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 2006

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Belgium**
Reporting Year: **2006**
Institutions and laboratories involved in reporting and monitoring:

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[1]. 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 2006. 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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[1] 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 (January - February - March) 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 localisation 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 animals of these species is only slightly decreasing what means that the total number of animals per premise is increasing. This is due to the take over of livestock animals from small holdings who are ceasing breeding activity by large farms.

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 this region is limited.

Table Susceptible animal populations

* Only if different than current reporting year

Animal species	Category of animals	Number of herds or flocks	Year*	Number of holdings	Year*	Livestock numbers (live animals)	Year*	Number of slaughtered animals	Year*
Cattle (bovine animals)	dairy cows and heifers			11838					
	meat production animals							496181	
	calves (under 1 year)							327467	
	in total			40640		2697824		823648	
Deer	farmed - in total			2021		12805		287	
Ducks	parent breeding flocks	4							
	meat production flocks	21							
	in total	25						78674	
Gallus gallus (fowl)	grandparent breeding flocks, unspecified - in total	2							
	parent breeding flocks, unspecified - in total	230							
	laying hens	472							
	broilers	978							
	in total	1682						247721072	
Geese	breeding flocks, unspecified - in total	3							
	meat production flocks	2							
	in total	5						1826	
Goats	in total			14247		43727		3036	
Guinea fowl	meat production flocks	12						57087	
Partridges	meat production flocks	2						15487	
	parent flocks	2							
Pheasants	parent flocks	5							
Pigeons	meat production flocks	1						198893	
	parent flocks	1							
Pigs	breeding animals (1)					653385			
	fattening pigs					4850501			
	in total			10631				10794757	
Rabbits	farmed - at slaughterhouse							2267343	
	wild - at game handling establishment (2)							33865	
Sheep	in total			32323		219274		148767	
Solipeds, domestic	horses - in total							10728	
Turkeys	breeding flocks, unspecified - in total	1							
	meat production flocks	40							
	in total	41						634389	

Wild boars	wild - at game handling establishment							9284	
wild	fallow deer - at game handling establishment							4506	
	roe deer - at game handling establishment (3)							6293	
	game birds - at game handling establishment							684195	
Quails	in total							1113	
Ratites (ostrich, emu, nandu)	in total							240	

(1): gilts, sows and boars
(2): and hares
(3): and other cloven-hoofed wild animals

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. Salmonellosis in humans

A. Salmonellosis in humans

Reporting system in place for the human cases

Data are obtained by a weekly updated surveillance system. The National Reference Centre for Salmonella and Shigella (NRCSS-IPH) received the human Salmonella isolates from 182 peripheral clinical laboratories (sentinel laboratories).

Diagnostic/ analytical methods used

All isolates are serotyped by slide agglutination with commercial antisera following the Kauffmann-White scheme. When necessary, additional biochemical tests were realized to confirm the identification or to differentiate between the subspecies.
Phage typing (Institute Pasteur of Brussels) and antimicrobial susceptibility testing (AST) were realised on isolates randomly sampled from the four serotypes Enteritidis, Typhimurium, Hadar and Virchow. Two additional serotypes (Brandenburg and Derby) were also randomly sampled and only tested for their antimicrobial susceptibility.
For AST, human Salmonella isolates, randomly collected from the most important serotypes, were examined for their resistance by disk diffusion to fourteen antibiotics which are of therapeutic or epidemiological interest. Antimicrobial susceptibility was determined by the disk diffusion method according to the NCCLS recommendations. The following antibiotics were tested: ampicillin (AMP), amoxicillin + clavulanic acid (AMX), cefotaxime (CTX), chloramphenicol (CHL), ciprofloxacin (CIP), gentamicin (GEN), kanamycin (KAN), nalidixic acid (NAL), streptomycin (STR), sulfonamides (SUL), tetracycline (TET), trimethoprim (TMP), trimethoprim + sulfamethoxazole (SXT).

Notification system in place

Notification of laboratory confirmed cases / National Surveillance Program

History of the disease and/ or infection in the country

Since 1987 a remarkable increase in the number of registered human salmonellosis was monitored by the National Reference Centre, with a peak of 15.774 cases in 1999. This situation was chiefly linked to the increase of Salmonella enteritidis, the most important serotype in Belgium. From 1987 to 1999, the incidence of laboratory-confirmed cases doubled to reach a value of 160/ 100.000 inhabitants in 1999.
Since then the total number of laboratory-confirmed cases fell to 14.088, 10.783, 10.075, 12.894, 9.545 and 4.875 reports in 2000, 2001, 2002, 2003, 2004 and 2005 respectively. In 2003, an increase in the total number of human salmonellosis was again recorded (28% more than in 2002). This resulted from the spectacular increase of the serotype Enteritidis in 2003 which exceeded for the first time 70% of the total representativeness.

Salmonella typhimurium, the second serotype in importance, declined from 1999 until 2001 and then remained stable in 'number of isolates'.

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

The aim of the National surveillance program is to document the occurence and trends of serovars, to detect local, regional, national or even international outbreaks, to find and eliminate the source and to suggest preventive actions to the Belgian Food Agency (FASFC). This national salmonella surveillance is also intended to rapidly interact at the international level via electronic communication (with the Enter-net international surveillance network) and will help to detect outbreaks and target future prevention strategies.

2.1.3. Salmonella in foodstuffs

A. Salmonella spp. in broiler meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, meat preparation and fillets of broilers. The carcass samples of broiler and fowl consisted of 10g with neck skin. The following contamination levels were analysed: 25g cutting or minced meat of chicken and 1g of chicken carcasses.
Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.

