and was negative by culture.
Despite these important epidemiological investigations and this intensive testing, no source of infection could be found and no other infected animal or breakdown herd was detected.

2.7 YERSINIOSIS

2.7.1 General evaluation of the national situation

A. Yersinia enterocolitica general evaluation

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

Only a few strains of Y. enterocolitica cause illness in humans. The major animal reservoir for Y. enterocolitica strains that cause human illness are pigs but other strains are also found in many other animals including rodents, rabbits, sheep, cattle, horses, dogs, and cats. In pigs, the bacteria are most likely to be found on the tonsils. Infection is most often acquired by eating contaminated food, especially raw or undercooked pork products. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection.

2.7.2 Yersiniosis in humans

A. Yersinosis in humans

Relevance as zoonotic disease

Y. enterocolitica is a relatively infrequent cause of diarrhea and abdominal pain. Infection with Y. enterocolitica occurs most often in young children. Common symptoms in children are fever, abdominal pain, and diarrhea, which is often bloody. Symptoms typically develop 4 to 7 days after exposure and may last 1 to 3 weeks or longer. In older children and adults, right-sided abdominal pain and fever may be the predominant symptoms, and may be confused with appendicitis. In a small proportion of cases, complications such as skin rash, joint pains or spread of bacteria to the bloodstream can occur.

Only a few strains of Y. enterocolitica cause illness in humans. The major animal reservoir for Y. enterocolitica strains that cause human illness are pigs but other strains are also found in many other animals including rodents, rabbits, sheep, cattle, horses, dogs, and cats. In pigs, the bacteria are most likely to be found on the tonsils. Infection is most often acquired by eating contaminated food, especially raw or undercooked pork products. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection.

2.7.3 Yersinia in foodstuffs

Table Yersinia in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Yersinia	Y. enterocolitica	Y. pseudotuberculosis	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - Y. enterocolitica, unspecified
Meat from bovine animals - minced meat	FASFC DIS823 DIS888	Batch	1g	38	0						
Meat from pig - minced meat	FASFC DIS823 DIS888	Batch	1g	45	0						
Meat from bovine animals and pig - minced meat	FASFC DIS823 DIS888	Batch	1g	27	0						

Footnote:

Used diagnostic method: ISO 10273 method for isolation of pathogenic Yersinia enterocolitica in food

2.8 TRICHINELLOSIS

2.8.1 General evaluation of the national situation

A. Trichinellosis general evaluation

History of the disease and/or infection in the country

Since 1940, the Competent Authority did organize analysis for Trichinella in pigs at the slaughterhouses. The analysis is generalized since 1991. Trichinella has not been detected in carcasses of pigs and horses produced for human consumption in Belgium. One autochthonous human case, probably caused by a home raised wild boar occurred in 1979.

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

Trichinellosis is virtually absent in Belgian domestic livestock. Since systematic controls of pigs and horses are done at slaughter (EU Directive 92/45/EEC) no positive case was found. The last outbreak in humans in Belgium occurred in 1979 following the consumption of meat from wild boar.
Increased monitoring in the last decade has shown that Trichinella spp. still circulate amongst wildlife, although both the prevalence and the intensities of infection are low.
EU Directive requires that also wild boars hunted in the EU for commercial purpose are examined for Trichinella. In Belgium each year about 10000 sport-hunted wild boars were tested, and recently those numbers are rising. Until now, one animal, in 2004, originating from Mettet (province of Namur), was found to harbour a light infection. The larvae, isolated by artificial digestion were identified by PCR to be Trichinella britovi, a species previously not demonstrated in Belgium. T. britovi has sylvatic carnivores as main hosts. Even if wild boars are not the preferred host they can acquire the infection and consequently pass it to humans. Both T. spiralis and T. britovi have been associated with human infection. One larva was recovered from a pooled sample (originating from three wild boars from a hunting party from Alle-sur-Semois) in 2007. Consecutive digestions could not reveal the causative animal, and unfortunately PCR failed to identify the Trichinella species.
The routine examination of wild boars devoted to the market has proved to be a good measure to protect the consumer against sylvatic trichinellosis. In addition, monitoring of infection through examining sentinel animals, such as the fox, is recommended to access the prevalence of trichinellosis and to follow trends in time. Serological examination might be an alternative for muscle digestion but needs further evaluation.
An extra measure to protect the consumer is to eat meat of wild boar "well done", or to freeze the meat at -20°C for 4 weeks. An important measure to avoid spreading of the infection among wildlife is not to leave offal of animal carcasses in the field after skinning.

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

The last outbreak in humans in Belgium occurred in 1979 following the consumption of meat from wild boar.

Recent actions taken to control the zoonoses

Monitoring of wildlife.
Routine examination of wild boars destined for human consumption
Monitoring of infection through examining sentinel animals such as the fox.
Recommendation to consume wild boar meat after freezing at -20°C for 4 weeks.
Recommendation to travellers not to import raw meats of unknown origin and of susceptible animals, e.g. home made sausages, and not to consume meats of unknown quality abroad.

Additional information

The status "negligible risk for Trichinella in slaughterpigs kept under industrial housing conditions" was granted by the EC to Belgium end December 2010.

2.8.2 Trichinellosis in humans

A. Trichinellosis in humans

Reporting system in place for the human cases

Trichinellosis is a notifiable disease in humans in Belgium

History of the disease and/or infection in the country

The only human case of Trichinella infection was in 1978. A person who had fattened two wild boars for his own consumption got infected by Trichinella. The two boars captured as wild piglets were enclosed for fattening. This person most probably was infected after consumption of the meat of his wild boars. Epidemiological investigations in this case did not reveal the source of infection. All possible infectious 'sources' were taken into accounts (e.g. rodents etc.).

Description of the positive cases detected during the reporting year

No positive human case was detected during the reporting year.

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

There are no reports of autochtonously acquired Trichinella infections in Belgium

2.8.3 Trichinella in animals

A. Trichinella in horses

Monitoring system

Sampling strategy

Permanent surveillance at the slaughterhouses.

Frequency of the sampling

Every slaughtered animal is sampled.

Type of specimen taken

Diaphragm, tongue or masseter muscle.

Methods of sampling (description of sampling techniques)

Horse: 5 gram of diaphragm (or tongue, or masseter) for routine diagnosis, analyses on pooled samples, 10 to 25 gram for examination of individual samples.

Case definition

An animal is considered positive in case of detection and identification of Trichinella larvae in the muscle sample.