B. Salmonella spp. in pig meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, cuts and minced meat of pork. Sampling of pork carcasses was done by means of swabs. The following contamination levels were analysed: 25g (cutting, minced meat of pork) and 600 cm2 (pork carcasses). Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.

C. Salmonella spp. in bovine meat and products thereof

Monitoring system

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by the FASFC. More than 200 Belgian slaughterhouses, more than 100 meat cutting plants and more than 200 retail trades

representative of the Belgian production of carcasses and meat were selected.
The matrixes were carcasses, cuts and minced meat of beef.
The following contamination levels were analysed: 25g cutting or minced meat of beef.
Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.

D. Salmonella spp. in food

Monitoring system

Sampling strategy

A monitoring programme was organised 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, cuts and minced meat from pork, carcasses, cuts and meat preparation from chicken, layer carcasses and beef minced meat. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain. For most of the matrixes, approximately 100 - 300 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence. All 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, 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. 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 positive sample.

Notification system in place

See control program.

Table Salmonella in poultry meat and products thereof (Part A)

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Livingstone	S. Agona	S. Virchow	S. Indiana	S. Anatum	S. Minnesota	S. Paratyphi B	S. Infantis	S. Cleveland	S. Derby	S. Havana	S. Worthington
Meat from broilers (Gallus gallus)																				
fresh (1)	FASFC DPA019	single	25g	6432	603	27	42	94	7	10	9	11	1	2	178	15	2			
- at cutting plant - Monitoring - official sampling - objective sampling	FASFC TRA200	single	1g	293	39	2	2	6			1				4					
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 821	single	25g	40	3	1	1													
meat preparation																				
intended to be eaten cooked	TRA202	single	1g	141	3										3					
carcass																				
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling	FASFC DPA003	single	1g	69	1															

- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 820	single	25g	40	1		1													
Meat from other poultry species																				
carcass																				
- at slaughterhouse - Monitoring (2)	DPA020	single	caeca	1017	266	207	6	3	22	5						15		1	1	1
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling (3)	FASFC DPA004	single	1g	101	36	30		1	5											
Meat from poultry, unspecified																				
meat preparation																				
intended to be eaten cooked																				
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 826	single	10g	103	6										2					

(1) : at slaughterhouse - animal sample: caeca - Monitoring
(2) : laying hens
(3) : laying hens

Table Salmonella in poultry meat and products thereof (Part B)

	S. Rissen	S. Bovismorbificans	S. Brandenburg	S. Saintpaul	S. Hadar	S. Blockley	S. Bredeney	S. Senftenberg	S. Kottbus	S. Heidelberg	S. Mbandaka
Meat from broilers (Gallus gallus)											
fresh (1)		3	1	2	25	57	104	10	2	1	
- at cutting plant - Monitoring - official sampling - objective sampling						2	22				
- at retail - Monitoring - official sampling - objective sampling							1				
meat preparation											
intended to be eaten cooked											
carcass											
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling							1				
- at retail - Monitoring - official sampling - objective sampling											
Meat from other poultry species											
carcass											

- at slaughterhouse - Monitoring (2)	1				1			1			1
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling (3)											
Meat from poultry, unspecified											
meat preparation intended to be eaten cooked											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling							4				

(1) : at slaughterhouse - animal sample: caeca - Monitoring
(2) : laying hens
(3) : laying hens

Table Salmonella in milk and dairy products

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Milk, cows'								
raw								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 016	single	25ml	36	0			
pasteurised milk								
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 115	single	25ml	18	0			
Milk, goats'								
raw								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 011	single	25ml	40	0			
Milk, sheep's								
raw								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 011	single	25ml	10	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 008	single	25g	194	0			
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 133	single	25g	18	0			
made from pasteurised milk								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 022	single	25g	24	0			

- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 134	single	25g	52	0			
unspecified								
made from pasteurised milk								
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 818	single	25	114	0			
made from raw or low heat-treated milk								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns soft, semisoft and fresh cheese.)	FASFC DIS 849	single	25	98	0			
Cheeses made from goats' milk								
unspecified								
made from raw or low heat-treated milk								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 851	single	25	10	0			
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 023	single	25g	12	0			
Cheeses made from sheep's milk								
unspecified								
made from raw or low heat-treated milk								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 850	single	25	10	0			
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 024	single	25g	7	0			
Dairy products (excluding cheeses)								
butter								
made from raw or low heat-treated milk								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 858	single	25	16	0			

- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 009	single	25g	30	0			
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 151	single	25g	31	0			
cream								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 025	single	25g	10	0			
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 184	single	25g	10	0			
milk powder and whey powder								
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 123	single	25g	20	0			
ice-cream								
- at retail - Monitoring - official sampling - objective sampling (It concerns soft ice.)	FASFC DIS 804	single	25	49	0			
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 010	single	25g	10	0			
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 160	single	25g	10	0			
yoghurt								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 007	single	25g	23	0			
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 142	single	25g	21	0			
dairy desserts								
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 190	single	25g	19	0			
Milk, mares'								
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 012	single	25ml	23	0			

Table Salmonella in red meat and products thereof

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Mbandaka	S. Derby	S. Indiana
Meat from pig											
fresh	FASFC TRA306	single	25g	328	8		1	2		5	
minced meat											
intended to be eaten raw	FASFC TRA303	single	25g	83	1					1	
intended to be eaten cooked	FASFC TRA303	single	10g	59	4		2			2	
meat products											
raw and intended to be eaten raw											
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 860	single	25g	21	0						
Meat from bovine animals											
fresh											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns carpaccio.)	FASFC DIS 810	single	25g	110	0						
minced meat											
intended to be eaten raw	FASFC TRA304	single	25g	75	1		1				
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns unprepared steak tartare (filet americain nature).)	FASFC DIS 816	single	25g	35	0						
meat preparation											
intended to be eaten raw											

- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns prepared filet americain.)	FASFC DIS 815	single	25g	124	0						
carcass											
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling - objective sampling	FASFC DPA001	single	swabs 1600 cm2	69	0						
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)											
carcass											
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling - objective sampling	FASFC DPA002	single	swabs 600cm2	154	11		4	2	1	4	
Meat from other animal species or not specified											
meat preparation											
intended to be eaten cooked											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 846	single	10g	38	0						
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 312	single	10g	82	2		1				1
minced meat											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 823	single	25g	86	1		1				

Table Salmonella in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Egg products								
liquid								
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 105	single	25g	60	0			
dried								
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 105	single	25g	75	0			
Crustaceans								
unspecified								
cooked - at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 852	single	25g	61	1			1
shrimps								
raw								
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 811	single	10g	38	0			
Molluscan shellfish								
cooked								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 800	single	25g	20	0			
Live bivalve molluscs								

- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 806	single	25g	92	0			
Infant formula								
dried								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 803	single	25g	57	0			
Foodstuffs intended for special nutritional uses								
dried dietary foods for special medical purposes intended for infants below 6 months								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 862	single	25g	62	0			
Vegetables								
pre-cut								
ready-to-eat								
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 813	single	25g	87	0			
non-precut								
- at retail - Monitoring - official sampling - objective sampling (It concerns leafy vegetables.)	FASFC DIS 841	single	25g	55	0			
Mushrooms								
- at retail - Monitoring - official sampling - objective sampling (1)	FASFC DIS 812	single	25g	52	0			
Fruits								
products								
dried								
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 836	single	25g	81	0			
non-precut								
- at retail - Monitoring - official sampling - objective sampling (It concerns small red fruits.)	FASFC DIS 855	single	25g	38	0			

(1) : It concerns dried mushrooms.

2.1.4. Salmonella in animals

A. Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens

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 16 weeks and every 2 weeks during production. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

Laying hens flocks

There is no official surveillance programme for layers. The farmer is responsible for a voluntary sampling at entrance. Sampling of flocks on farms with more than 5000 birds is required within 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): Rearing period

At the age of 16 weeks

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

Every 2 weeks

Laying hens: Day-old chicks

Other: not compulsory

Laying hens: Before slaughter at farm

Other: every flock on farms > 5000 birds

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

Faeces

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

Faeces

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Production period

Faeces

Laying hens: 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 (5 by 5 cm) of the inner linings of deliveryboxes 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 analyzed separately.
In addition, 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

Two pooled faeces sample of 60 X 1g or 2 pair of overshoes are taken at the age of 16 weeks by technicians of DGZ and ARSIA. The sample is analyzed in the laboratories of DGZ and ARSIA.

Breeding flocks: Production period

Every six weeks, two pooled faeces sample of 60 X 1g or 2 pair of overshoes are taken of every flock in production by technicians of DGZ and ARSIA. Every two weeks each flock is sampled on voluntary basis with 2 pair of overshoes. The samples are

immediately analyzed in the laboratories of DGZ and ARSIA.

Laying hens: Day-old chicks

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

Laying hens: Production period

Faeces samples are taken by the owner from the delivery boxes on a voluntary basis. A sample made of 60 x 1g 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.

Laying hens: 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 overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample. 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 or Typhimurium is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples are taken by or under the authority of the competent authority. The result of the confirmation samples are binding.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample taken by or under the authority of the Federal Agency for the Safety of the Food Chain. A flock is considered positive as soon as one sample is positive. If a sample taken by the farmer is positive, new samples are taken by or under the authority of the competent authority for confirmation. The result of the confirmation samples are binding.

Laying hens: Day-old chicks

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

Laying hens: Rearing period

A sample is considered positive if Salmonella Enteritidis 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

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Laying hens: Day-old chicks

Bacteriological method: ISO 6579:2002

Laying hens: Production period

Bacteriological method: ISO 6579:2002

Laying hens: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Laying hens: At slaughter

Bacteriological method: ISO 6579:2002

Vaccination policy

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

Strongly recommended for parent flocks. Strongly discouraged for grand parent flocks and elite flocks.

Laying hens flocks

Strongly recommended.

Other preventive measures than vaccination in place

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

Health qualification system (e.g. infrastructure, management).

Laying hens flocks

Health qualification system (e.g. infrastructure, management).

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 Directive 92/ 117/ EEC.

Laying hens flocks

There is no national or regional control programme for Salmonella in laying hens. The sanitary qualification for farms with more than 5000 birds requires an exit sampling for Salmonella in general, within 3 weeks of slaughter.

Measures in case of the positive findings or single cases

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

1) Incubation of hatching eggs is prohibited.
2) Incubated hatching eggs are removed and destroyed.
3) Not yet incubated hatching eggs may be pasteurized.
4) Positive breeding flock is slaughtered.
5) Cleaning and desinfection of housing after removal of the breeding flock.

Laying hens flocks

1) Cleaning and desinfection of housing after removal of the positive flock.

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.

Results of the investigation

In the parent flocks, 13 flocks of day-old chicks were tested of which none were positive for Salmonella. All flocks tested negative at 16 weeks and during production. Only the total number of

sampled breeding flocks is known. The differentiation between egg production and meat production is not made.
In laying hen flocks within 3 weeks before slaughter, 34 out of 844 samples were positive for Salmonella, 33 out of 676 flocks and 32 out of 349 farms were positive for Salmonella.

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

Layer breeders were free of Salmonella in 2005 and 2006. In 2004, 5% of flocks in production were positive, of which one Salmonella Infantis.
In 2004, 27% of laying hen flocks were positive for Salmonella. In 2005 about 6% of laying hen flocks were positive. This dramatic decrease is partly due to the recommended vaccination.

B. Salmonella spp. in Gallus gallus - breeding flocks for meat production and broiler 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 16 weeks and every 2 weeks during production. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

Broiler flocks

There is no official surveillance programme for broilers. It is compulsory to sample, for Salmonella in general, all flocks from farms with more than 5000 birds in the last three weeks before slaughter. Flocks from farms with less than 5000 birds are sampled voluntarily.
There is also a voluntary sampling of day-old chicks (health qualification A).

Frequency of the sampling

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

Every flock is sampled

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

At the age of 16 weeks

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

Every 2 weeks

Broiler flocks: Day-old chicks

Other: not compulsory

Broiler flocks: Before slaughter at farm

Every hatch is sampled on farm with > 5000 birds

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

Faeces

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

Faeces

Broiler flocks: Day-old chicks

Internal linings of delivery boxes

Broiler 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 (5 by 5 cm) of the inner linings of deliveryboxes 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 analyzed separately.
In addition, 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

Two pooled faeces sample of 60 X 1g or 2 pair of overshoes are taken at the age of 16 weeks by technicians of DGZ and ARSIA. The sample is analyzed in the laboratories of DGZ and ARSIA.

Breeding flocks: Production period

Every six weeks, one or two pooled faeces sample of 60 X 1g or 2 pair of overshoes are taken of every flock in production by technicians of DGZ and ARSIA. Every two weeks each flock is sampled on voluntary basis with 2 pair of overshoes. The samples are immediately analyzed in the laboratories of DGZ and ARSIA.

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

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 overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

Case definition

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium 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 or Typhimurium is isolated. A flock is considered positive as soon as one sample is positive. If the farmer requests a confirmation sampling, new samples are taken by or under the authority of the competent authority. The result of the confirmation samples are binding.

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

A sample is considered positive if Salmonella Enteritidis or Typhimurium is isolated from a sample taken by or under the authority of the Federal Agency for the Safety of the Food Chain. A flock is considered positive as soon as one sample is positive. If a sample taken by the farmer is positive, new samples are taken by or under the authority of the competent authority for confirmation. The result of the confirmation samples are binding.

Broiler flocks: Day-old chicks

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

Diagnostic/ analytical methods used

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

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

Bacteriological method: ISO 6579:2002

Broiler flocks: Day-old chicks

Bacteriological method: ISO 6579:2002

Broiler flocks: Before slaughter at farm

Bacteriological method: ISO 6579:2002

Vaccination policy

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

Strongly recommended for parent flocks. Strongly discouraged for grand-parent and elite flocks.

Other preventive measures than vaccination in place

Broiler flocks

Health qualification system (e.g. infrastructure, management).

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 Directive 92/ 117/ EEC.

Broiler flocks

There is no national or regional control programme for Salmonella in broiler flocks. The sanitairy qualification for farms with more than 5000 birds requires an exit sampling for Salmonella in general, within 3 weeks of slaughter.

Measures in case of the positive findings or single cases

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

Positive flocks are destroyed.

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

Positive flocks are destroyed or slaughtered.

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

1) Incubation of hatching eggs is prohibited.
2) Incubated hatching eggs are removed and destroyed.
3) Not yet incubated hatching eggs may be pasteurized.
4) Positive breeding flock is slaughtered.
5) Cleaning and desinfection of housing after removal of the breeding flock.

Broiler flocks: Day-old chicks

No measures apply for positive flocks.

Broiler flocks: Before slaughter at farm

If a flock is Salmonella positive, it is slaughtered at the end of the day (logistic slaughter).

Notification system in place

A notification system is in place since the first of Januari 2004.

Results of the investigation

For the meat production line, 112 flocks of day-old chicks were tested, none were positive for Salmonella. In total 188 (meat and egg production) rearing flocks were tested, none were positive for Salmonella. During production, 558 flocks were tested (meat and egg production) of which none were positive for S. Enteritidis, Typhimurium, Hadar, Infantis and Virchow.
The results of the sampling within 3 weeks of slaughter, 444 of 15525 samples were positive for Salmonella, 312 out of 8593 flocks and 162 out of 1065 farms were positive for Salmonella.

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

During rearing and production S. Enteritidis and S. typhimurium was not found. In broiler breeders, the Salmonella isolates belonged to a wide range of serotypes.

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

Monitoring system

Sampling strategy

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

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 the age of 26 weeks and within the last 3 weeks before slaughter.

Meat production flocks

If the holding has a capacity of more than 5000 birds (Health Qualification B), all flocks are sampled within three weeks of 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

At the age of 26 weeks

Meat production flocks: Day-old chicks

Other: not mandatory

Meat production flocks: Before slaughter at farm

Every flock is sampled

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 (5 by 5 cm) of the inner linings of deliveryboxes 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 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.
At 26 weeks, 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. The samples have to reach an accredited laboratory within 48 hours of sampling.

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 overboots, pooled. The samples have to reach an accredited laboratory within 48 hours.

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

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

Bacteriological method: 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

Case definition

A flock is positive if Salmonella is found.

Vaccination policy

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

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

Health Qualification A: infrastructural and management obligations.