Diagnostic/analytical methods used

Artificial digestion method of collective or individual samples. The magnetic stirrer method for digestion of pooled samples as described in Commission Regulation (EC) No 2075/2005 was used on samples of 5 gram of muscles from horses.

Results of the investigation including the origin of the positive animals

No positive animals were detected this year.

Control program/mechanisms

The control program/strategies in place

Commission Regulation (EC) No 2075/2005 imposes systematic Trichinella examination of all slaughtered pigs, horses and wild boar and other wildlife animals by artificial digestion method of muscle before marketing.

Notification system in place

Notification to the Federal Agency for the Safety of the Food Chain is compulsory for any positive test result.

B. Trichinella in pigs

Officially recognised regions with negligible Trichinella risk

Belgium was granted the status of negligible Trichinella risk at the end of 2010

Monitoring system

Sampling strategy

General

Permanent surveillance of all slaughtered pigs at the slaughterhouses in implementation of Commission Regulation (EC) No 2075/2005.

For regions with negligible Trichinella risk

Testing of wildlife (mainly foxes)

Frequency of the sampling

General

Systematic Trichinella examinations of all slaughtered pigs.

For regions with negligible Trichinella risk

Not yet in place for 2010

Type of specimen taken

General

Diaphragm muscle, 1 gram for fattening pigs, 2 grams for sows and boars.

For regions with negligible Trichinella risk

Not yet applied in 2010

Methods of sampling (description of sampling techniques)

General

Fattening pigs: 1 gram of diaphragm muscle to be pooled (up to 100 animals in 1 pool)
Sows and boars: 2 grams of diaphragm muscle to be pooled (up to 50 animals in 1 pool)

For regions with negligible Trichinella risk

Still general sampling and testing for 2010

Case definition

General

An animal is considered positive in case of detection and identification of Trichinella larvae in the muscle sample.

For regions with negligible Trichinella risk

In 2010 same as general

Diagnostic/analytical methods used

General

Artificial digestion method of collected samples.(Reference method, annex I, chapter I)
The analysis is done by artificial digestion: the magnetic stirrer method of pooled 100 gram sample as described in Commission Regulation (EC) No 2075/2005, reference method, 1 gram per fattening pig, 2 grams per sow and boar,and 5 grams per horse and wild boar.
Serology may be done in live pigs and for epidemiological studies and monitoring on wildlife.

For regions with negligible Trichinella risk

In 2010: still general

Measures in case of the positive findings or single cases

Carcasses found positive are declared unfit for human consumption.

Notification system in place

Notification to the Federal Agency for the Safety of the Food chain is compulsory for any positive test result.

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

Since 1992, when the European Union Council Directive requires that wild boars (Sus scrofa) hunted in EU for commercial purpose should be examined for Trichinella, the infection has only been detected twice in wild boars from Belgium.

In November 2004, Trichinella larvae were detected in a wild boar hunted near Mettet, Namur province (Southern Belgium). Larvae were identified as Trichinella britovi by two different polymerase chain reaction methods. This is the first report of the identification of Trichinella larvae from Belgium at the species level. The detection of T. britovi in wildlife in Belgium is consistent with findings of this parasite in other European countries and confirms the need to test game meat for Trichinella to avoid its transmission to humans.

In December 2007 one Trichinella larva was recovered from a pooled sample, originating from 3 hunted wild boars from Alle-sur-Semois (Southern Belgium). Consecutive testing could not reveal the causative animal, and unfortunately PCR failed to identify the species of this larva.

There is serological evidence of the presence of anti-Trichinella antibodies in wildlife.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella	T. spiralis	Trichinella spp., unspecified
Foxes	FASFC	Animal	362	0		
Pigs - breeding animals - unspecified - sows and boars	FASFC	Animal	235107	0		
Pigs - fattening pigs - raised under controlled housing conditions	FASFC	Animal	11687658	0		
Solipeds, domestic - horses	FASFC	Animal	8970	0		
Wild boars - wild	FASFC	Animal	11730	0		

2.9 ECHINOCOCCOSIS

2.9.1 General evaluation of the national situation

A. Echinococcus spp. general evaluation

History of the disease and/or infection in the country

At the slaughterhouses, a small number of carcasses showing lesions of Echinococcus (cysts) are sometimes detected and notified to the Federal Agency for the Safety of the Food Chain. In case of positive findings, carcasses are partially or totally rejected and declared unfit for human consumption.

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

Echinococcosis is caused either by Echinococcus granulosus or Echinococcus multilocularis.

Echinococcus granulosus produces unilocular human hydatidosis. It is a small tapeworm (6 mm) that lives in the small intestine of domestic and wild canids. Sheep and cattle serve as intermediate hosts for the infection. Humans acquire infection by ingestion of typical taeniid eggs, which are excreted in the faeces of infected dogs: the oncospheres liberated from the eggs migrate via the bloodstream to the liver, lungs and other tissues to develop in hydatid cysts. Indigenous unilocular hydatidosis in man has been reported in Belgium.

Echinococcus multilocularis causes alveolar (multilocular) echinococcosis in humans.
Foxes and dogs are the definitive hosts of this parasite and small rodents the intermediate hosts. In the liver of rodents the invasive larval stage has a multi-compartimented appearance containing many protoscolices. Ingestion of the eggs by humans can result in the development of invasive cysts in the liver. In Belgium, the percentage of infected foxes varies with the region, with a decreasing rate from the South-East to the North-West: e.g 33% in the Ardennes, 13% in the Condroz region and 2% in Flanders. The endemic region is situated under the river Meuse, on the heights of the Ardennes.

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

Post mortem visual examination is performed at the slaughterhouses in the domestic intermediate hosts: cattle, sheep, horses and pigs . Whole carcasses or parts are rejected in case Echinococcus granulosus cysts are found.

Recent actions taken to control the zoonoses

Consumption of berries is discouraged by warning messages, displayed to visitors of Parks and Woodlands.

2.9.2 Echinococcus in animals

Table Echinococcus in animals

	Source of information	Sampling unit	Region	Units tested	Total units positive for Echinococcus	E. granulosus	E. multilocularis	Echinococcus spp., unspecified
Cattle (bovine animals)	FASFC	Animal	Belgique-België	837290	0			

2.10 TOXOPLASMOSIS

2.10.1 General evaluation of the national situation

A. Toxoplasmosis general evaluation

History of the disease and/or infection in the country

The majority of grazing animals seems to be inappearent carriers of tissue cysts.

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

Man is infected with Toxoplasma gondii through ingestion of undercooked infected meat or upon accidental ingestion of sporulated oocysts from the environment. The cat is the final host, man and most warm-blooded animals are intermediate hosts.
Most infections with T.gondii are asymptomatic, however mild (flu-like symptoms), moderate (lymphadenopathy, chronic fatigue) to severe disease (disseminated toxoplasmosis, encephalitis) may occur, the latter mainly in immunocompromized hosts.
Moreover, when infection occurs in pregnant women, toxoplasmosis may cause abortion and congenital disorders. If a woman acquires primary infection during pregnancy, Toxoplasma can be transmitted through the placenta to the foetus and lead to congenital toxoplasmosis.
A percentage of young children (1 to 14-year-old age group) may get post-natal infections with T. gondii and develop symptomatic toxoplasmosis (e.g. ocular disease). A number of cases of the disease in a 15 to 24-year-old age group may be referred to as acquired toxoplasmosis in immunocompetent patients, which may present with a range of signs, from lymphadenopathy to retinitis and uveitis. Immunocompetent individuals may often develop clinical toxoplasmosis. The majority of adult persons have acquired a degree of immunity to re-infection but can remain carrier.

Recent actions taken to control the zoonoses

Screening for toxoplasmosis during pregnancy is common. The seroprevalence in women tested before pregnancy is about 50%.

Prevention of congenital toxoplasmosis by specific hygienic measures seems to have limited impact.

2.10.2 Toxoplasma in animals

Table Toxoplasma in animals

	Source of information	Sampling unit	Units tested	Total units positive for Toxoplasma	T. gondii
Cats [1)]	ISP	Animal	166	53	53
Cattle (bovine animals) [2)]	ISP	Animal	22	21	21
Dogs [3)]	ISP	Animal	186	81	81
Goats [4)]	FASFC	Animal	20	17	17
Sheep [5)]	FASFC	Animal	62	62	62
Deer - wild - roe deer - Monitoring [6)]	ISP	Animal	73	38	38

Comments:

[1)] Diagnostic

[2)] Diagnostic

[3)] Diagnostic

[4)] Abortion protocol

[5)] Abortion protocol

[6)] BWDS

Footnote:

Presence of T. gondii is tested by Real-Time PCR.

2.11 RABIES

2.11.1 General evaluation of the national situation

A. Rabies general evaluation

History of the disease and/or infection in the country

Since the last indigenously acquired case of rabies occurred in Belgium in a bovine coming from Bastogne (province of Luxembourg) in July 1999, Belgium obtained the official status of rabies-free country in July 2001 according to the WHO recommendations (1992) and the Office Internationale des Epizooties (OIE) guidelines (1997).

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

In October 2007, Belgium lost temporary its official status of rabies free country due to a positive case of rabies in a dog, illegally imported from Morocco. The clinical diagnosis was confirmed after euthanasia of the dog.

Belgium regained its official free status of rabies on 28 October 2008.

Recent actions taken to control the zoonoses

Surveillance system and methods used.
Domestic animals with nervous symptoms that are suspected of rabies have to be notified to the Federal Agency for the Safety of the Food chain. Wildlife found dead or shot should also be declared for analysis to the Scientific Institute of Public Health, the National Reference laboratory of rabies.
Collection of dead-found bats is recommended for rabies surveillance.
Live suspected animals are killed and their brain is examined by immunofluorescence and virus cultivation in neuroblasts at the Scientific Institute of Public Health.
The high percentage of examinations of cattle is in consequence of the surveillance system for TSE in cattle: all suspected BSE cases were first examined for rabies. Rabies must be considered in the differential diagnosis of BSE, although the clinical course of rabies is usually quicker than the evolution of clinical nervous symptoms in case of BSE.

Vaccine baits (Raboral, Rhône Mérieux) were dispersed for the oral vaccination of foxes. During last vaccination campaign in April and October 2003, a zone of approximately 1.800 km2 along the German border was covered by spreading 32 000 baits by means of a helicopter (17.78 baits per km2). Since there were no more cases of rabies for the last years, vaccination of foxes by baits was stopped (end of 2003). In the southern part of the country, below the rivers Sambre and Meuse, vaccination of dogs and cats is compulsory. In addition, all pets staying on any Belgian public camping must be vaccinated.

Suggestions to the Community for the actions to be taken

It is highly recommended to report on the rabies virus type detected to be able to differentiate between the classical rabies type (genotype 1) and the European bat Lyssa virus types (unspecified or EBL 1 or EBL 2).

Bat rabies is of public health concern. The public should be made aware of the danger of human exposure to bats, especially in case of abnormal behavior of bats. Rabies is transmitted to humans and other animals through saliva, usually in a bite. Any person exposed to bats should be previously vaccinated

against rabies. Nobody should handle diseased or dead bats without protection such as gloves. Any person finding a bat behaving abnormally, in an unusual place, or under unusual circumstances, should not attempt to handle or to move the animal but should contact official authority. Education and recommendations should be given to travelers in order to reduce their risk of infection. Although dogs represent a more serious threat in many countries, yet the risk of rabies infection by bat bites also exists.

Pre-exposure vaccination should be offered to persons at risk, such as laboratory workers, veterinarians, animal handlers, international travelers. Currently available vaccines are safe and effective against both the classical rabies virus and the bat Lyssa viruses.

2.11.2 Lyssavirus (rabies) in animals

A. Rabies in dogs

Monitoring system

Sampling strategy

The brain of dogs with nervous symptoms suspected of rabies are examined by direct immunofluorescence test and virus cultivation in neuroblasts at the Scientific Institute of Public Health, the National Reference Laboratory for rabies.

Frequency of the sampling

All suspected dogs with clinical nervous symptoms are tested.

Type of specimen taken

brain

Methods of sampling (description of sampling techniques)

Small animals: head / carcass
Huge animals: brain (CNS)

Shipping and packaging conditions:
Brains are transported as soon as possible (refrigerated if possible) in a tightly sealed packet to the National Reference Laboratory. In case of carcass transportation an authorization is required.

The storage period of samples at the National Reference Laboratory for further analysis is one year.

Case definition

An animal is considered positive in case of a positive direct immunofluorescence test (Antigen detection) confirmed by cell cultivation of the virus or detection by RT-PCR or (rarely performed) by mice inoculation test (clinical observation of rabies symptoms).

Diagnostic/analytical methods used

Direct immunofluorescence for the detection of viral antigen, virus isolation in neuroblastoma cell culture, detection by RT-PCR, mouse inoculation test

Vaccination policy

In the Southern part of the country, below the rivers Sambre and Meuse, vaccination of dogs and cats is compulsory. In addition, all pets staying on any Belgian public camping must be vaccinated.