Meat production flocks

Health Qualification B: infrastructural and management obligations.

Measures in case of the positive findings or single cases

Only measures are taken at time of slaughter, if Salmonella positive, a flock is slaughtered at the end of the day (logistic slaughter).

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

Two breeding flocks were tested negative for Salmonella as one day chicks and during production. One of the 13 meat producing flocks tested was positive for Salmonella Stanleyville within 3 weeks of slaughter.

D. 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

Other: not mandatory

Meat production flocks: Before slaughter at farm

3 weeks prior to slaughter

Type of specimen taken

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

Internal linings of delivery boxes

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

Bacteriological method: 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 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. 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. 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 were tested.

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 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.

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

Other: not mandatory

Meat production flocks: Before slaughter at farm

Every flock is sampled

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 deliveryboxes 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 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 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 (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 overboots, 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

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

Two breeding flocks were tested, neither was positive for Salmonella.
24 meat production flocks were tested, 4 were positive for Salmonella, 1 for Salmonella Kottbus, 2 for Salmonella Indiana and 1 for Salmonella Typhimurium.

F. Salmonella spp. in pigs

Monitoring system

Sampling strategy

Fattening herds

Blood samples from fattening pigs taken in the framework of the monitoring of Aujeszky's disease, are also analysed for Salmonella.

Frequency of the sampling

Fattening herds at farm

Every 4 months

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, 1 to 12 bloodsamples are taken of the fattening pigs.

Case definition

Fattening herds at farm

The definition of a case is set in 2007.

Vaccination policy

Breeding herds

In 2006, no vaccine was authorized in Belgium for the vaccination of pigs against Salmonellosis.

Multiplying herds

In 2006, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Fattening herds

In 2006, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Measures in case of the positive findings or single cases

At this stage, since 'positive' had not been defined yet, no measures were taken.

Results of the investigation

207.820 serological analyses were performed. 19.950 samples had a S/ P ratio greater than 1 (9.6%).

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

The results of the serological tests demonstrate a slow decrease compared to 2005.

G. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

There was no official monitoring of cattle in 2006 in Belgium. Isolates were diagnostic samples sent to the NRL Salmonella, animal health, for serotyping.

Vaccination policy

In 2006, no vaccine was authorized for the vaccination of cattle against salmonellosis.

Table Salmonella in breeding flocks of Gallus gallus

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Mbandaka	S. Rissen	S. Braenderup	S. Senftenberg	S. Agona	S. Schwarzengrund	S. Panama	S. Anatum
Gallus gallus (fowl)															
parent breeding flocks for egg production line															
day-old chicks	DGZ	flock	2	0											
during rearing period	DGZ	flock	1	0											
during production period	DGZ	flock	32	0											
grandparent breeding flocks for meat production line	ARSIA	flock	3	0											
parent breeding flocks for meat production line															
day-old chicks	DGZ/ ARSIA	flock	109	0											
during rearing period	DGZ/ ARSIA	flock	161	0											
during production period	DGZ/ ARSIA	flock	454	13	0	0	0	2	1	2	2	2	1	1	2
parent breeding flocks, unspecified															

day-old chicks	DGZ	flock	11	0										
during rearing period	DGZ	flock	26	0										
during production period	DGZ	flock	72	0										

Table Salmonella in other poultry

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Kottbus	S. Stanleyville	S. Indiana
Gallus gallus (fowl)										
laying hens										
day-old chicks	External Labs	flock	181	0						
during rearing period	External Labs	flock	40	0						
during production period	External Labs	flock	676	33			33			
broilers										
day-old chicks	External Labs	flock	5003	16			16			
during rearing period	External Labs	flock	8593	312			312			
Ducks										
breeding flocks	ARSIA	flock	2	0						
meat production flocks	ARSIA	flock	24	4		1		1		2
Turkeys										
breeding flocks	DGZ	flock	2	0						
meat production flocks	DGZ/ ARSIA	flock	13	2				1	1	
Partridges										
parent flocks	DGZ	flock	2	0						

Table Salmonella in other birds

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Guinea fowl	DGZ	flock	1	0			

Table Salmonella in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Pigs							
fattening pigs	DGZ/ ARSIA	animal	207820	19950			19950

Footnote

The blood samples from fattening pigs that were taken in the framework of the monitoring of Aujeszky disease, were also analysed for Salmonella. Blood samples from pigs were taken every 4 months. Depending on the number of pigs in the farm, 1 to 12 blood samples were taken ad random. The analysis for Salmonella specific antibodies was done in the veterinary laboratories ARSIA and DGZ by an indirect ELISA. The results of the tests are reported as SP-ratio's.
The aim of the surveillance programme is to determine the 10% of pig farms with the highest Salmonella prevalence and the identification of Salmonella infection risk factors.

2.1.5. Salmonella in feedingstuffs

Table Salmonella in feed material of animal origin

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	S. Livingstone
Feed material of land animal origin									
dairy products	FASFC	single	25g	2	0				
meat and bone meal	FASFC	single	25g	23	1				1
poultry offal meal	FASFC	single	25g	1	0				
feather meal	FASFC	single	25g	1	0				
blood meal	FASFC	single	25g	3	0				
animal fat	FASFC	single	25g	9	0				
egg powder	FASFC	single	25g	2	0				

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Tennessee	S. Anatum
Feed material of cereal grain origin										
maize	FASFC	single	25g	1	0					
other cereal grain derived	FASFC	single	25g	1	0					
Feed material of oil seed or fruit origin										
rape seed derived	FASFC	single	25g	24	1				1	
palm kernel derived	FASFC	single	25g	2	0					
soya (bean) derived	FASFC	single	25g	58	1					1
sunflower seed derived	FASFC	single	25g	22	0					
linseed derived	FASFC	single	25g	10	0					
other oil seeds derived	FASFC	single	25g	19	0					