Oral vaccination of foxes by baits started in 1989.
Since there were no more cases of rabies for the last years, oral vaccination of foxes by baits was stopped by the end of 2003.

Measures in case of the positive findings or single cases

In case of positive findings national legislation has to be applied (Royal Decree of 10 February 1967, Royal Decree of 22 May 2005 and Ministerial Decree of 23 February 1967.

Notification system in place

Royal Decree of 10 February 1967, Animal Health Law of 24 March 1987 Chapter III and Royal Decree of 25 April 1988 (list of all notifiable animal diseases)

Notification of all laboratory confirmed cases to the competent Authority is mandatory.

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

In October 2007, there was a suspicion of rabies on clinical symptoms in a dog illegally imported from Morocco. The clinical diagnosis was confirmed by laboratory testing after euthanasia of the animal. Finally 32 persons and 18 pet owners with possible contact with the rabic animal were detected. Medical information and follow-up by experts of the Scientific Institute of Public Health of all 'contact' persons was realized.

Belgium regained its official free rabies status on 28 October 2008.

Table Rabies in animals

	Source of information	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified	European Bat Lyssavirus 1 (EBL 1)
Bats - wild	WIV ISP	Animal	Vlaams Gewest	56	0				
Cats	WIV ISP	Animal	Vlaams Gewest	2	0				
Cattle (bovine animals)	WIV ISP	Animal	Vlaams Gewest	105	0				
Deer	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	1	0				
Dogs	WIV ISP	Animal	Vlaams Gewest	3	0				
Foxes - wild	WIV ISP	Animal	Vlaams Gewest	68	0				
Goats	WIV ISP	Animal	Vlaams Gewest	53	0				
Sheep	WIV ISP	Animal	Vlaams Gewest	111	0				
Solipeds, domestic	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	1	0				
Bats - wild	WIV ISP	Animal	Région Wallonne	1	0				
Bats - wild	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	1	0				

Table Rabies in animals

	Source of information	Sampling unit	Region	Units tested	Total units positive for Lyssavirus (rabies)	Lyssavirus, unspecified	Classical rabies virus (genotype 1)	European Bat Lyssavirus - unspecified	European Bat Lyssavirus 1 (EBL 1)
Bats - wild - Clinical investigations [1)]	WIV ISP	Animal		1	1				1
Cats	WIV ISP	Animal	Région Wallonne	8	0				
Cats	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	3	0				
Cattle (bovine animals)	WIV ISP	Animal	Région Wallonne	105	0				
Dogs	WIV ISP	Animal	Région Wallonne	2	0				
Foxes - wild	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	35	0				
Foxes - wild	WIV ISP	Animal	Région Wallonne	11	0				
Goats	WIV ISP	Animal	Région Wallonne	4	0				
Sheep	WIV ISP	Animal	Région de Bruxelles-Capitale / Brussels Hoofdstedelijk Gewest	2	0				
Sheep	WIV ISP	Animal	Région Wallonne	30	0				
Solipeds, domestic	WIV ISP	Animal	Région Wallonne	1	0				

Table Rabies in animals

Comments:

[1)] One bat originating from Spain

Footnote:

One bat (species Eptesicus serotinus) was diagnosed positive for the rabies virus genotype 5 (European bat lyssavirus-1). The bat originated from the north of Spain and had bitten a Belgian photographer on 21 August 2010. The bat died soon after the bite, after which the photographer brought the dead bat to Belgium. Upon arrival in Belgium, the photographer submitted the bat to the NRL of Rabies (WIV-ISP) for diagnosis. The person was immediately treated with anti-rabies vaccine at the rabies centre of the WIV-ISP.

2.12 STAPHYLOCOCCUS INFECTION

2.12.1 General evaluation of the national situation

2.12.2 Staphylococcus in foodstuffs

Table Staphylococcus in Food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcus	Total units positive for S. aureus, methicillin resistant (MRSA)	S. aureus, methicillin resistant (MRSA) - spa-type t011	S. aureus, methicillin resistant (MRSA) - spa-type t108	S. aureus, methicillin resistant (MRSA) - spa-type t034	S. aureus, methicillin resistant (MRSA) - MRSA, unspecified	S. aureus
Meat from pig - minced meat	FASFC DIS823 DIS888	Batch	1g	45	0						
Meat from bovine animals - minced meat	FASFC DIS823 DIS888	Batch	1g	38	0						
Meat from broilers (Gallus gallus) - meat products	FASFC TRA416 DIS801 DIS877	Batch	1g	91	0						
Meat from turkey - meat products	FASFC TRA317	Batch	1g	1	0						
Cheeses made from cows' milk - fresh - made from pasteurised milk	FASFC TRA134 DIS818	Batch	1g	30	0						
Cheeses made from cows' milk - fresh - made from raw or low heat-treated milk	FASFC DPA008 DPA026 DIS818	Batch	1g	30	1						1
Cheeses made from cows' milk - soft and semi-soft - made from pasteurised milk	FASFC TRA314 DIS818	Batch	1g	62	1						1

Table Staphylococcus in Food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcus	Total units positive for S. aureus, methicillin resistant (MRSA)	S. aureus, methicillin resistant (MRSA) - spa-type t011	S. aureus, methicillin resistant (MRSA) - spa-type t108	S. aureus, methicillin resistant (MRSA) - spa-type t034	S. aureus, methicillin resistant (MRSA) - MRSA, unspecified	S. aureus
Cheeses made from cows' milk - soft and semi-soft - made from raw or low heat-treated milk	FASFC DPA008 DIS818 DIS849	Batch	1g	60	0						
Cheeses made from goats' milk - unspecified - made from pasteurised milk	FASFC TRA134 DIS818	Batch	1g	46	0						
Cheeses made from goats' milk - unspecified - made from raw or low heat-treated milk	FASFC DPA008 DPA011 DPA023 DIS818 DIS851	Batch	1g	45	0						
Cheeses made from sheep's milk - unspecified - made from raw or low heat-treated milk	FASFC DPA008 DPA024 DIS818	Batch	1g	42	0						
Dairy products (excluding cheeses) - butter - made from raw or low heat-treated milk	FASFC DPA009 DIS858	Batch	1g	68	4						4
Dairy products (excluding cheeses) - yoghurt	FASFC DPA007 TRA142 DIS858	Batch	1g	85	0						
Meat from bovine animals and pig - meat preparation	FASFC DIS815 DIS816	Batch	1g	240	1						1
Meat from bovine animals and pig - meat products	FASFC TRA317 TRA416 DIS801 DIS827	Batch	1g	300	1						1
Meat from bovine animals and pig - minced meat	FASFC DIS823 DIS888	Batch	1g	27	0						

Table Staphylococcus in Food

2.13 Q-FEVER

2.13.1 General evaluation of the national situation

A. Coxiella burnetii (Q-fever) general evaluation

History of the disease and/or infection in the country

In 2010, due to the problematic nature of Q-fever in the Netherlands, a monitoring of tankmilk was set up. The farms with milkgoats and milksheep were tested every month until June and every two months in the period between August and December.
For cattle, sheep and goats, in case of abortion, samples are tested against a number of possible agents including Coxiella burnetii.
The presence of Coxiella burnetii on cattle farms is known due to the presence of antibodies against Coxiella burnetii in the milk.

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

The results of the monitoring of tankmilk in 2010 did not differ compared to December 2009.

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

There is a steady state in the number of reported cases of human Q-fever.

Recent actions taken to control the zoonoses

Milk from goats or sheep herds where Coxiella burnetii was found has to be pasteurized before human consumption. The location of positive herds is reported to the human health services for the purpose of warning the medical doctors.

B. Coxiella general evaluation

History of the disease and/or infection in the country

Only limited testing was performed on individual animal level of genetic selected bulls of Artificial Insemination centers and for confirmation of clinical suspicion in case of an increased number of abortions of ruminants.

In 2010, due to the specific problems with Q-fever in the Netherlands, a monitoring of tankmilk was set up. The farms with milkgoats and milksheep were tested every month until June and every two months in the period between August and December. The presence of Coxiella burnetii on cattle farms was known due to the presence of antibodies against Coxiella burnetii in het milk.

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

The situation in Belgium remained stable in 2010.

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

There was no increase in the number of reported human cases.

2.13.2 Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella (Q-fever)	C. burnetii
Cattle (bovine animals) [1)]	DGZ, ARSIA	Animal	5254	502	502
Goats [2)]	DGZ, ARSIA	Animal	22	1	1
Sheep [3)]	DGZ, ARSIA	Animal	76	2	2
Goats - milk goats - Surveillance [4)]	FASFC	Herd	115	15	15
Sheep - milk ewes - Surveillance [5)]	FASFC	Herd	3	0	

Comments:

[1)] samples taken in case of abortion

[2)] samples taken in case of abortion

[3)] samples taken in case of abortion

[4)] tankmilk

[5)] tankmilk

Footnote:

All tests were PCR's.

2.14 CYSTICERCOSIS, TAENIOSIS

2.14.1 General evaluation of the national situation

A. Cysticerci general evaluation

History of the disease and/or infection in the country

Cattle

Taenia saginata:

2002 total 3.336 (3.317 lightly, 18 heavily contaminated)
2003 total 3.886 (3.859 lightly, 25 heavily contaminated)
2004 total 3.002 (2.981 lightly, 21 heavily contaminated)
2005 total 2.392 (2.376 lightly, 16 heavily contaminated)
2006 total 1.824 (1.796 lightly, 28 heavily contaminated)
2007 total 1.527 (1.517 lightly, 10 heavily contaminated)
2008 total 2.374 (2.356 lightly, 18 heavily contaminated)
2009 total 1.820 (1.811 lightly, 9 heavily contaminated)
2010 total 1.766 (1.756 lightly, 10 heavily contaminated)

Pigs

The Belgian pig population is free from Cysticercus cellulosae. Taenia solium (and Cysticercus cellulosae) is not autochthonous in Belgium.

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

Cysticercus bovis in muscular tissue of cattle is the larval stage of the tapeworm, Taenia saginata, a parasitic cestode of the human gut (taeniasis). Cattle can become infected by ingestion of vegetation contaminated with T. saginata eggs shed in human faeces. Risk factors are access to streams and flooding of pastures.

Humans contaminate themselves by the ingestion of raw or undercooked beef containing the larval form (cysticerci). Usually pathogenetic for humans is low. The tapeworm eggs contaminate the environment directly or through surface waters. Human carriers should be treated promptly. Strict rules for the hygienic disposal or sanitation of human faeces with a method that inactivates T. saginata eggs should be developed. The spreading of human excrement on land should not be allowed.

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

Post-mortem, macroscopic examination of carcasses of adult cattle as well as calves is routinely done in all slaughterhouses. Serologic examination is possible and confirmation of the lesions by PCR or DNA-test can be done.

Lightly contaminated carcasses are treated by freezing at -18°C for 10 days before declared fit for human consumption. Heavily contaminated carcasses are unfit for human consumption and are destroyed.

Suggestions to the Community for the actions to be taken

The introduction of serologic analyzes for the detection of cysticerci antigens in the serum of animals (cattle) should be developed. This would allow the detection of more cases than by visual inspection of carcasses at slaughterhouse.

2.15 SARCOCYSTOSIS

2.15.1 General evaluation of the national situation

A. Sarcocystis general evaluation

History of the disease and/or infection in the country

At the slaughterhouses, a small number of carcasses showing myositis eosinophilica (green coloring spots of the carcass) are detected and notified to the Federal Agency for the Safety of the Food Chain. In case of positive findings, carcasses are totally rejected and declared unfit for human consumption. In 2010, 37 cases of sarcosporidiosis in cattle were reported.

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

Sarcocystis bovihominis (bovine as intermediate host) and Sarcocystis suihominis (porcine intermediate host) occur sporadically. Domestic carnivores are hosts of the adult stage.

Humans can be a definitive host for sarcosporidiosis by ingestion of infected meat or excreted oocysts and develop symptoms like diarrhea, headache, eosinophilia, abortion, congenital disorder.
For human sarcosporidiosis there is no immunity development.
The majority of grazing animals are inappearent carriers of tissue cysts.

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

Carcasses are entirely condemned when myositis eosinophilica lesions are apparent. Myositis eosinophilica is commonly associated with sarcosporidiosis but this is still not proven!

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1 ESCHERICHIA COLI, NON-PATHOGENIC

3.1.1 General evaluation of the national situation

A. Escherichia coli general evaluation

Recent actions taken to control the zoonoses

3.1.2 Escherichia coli, non-pathogenic in foodstuffs

A. E. coli in food

Monitoring system

Sampling strategy

The hygiene of slaughtering and cutting process is watched via the evaluation of the contamination of carcasses and cutting meat by indicators of faecal contamination.

Frequency of the sampling

every week

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Broilers and laying hens carcasses are taken at slaughterhouses. At cutting plants about 200g of meat were taken.