Table Salmonella in compound feedingstuffs

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Typhimurium	S. Enteritidis	Salmonella spp., unspecified	S. Mbandaka
Compound feedingstuffs for cattle									
final product	FASFC	single	25g	3	0				
Compound feedingstuffs for pigs									
final product	FASFC	single	25g	20	0				
Compound feedingstuffs for poultry (non specified)									
final product	FASFC	single	25g	44	0				
Compound feedingstuffs for poultry -breeders									
final product	FASFC	single	25g	8	1				1
Compound feedingstuffs for poultry - laying hens									
final product	FASFC	single	25g	27	0				
Compund feedingstuffs for poultry - broilers									
final product	FASFC	single	25g	35	0				
Pet food									
dog snacks (pig ears, chewing bones)	FASFC	single	25g	1	0				
Compound feedingstuffs for sheep									
final product	FASFC	single	25g	1	0				
Compound feedingstuffs, not specified	FASFC	single	25g	28	0				
Complementary feedingstuffs									
final product	FASFC	single	25g	130	0				

2.1.6. Salmonella serovars and phagetype distribution

The methods of collecting, isolating and testing of the Salmonella isolates are described in the chapters above respectively for each animal species, foodstuffs and humans. The serotype and phagetype distributions can be used to investigate the sources of the Salmonella infections in humans. Findings of same serovars and phagetypes in human cases and in foodstuffs or animals may indicate that the food category or animal species in question serves as a source of human infections. However as information is not available from all potential sources of infections, conclusions have to be drawn with caution.

Table Salmonella serovars in animals

Serovars		Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Other poultry	
Sources of isolates (*)		M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		28	271		583			5
Number of isolates serotyped	N=	0	28	271	0	583	0	0	5
Number of isolates per type									
S. Agona				3		16			
S. Anatum				3		5			
S. Bareilly						1			
S. Blockley						30			
S. Bovismorbificans				1		2			
S. Braenderup				1		5			
S. Brandenburg				7		2			
S. Bredeney						79			
S. Cerro						1			
S. Cleveland						1			
S. Cubana						2			
S. Derby				24		1			
S. Dublin			15						
S. Duisburg						1			
S. Enteritidis				6		158			
S. Goldcoast				2					
S. Hadar						23			

S. Havana					1			
S. Hessarek								1
S. Indiana					6			
S. Infantis			5		15			
S. Kentucky					2			
S. Kottbus					1			
S. Lexington			2					
S. Livingstone			5		11			
S. London			3					
S. Mbandaka					5			
S. Minnesota					2			
S. Oranienburg					1			
S. Ouakam			1					
S. Panama		1						
S. Paratyphi B (1)					13			
S. Rissen			5		6			
S. Saintpaul					2			
S. Senftenberg					11			
S. Stanley			1					
S. Stanleyville					1			
S. Typhimurium		11	185		42			4
S. Virchow			1		16			
S. Worthington					1			
S. Paratyphi B var. Java					89			
S. group B		1	11		4			
Not typeable			3		24			
S. group E1, monophasic strain			2		2			
S. group C2, monophasic strain					1			

(1) : Tartrate negative

Footnote

(*) M : Monitoring, C : Clinical

2.1.7. Antimicrobial resistance in Salmonella isolates

Antimicrobial resistance is the ability of certain microorganisms to survive or grow in the presence of a given concentration of antimicrobial agent that usually would kill or inhibit the microorganism species in question. Antimicrobial resistant Salmonella strains may be transferred from animals or foodstuffs to humans.

A. Antimicrobial resistance in Salmonella in cattle

Sampling strategy used in monitoring

Type of specimen taken

Laboratory findings of the National Reference Laboratory Salmonella, animal health.

Methods of sampling (description of sampling techniques)

Diagnostic samples sent to NRL.

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Breakpoints used in testing

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

Control program/ mechanisms

The control program/ strategies in place

There was no monitoring programme for Salmonella in cattle in 2006.

Results of the investigation

Obviously, the resistance of Salmonella strains isolated from a certain origin is reflected by the resistance of the serotypes most prevalent in the corresponding samples. Therefore, Salmonella from cattle are relatively less susceptible in comparison with those from other animal origin.

B. 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.

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

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

Control program/ mechanisms

The control program/ strategies in place

There was a monitoring programme for Salmonella in pigs in 2006.

C. Antimicrobial resistance in Salmonella in poultry

Sampling strategy used in monitoring

Methods of sampling (description of sampling techniques)

Analysis of diagnostic samples sent to the National Reference Laboratory.

Methods used for collecting data

All requests to the CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA - CERVA was done under Beltest accreditation conditions (EN 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

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

D. Antimicrobial resistance in Salmonella in foodstuff derived from cattle

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(microg / ml)
Ampicillin 8 – 32
Ceftriaxon 8 – 64
Streptomycin 8 – 32
Kanamycin 16 – 64
Tetracycline 4 – 16
Sulfamethoxazole 256 – 512

Trimethoprim 8 – 16
Trimethoprim - sulfonamides 2 – 4
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Chloramphenicol 8 – 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

E. 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(microg / ml)
Ampicillin 8 – 32
Ceftriaxon 8 – 64
Streptomycin 8 – 32
Kanamycin 16 – 64
Tetracycline 4 – 16
Sulfamethoxazole 256 – 512
Trimethoprim 8 – 16
Trimethoprim - sulfonamides 2 – 4
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Chloramphenicol 8 – 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

In total 21 Salmonella strains from pork were tested for their susceptibility. Salmonella Typhimurium (10) and Salmonella Derby (7) are the two most frequently isolated serotypes from pork. In total 57% of the strains were sensitive to all tested antibiotics. A high degree of resistance was determined for sulfamethoxazole 24%, streptomycin 19% and tetracycline, 38%. No resistance was noticed to ceftriaxon, ciprofloxacin, kanamycin and nalidixic acid. Only 1 strain was resistant against chloramphenicol. Multi resistance was observed in 19% of the strains (> 4 antimicrobials). In comparison with 2005 a decrease in antimicrobial resistance was observed.