Definition of positive finding

Action limits were established for every matrix.

Diagnostic/analytical methods used

ISO method was used to count E. coli in food.

Measures in case of the positive findings or single cases

Monitoring/Not favorable results are sent to the FBO.

3.1.3 Antimicrobial resistance in Escherichia coli, non-pathogenic

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Animals

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

Table Cut-off values used for antimicrobial susceptibility testing of Escherichia coli, non-pathogenic in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Amphenicols	Chloramphenicol		16	
Tetracyclines	Tetracycline		8	
Fluoroquinolones	Ciprofloxacin		0.03	
Quinolones	Nalidixic acid		16	
Trimethoprim	Trimethoprim		2	
Sulphonamides	Sulphonamides		256	
Aminoglycosides	Streptomycin		16	
	Gentamicin		2	
Cephalosporins	Cefotaxim		0.25	
Penicillins	Ampicillin		8	

3.2 ENTEROCOCCUS, NON-PATHOGENIC

3.2.1 General evaluation of the national situation

3.2.2 Antimicrobial resistance in Enterococcus, non-pathogenic isolates

Table Cut-off values for antibiotic resistance of E. faecalis in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	

Table Cut-off values for antibiotic resistance of E. faecalis in Animals

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecalis in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecalis in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		512	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		32	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecium in Animals

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		128	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecium in Feed

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		128	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

Table Cut-off values for antibiotic resistance of E. faecium in Food

Test Method Used	Standard methods used for testing

			Concentration (microg/ml)	Zone diameter (mm)
		Standard	Resistant >	Resistant <=
Aminoglycosides	Streptomycin		128	
	Gentamicin		32	
Amphenicols	Chloramphenicol		32	
Penicillins	Ampicillin		4	
Glycopeptides (Cyclic peptides, Polypeptides)	Vancomycin		4	
Macrolides	Erythromycin		4	
Streptogramins	Quinupristin/Dalfopristin		1	
Tetracyclines	Tetracycline		2	
Oxazolidines	Linezolid		4	

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1 ENTEROBACTER SAKAZAKII

4.1.1 General evaluation of the national situation

4.1.2 Enterobacter sakazakii in foodstuffs

A. Enterobacter sakazakii in foodstuffs

Monitoring system

Sampling strategy

Tests for Enterobacter sakazakii were performed in 10g sample.

Frequency of the sampling

Samples are taken according to the national control program or in the frame of RASFF, complaints or suspicion.

Type of specimen taken

Foodstuff intended for special nutritional uses, infant formula and other

Methods of sampling (description of sampling techniques)

The samples were taken according to Regulation (EC) No 2073/2005.

Definition of positive finding

To determine the conformity of a sample or a batch, the criteria laid down in the Regulation (EC) No 2073/2005 are applied.

Diagnostic/analytical methods used

The method is used according to Regulation (EC) No 2073/2005.

Measures in case of the positive findings or single cases

Measures to be taken in the case of a non-compliant result:
- Notification of the producer or importer
- Possibility of a counter analysis
- Destruction of the non compliant batch or single sample
- Further investigation: additional sampling, possible recall, RASFF, ...

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii	E. sakazakii
Foodstuffs intended for special nutritional uses - dried dietary foods for special medical purposes intended for infants below 6 months	FASFC DIS862	Batch	10g	145	0	
Infant formula - dried	FASFC TRA127	Batch	10g	5	0	

4.2 HISTAMINE

4.2.1 General evaluation of the national situation

4.2.2 Histamine in foodstuffs

A. Histamine in foodstuffs

Monitoring system

Sampling strategy

The reported data are test results from official surveillance performed by the Federal Agency for the Safety of the Food Chain. The sampling for histamine in fishery products is part of the risk-based national control program (random sampling) of the Federal Agency for the Safety of the Food Chain which covers the whole Member State. In 2010 a number of samples was taken outside the scope of the control program (targeted sampling): for example in case of suspicion, following complaints, follow-up of RASFF, specific Commission Decision for imported products...

The sampling population represents fishery products from fish species associated with a high amount of histidin. All samples taken in 2010 were not enzyme maturated products of the following species: tuna, mackerel, sardines, anchovy and herring. Fresh, frozen and canned (in water, in brine, in oil) products were sampled.

The samples were taken at retail, wholesale, catering and at the border inspection posts (imported products). None of the canned products are manufactured in Belgium (origin Third countries or other MS).

Frequency of the sampling

Samples are taken according to the national control program or in the frame of RASFF, complaints or suspicion.
The samples (61) were taken in fish auction halls (1), retail and wholesale(38),Border inspection posts (9), Catering companies (13)

Type of specimen taken

Fishery products

Methods of sampling (description of sampling techniques)

The samples were taken according to Regulation (EC) No 2073/2005.

In general nine samples of 150g were taken out of a batch.

In some cases only a single sample of 150g was taken.

In both cases, the same amount of product was taken for a possible counter analysis.

The samples are transported in a sealed plastic bag:
- chilled (fresh products)
- frozen (frozen products)
- at ambient temperature (canned products).

Definition of positive finding

To determine the conformity of a sample or a batch, the criteria laid down in the Regulation (EC) No 2073/2005 are applied.

Diagnostic/analytical methods used

The method used is a accredited quantitative ELISA.

Preventive measures in place

Maintenance of the cold chain (self-control) by the responsible operator
Inspections on compliance to EU regulations (GMP and inspections of the self-checking systems, by the responsible operator)

Measures in case of the positive findings or single cases

Measures to be taken in the case of a non-compliant result:
- Notification of the producer or importer
- Possibility of a counter analysis
- Destruction of the non compliant batch or single sample
- Further investigation: additional sampling, possible recall, RASFF, ...

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

Initially there were two positive findings out of 61 samples. Finally after counter analysis, there were no positive results.

Table Histamine in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units in non-conformity	<= 100 mg/kg	>100 - <= 200 mg/kg	>200 - <= 400 mg/kg	> 400 mg/kg
Fish - Fishery products from fish species associated with a high amount of histidine - not enzyme maturated [1)]	FASFC DIS 661 and TRA 410	Batch	1g	61	0	61	0	0	0

Comments:

[1)] After counter analysis, no positive findings

4.3 STAPHYLOCOCCAL ENTEROTOXINS

4.3.1 General evaluation of the national situation

4.3.2 Staphylococcal enterotoxins in foodstuffs

A. Staphylococcal enterotoxins in foodstuffs

Monitoring system

Sampling strategy

Tests Staphylococcal enterotoxins were performed in 1g of sample.