F. 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(microg / ml)
Ampicillin 8 – 32
Ceftriaxon 8 – 64
Streptomycin 8 – 32
Kanamycin 16 – 64
Tetracycline 4 – 16
Sulfamethoxazole 256 – 512
Trimethoprim 8 – 16
Trimethoprim - sulfonamides 2 – 4
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Chloramphenicol 8 – 32
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

Antimicrobial resistance in strains isolated from poultry meat.
In 2006, 132 Salmonella enterica isolates from poultry meat were tested for their antimicrobial susceptibility. Of all tested strains 70% were sensitive for all tested antibiotics. Most resistance was found to sulfamethoxazole (14%), tetracycline (14%), streptomycin (13%) trimethoprim and trimethoprim+sulfonamides (15%), ampicillin (14%) and nalidixic acid (11%). Chloramphenicol resistance was observed in 7% of the Salmonella strains isolated from poultry meat. Four strains (3%) were resistant against the cephalosporin ceftriaxon. No resistance was found for ciprofloxacin and kanamycin. From the Salmonella isolates from broiler the percentage of resistance decreased for almost all the antibiotics tested except for ceftriaxon were an increase in the percentage resistance was noticed in comparison with 2005.
For 2006, 51 Salmonella Enteritidis isolates from poultry meat were tested for their susceptibility to all antimicrobials. The resistance in this serotype is very low as was found in previous years. Only two strains showed resistance, one against ampicillin and the other strain against streptomycin and nalidixic acid.
All Salmonella Paratyphi B (n=9) isolates were resistant against at least one or more antimicrobials. The serotypes Agona (1) Derby (1) and Infantis (7) were fully sensitive against all tested antimicrobials.

G. 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
Ceftriaxon
Streptomycin
Kanamycin
Tetracycline
Sulfamethoxazole
Trimethoprim
Trimethoprim - sulfonamides
Nalidixic acid
Ciprofloxacin
Chloramphenicol

Breakpoints used in testing

Minimum Inhibitory Concentrations (MIC) were determined by the use of E-test following the NCCLS standards.
The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 – 32
Ceftriaxon 8 – 64
Streptomycin 8 – 32
Kanamycin 16 – 64
Tetracycline 4 – 16
Sulfamethoxazole 256 – 512
Trimethoprim 8 – 16
Trimethoprim - sulfonamides 2 – 4
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Chloramphenicol 8 – 32

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

Sampling strategy used in monitoring

Methods used for collecting data

All requests to the CODA-CERVA for isolation of Salmonella and for typing of Salmonella

strains were routinely encoded in the Laboratory Management Information System (LIMS). The analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance are based on the results registered in the LIMS files that were created in 2004.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme. In case no unequivocal type was identified, strains were sent to the Scientific Institute for Public Health - Louis Pasteur (IPH) in Brussels for serotyping. Both isolation and serotyping at the CODA-CERVA was done under Beltest accreditation conditions (EN 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
For all susceptibility tests Neo-Sensitabs from Rosco were used according to the providers instructions

Results of the investigation

The susceptibility of 1 278 Salmonella strains was tested.
A total of 839 Salmonella isolates (65.6%) was fully susceptible to all antimicrobial drugs tested. Most resistance was found against Ap (24.5%), Su (22.2%), St (15.3%), Tc (14.6%), Nal (12.8%) and TSu (11.3%). Sixty-four strains were found resistant against Cm (5.0%); about 62% of these isolates were also resistant against Ff. Moreover, 55 isolates were found Cef resistant (4.3%). These cephalosporin resistant strains (n=55) only originated from poultry (n=52) and from food (n=3). In addition, nine Enr resistant strains (0.7%) (seven Salmonella Typhimurium, one Group E1-E2-E3 and one non typable) were detected. Finally, 5 neomycin resistant strains were found. All the isolates were found sensitive to gentamicin.
Most (95,5%) Salmonella Agona isolates (n=66) were fully susceptible for all antimicrobials tested.
About 46.7% of Salmonella Blockley isolates (n=30; all from poultry) were completely sensitive, but 12 isolates had profile Ap Nal Su Tc TSu.
Most of Salmonella Derby strains (n=28) were sensitive (82.1%), although some resistance against Su