Frequency of the sampling

Samples are taken according to the national control program or in the frame of RASFF, complaints or suspicion.

Type of specimen taken

Yoghurt, cheeses, soft-ice, ice cream, milk powder and other

Methods of sampling (description of sampling techniques)

The samples were taken according to Regulation (EC) No 2073/2005.

Definition of positive finding

To determine the conformity of a sample or a batch, the criteria laid down in the Regulation (EC)No 2073/2005 are applied.

5. FOODBORNE

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.

A. Foodborne outbreaks

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

In Belgium different authorities are dealing with food-borne outbreaks:
-The Federal Agency for the Safety of the Food chain FASFC deals with safety of foodstuffs, epidemiological investigation on foodstuffs and animal health issues in case of a food-borne outbreak.
-The Communities (Flemisch, French and German speaking Community) are dealing with person related matters as human health and can start an epidemiological investigation by Public health medical inspectors in case of a food-borne outbreak.
-The Scientific Institute of Public Health IPH (National Reference Laboratory on Food-borne Outbreaks) analyses all suspected food samples, collects all data on food-borne outbreaks and gives scientific support to the FASFC officers and the Public Health Inspectors.

A national "Platform Food-borne outbreaks", approved by the National Conference of Ministers of Public Health, brings together the different competent authorities on food safety, animal health and public health. Furthermore in 2007, for a better communication, a protected web application was made available to exchange outbreak data and laboratory results in real time between the different authorities dealing with FBO. In this web-application a common file is created for each individual outbreak, and the data and laboratory results are shared between food inspectors and human health inspectors.

Data in this report came from the Federal Agency for the Safety of the Food Chain, the Flemish Community , the sentinel laboratories network for human microbiology, and the Federal Reference Centres for Food-borne outbreaks, for Clostridium botulinum, for Salmonella and Shigella and for Listeria.

Description of the types of outbreaks covered by the reporting:

A food-borne outbreak is defined as an incidence, observed under given circumstances, of two or more human cases of the same disease and/or infection, or a situation in which the observed number of human cases exceeds the expected number and where the cases are linked, or are probably linked, to the same food source (Directive 2003/99/EC, Article 2(d)). Data are collected from FASFC, the Flemish Community, the French community, the Brussels Common Community Committee, the sentinel laboratories network for human clinical microbiology, and the Federal Reference Centers for Food-borne outbreaks, Salmonella and Shigella, Listeria and C. botulinum.
The reporting includes both general and household outbreaks.
The causative agents covered are Salmonella spp., Shigella spp., Campylobacter spp., Verotoxigenic E.coli, Listeria monocytogenes, Clostridium botulinum, Staphylococcus aureus, Bacillus cereus, Clostridium perfringens, Giardia, Norovirus, enterotoxins of Staphylococcus aureus and Bacillus cereus and histamine

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

During 2010, a total of 106 outbreaks of food-borne infections and intoxications were recorded in Belgium. More than 4.211 people were ill and at least 91 persons were hospitalized. One death was reported after a Listeria monocytogenes infection but the contaminated food (raw milk farm cheeses) could not be confirmed and only one person was involved. The number of reported outbreaks are almost the same as previous years. The number of ill people was much greater due to a great water borne outbreak were more than 12.000 persons were exposed and at least 3.000 became ill.

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

In 2010 in total 18 outbreaks with strong evidence were reported. In these outbreaks the causative agent was found in the implicated food and or it was clear by descriptive epidemiological information. All other outbreaks were classified as outbreaks with weak evidence were the agent was unknown or the agent could be only detected at human level. Food borne viruses became the most frequently detected food-borne pathogen in food-borne outbreaks: 8 outbreaks were reported in total. In total 3.538 persons became ill. In three outbreaks Norovirus was not the only agent detected, co-infections were reported with Campylobacter, Bacillus cereus and other enteric bacteria and protozoa. In one case the witness meals during one week were positive for Norovirus which clearly demonstrates that someone of the kitchen personnel contaminated the food.

The second most reported agent was Salmonella (in 4 outbreaks). The origin of the infected people could not be confirmed by isolating the strain in one outbreak because of the late reporting of these outbreak. In three of these outbreaks eggs or products of eggs were at the origin of an infection with Salmonella Enteritidis.

Coagulase positive Staphylococcus spp. caused 2 of the outbreaks in 2010. Toxine A was detected in the food. No respect of the cold chain and conservation during a period at room temperature was at the origin of the toxin production.

B. cereus was the causative agent in 3 outbreaks and 28 persons became ill. In one case a cerulide producing strain could be confirmed in the rice. In the other cases the enterotoxin producing strains could be isolated and this corresponded with the diarrhea symptoms observed in the patients.
In one outbreak histamine was the reason for the outbreak after eating vegetables.

In 83% of the outbreaks no causative agent could be identified in the food. An important reason for this is the absence of leftovers of the suspected meal in most of those outbreaks. In 9 of the 88 possible outbreaks an agent was identified in the human samples but the evidence to be 'food-borne' was to weak.

Most food-borne outbreaks (47%) were due to the consumption of meals composed of different ingredients. Bovine meat and meat based products were responsible for 8.5 % of the outbreaks. Tap water was in one outbreak the origin of the infection with different enteric bacteria and protozoa. In 9% of the outbreaks the suspected food was unknown.

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

In most food-borne outbreaks (95%) the setting was known. Restaurants were the most important location of exposure, being the setting of 39 % of food-borne outbreaks in Belgium in 2010. A take away was reported in 14% of the food-borne outbreaks. 10% of the outbreaks happened at home.

Control measures or other actions taken to improve the situation

Logistic slaughtering is applied for poultry which means that poultry with a Salmonella-free certificate are slaughtered before other poultry. The vaccination of laying hens against salmonellosis, started in 2003 and is mandatory for Salmonella enteritidis and is strongly recommended for Salmonella typhimurium.

Table Foodborne Outbreaks: summarised data

	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Salmonella - S. Typhimurium	0	unknown	unknown	unknown	0	0
Salmonella - S. Enteritidis	0	unknown	unknown	unknown	4	4
Salmonella - Other serovars	1	7	1	0	0	1
Campylobacter	2	4	0	0	0	2
Listeria - Listeria monocytogenes	0	unknown	unknown	unknown	0	0
Listeria - Other Listeria	0	unknown	unknown	unknown	0	0
Yersinia	0	unknown	unknown	unknown	0	0
Escherichia coli, pathogenic -	2	6	3	0	0	2
Bacillus - B. cereus	0	unknown	unknown	unknown	2	2
Bacillus - Other Bacillus	0	unknown	unknown	unknown	0	0
Staphylococcal enterotoxins	0	unknown	unknown	unknown	2	2
Clostridium - Cl. botulinum	0	unknown	unknown	unknown	0	0
Clostridium - Cl. perfringens	0	unknown	unknown	unknown	0	0
Clostridium - Other Clostridia	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Brucella	0	unknown	unknown	unknown	0	0

	Number of outbreaks	Human cases	Hospitalized	Deaths	Strong evidence Number of Outbreaks	Total number of outbreaks
Other Bacterial agents - Shigella	0	unknown	unknown	unknown	0	0
Other Bacterial agents - Other Bacterial	0	unknown	unknown	unknown	0	0
Parasites - Trichinella	0	unknown	unknown	unknown	0	0
Parasites - Giardia	1	2	unknown	0	0	1
Parasites - Cryptosporidium	1	2	unknown	0	0	1
Parasites - Anisakis	0	unknown	unknown	unknown	0	0
Parasites - Other Parasites	0	unknown	unknown	unknown	0	0
Viruses - Norovirus	2	80	0	0	8	10
Viruses - Hepatitis viruses	0	unknown	unknown	unknown	0	0
Viruses - Other Viruses	0	unknown	unknown	unknown	0	0
Other agents - Histamine	0	unknown	unknown	unknown	1	1
Other agents - Marine biotoxins	0	unknown	unknown	unknown	0	0
Other agents - Other Agents	0	unknown	unknown	unknown	0	0
Unknown agent	80	442	11	0	0	80

Table Foodborne Outbreaks: detailed data for Bacillus

Please use CTRL for multiple selection fields

B. cereus

	Value
FBO Code	571
Number of outbreaks	1
Number of human cases	9
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Cereal products including rice and seeds/pulses (nuts, almonds)
More food vehicle information	
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

B. cereus

	Value
FBO Code	589
Number of outbreaks	1
Number of human cases	2
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Crustaceans, shellfish, molluscs and products thereof
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Other agents

Please use CTRL for multiple selection fields

Histamine

	Value
FBO Code	583
Number of outbreaks	1
Number of human cases	5
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Vegetables and juices and other products thereof
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Clinical symptoms of all human cases (children) were all 'histamine-like', shortly after consuming a puree of aubergines. In consequence of these typical clinical symptoms, left-overs of the puree and rests of aubergines out of the freezer were analyzed for the presence of histamine and enterobacteriaceae (which can induce a histamine conversion in vegetables). The number of enterobacteriaceae was high (1.6X10log4 cfu/g) in the frozen aubergine samples but low in the puree samples (due to the cooking process). Histamines were detected both in the puree and the frozen aubergines for respectively 19.3µg/g and 35.8µg/g.

Table Foodborne Outbreaks: detailed data for Salmonella

Please use CTRL for multiple selection fields

S. Enteritidis

	Value
FBO Code	548
Number of outbreaks	1
Number of human cases	8
Number of hospitalisations	7
Number of deaths	0
Food vehicle	Sheep meat and products thereof
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis

	Value
FBO Code	585
Number of outbreaks	1
Number of human cases	15
Number of hospitalisations	1
Number of deaths	0
Food vehicle	Bakery products
More food vehicle information	Tiramisu
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis

	Value
FBO Code	595
Number of outbreaks	1
Number of human cases	15
Number of hospitalisations	4
Number of deaths	0
Food vehicle	Eggs and egg products
More food vehicle information	Chocomousse
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

S. Enteritidis

	Value
FBO Code	591
Number of outbreaks	1
Number of human cases	10
Number of hospitalisations	2
Number of deaths	0
Food vehicle	Bakery products
More food vehicle information	Tiramisu
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

The following amendments were made:

Date of Modification	Row name	Column name	Old value
2012-01-05	S. Enteritidis	Food vehicle	Eggs and egg products

Date of Modification	New value
2012-01-05	Bakery products

Table Foodborne Outbreaks: detailed data for Staphylococcal enterotoxins

Please use CTRL for multiple selection fields

Enterotoxin A

	Value
FBO Code	572
Number of outbreaks	1
Number of human cases	24
Number of hospitalisations	22
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Camp, picnic
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	Bacillus cereus
Additional information	

Enterotoxin A

	Value
FBO Code	566
Number of outbreaks	1
Number of human cases	25
Number of hospitalisations	9
Number of deaths	0
Food vehicle	Broiler meat (Gallus gallus) and products thereof
More food vehicle information	
Nature of evidence	Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	Household / domestic kitchen
Setting	Household / domestic kitchen
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Storage time/temperature abuse
Mixed Outbreaks (Other Agent)	
Additional information	

Table Foodborne Outbreaks: detailed data for Viruses

Please use CTRL for multiple selection fields

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	555
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	Household / domestic kitchen
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	615
Number of outbreaks	1
Number of human cases	24
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Infected food handler
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	575
Number of outbreaks	1
Number of human cases	60
Number of hospitalisations	unknown
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Camp, picnic
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	Bacillus cereus enterotoxin +
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	524
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Sheep meat and products thereof
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Take-away or fast-food outlet
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	559
Number of outbreaks	1
Number of human cases	300
Number of hospitalisations	unknown
Number of deaths	0
Food vehicle	Pig meat and products thereof
More food vehicle information	minced meat
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	Campylobacter (longer period of illness)
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	611
Number of outbreaks	1
Number of human cases	3000
Number of hospitalisations	unknown
Number of deaths	unknown
Food vehicle	Tap water, including well water
More food vehicle information	
Nature of evidence	Analytical epidemiological evidence;Descriptive epidemiological evidence
Outbreak type	General
Setting	Disseminated cases
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Water treatment failure
Mixed Outbreaks (Other Agent)	Campylobacter Cryptospordium
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	520
Number of outbreaks	1
Number of human cases	100
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence
Outbreak type	General
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	

Calicivirus - norovirus (Norwalk-like virus)

	Value
FBO Code	587
Number of outbreaks	1
Number of human cases	18
Number of hospitalisations	0
Number of deaths	0
Food vehicle	Mixed or buffet meals
More food vehicle information	
Nature of evidence	Descriptive epidemiological evidence;Detection of causative agent in food vehicle or its component - Symptoms and onset of illness pathognomonic to causative agent
Outbreak type	General
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Unknown
Origin of food vehicle	Unknown
Contributory factors	Unknown
Mixed Outbreaks (Other Agent)	
Additional information	