(17.9%), St (10.7%) and TSu (10.7%) was noticed.
As for Salmonella Dublin isolates (n=15; all from cattle), 53.3% were found completely susceptible. Resistance against Su (33.3%), Cm (33.3%) and Nal (26.7%) was noticed.
Most Salmonella Enteritidis isolates (n=165) were susceptible (93.9%). Some resistance was found against Nal (3.6%; 6 isolates) and against Ap (1.8%).
All Salmonella Hadar (n=27) strains were found resistant against Nal (100%). In addition, Tc (85.2%) and Ap (51,9) were frequently found; most strains (51.9%; 14 isolates) were resistant to all three antimicrobials.
Half of the tested Salmonella Indiana strains (n=6; all from broilers) were fully susceptible. Three had the profile Ap Cm Tc Su TSu.
About half of the Salmonella Infantis strains (n=24) were fully susceptible (58.3%). Strains were mainly resistant against Ap (41.7%), Cef (25.0%) and St (16.7%). Some isolates (8.3%) were Nal resistant.
As for Salmonella Paratyphi B (all strains originated from broilers or from food with chicken), tartrate positive (i.e. var. Java;) and tartrate negative strains seem to have slightly different antibiotic resistance profiles. Salmonella Paratyphi B var. Java (n=90) were in 90% of cases resistant to one or more antibiotic, with most resistance against Ap (72.2%), St, Su and TSu (all three about 66%) and Nal (55.6%). Fourty (44.4%) of the isolates showed profile Ap St Su TSu. As for Salmonella Paratyphi B, tartrate negative isolates (n=14), 21.4% were fully sensitive, and especially Ap, Su, TSu and Nal resistance (all 57.1%) was registered. Profile Ap Su TSu was most abundant (35.7%).
About 54.6% of Salmonella Typhimurium isolates (n=174) were found susceptible; classic variant (O5+) strains were found slightly more often susceptible (35.9%) than Copenhagen variant (O5-)isolates (31.6%). The multiresistance profile Ap St Tc Su was encountered in only 12.6% of O5+, whereas this profile could be detected in 44.7% of O5- isolates. Pentaresistance Ap St Tc Su Cm in Classic and Copenhagen variants reached 7.1% and 26.3%, respectively.
All of the Salmonella Virchow isolates (n=25) were resistant to Nal (100%). Also Ap (36.0%) and Cef (20.0%) resistances were noteworthy.
Some 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 S. Enteritidis in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to	S. Enteritidis Meat from poultry, unspecified - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	51

Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	51	0	0	0	0	0	0	11	32	8	0	0	0	0	0	0	0	0	0	0		
Amphenicols																						
Chloramphenicol	51	0	0	0	0	0	0	4	8	36	3	0	0	0	0	0	0	0	0	0		
Florfenicol	0	0																				
Cephalosporins																						
3rd generation cephalosporins	0	0																				
Ceftriaxon	51	0	5	1	37	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	51	0	49	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
Enrofloxacin	0	0																				
Quinolones																						
Nalidixic acid	51	1	0	0	0	0	0	0	4	42	4	0	0	0	0	1	0	0	0	0		
Sulfonamides																						
Sulfonamide	51	0	0	0	0	0	0	0	0	0	0	0	2	13	35	1	0	0	0	0		
Trimethoprim	51	0	0	0	1	29	20	0	1	0	0	0	0	0	0	0	0	0	0	0		
Aminoglycosides																						
Streptomycin	51	1	0	0	0	0	0	9	40	1	0	0	0	0	0	1	0	0	0	0		
Gentamicin	0	0																				
Neomycin	0	0																				
Kanamycin	51	0	0	0	0	0	0	6	35	9	1	0	0	0	0	0	0	0	0	0		
Penicillins																						
Ampicillin	51	1	0	0	1	3	0	31	15	0	0	0	1	0	0	0	0	0	0	0		
Trimethoprim + sulfonamides	51	0	0	4	38	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0		

Table Antimicrobial susceptibility testing of Salmonella in animals

n = Number of resistant isolates

Salmonella spp.

	Cattle (bovine animals)		Pigs		Gallus gallus (fowl)		Turkeys	
Isolates out of a monitoring programme	no		yes		yes			
Number of isolates available in the laboratory	28		271		583			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin	28	10	271	84	583	74		
Amphenicols								
Chloramphenicol	28	12	271	33	583	16		
Florfenicol	28	5	271	15	583	5		
Cephalosporins								
Ceftiofur	28	0	271	0	583	52		
Fluoroquinolones								
Enrofloxacin	28	0	271	8	583	1		
Quinolones								
Nalidixic acid	28	6	271	10	583	131		
Sulfonamides								
Sulfonamide	28	15	271	115	583	140		
Aminoglycosides								
Streptomycin	28	10	271	72	583	98		
Gentamicin	28	0	271	0	583	0		
Neomycin	28	1	271	1	583	2		
Penicillins								
Ampicillin	28	11	271	116	583	173		
Trimethoprim + sulfonamides	28	1	271	31	583	104		
Fully sensitive	28	10	271	120	583	345		

Table Antimicrobial susceptibility testing of Salmonella spp. in food

n = Number of resistant isolates

Salmonella spp.

	Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)		Meat from other poultry species	
Isolates out of a monitoring programme			yes		yes			
Number of isolates available in the laboratory			21		44			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin			21	8	44	6		
Amphenicols								
Chloramphenicol			21	1	44	2		
Cephalosporins								
Ceftriaxon			21	0	44	4		
Fluoroquinolones								
Ciprofloxacin			21	0	44	0		
Quinolones								
Nalidixic acid			21	0	44	12		
Sulfonamides								
Sulfonamide			21	5	44	15		
Trimethoprim			21	3	44	19		
Aminoglycosides								
Streptomycin			21	4	44	13		
Kanamycin			21	0	44	0		
Penicillins								
Ampicillin			21	4	44	14		
Trimethoprim + sulfonamides			21	3	44	14		
Fully sensitive			21	12				
Resistant to 1 antimicrobial			21	5				
Resistant to 2 antimicrobials			21	0				
Resistant to 3 antimicrobials			21	0				
Resistant to 4 antimicrobials			21	0				
Resistant to >4 antimicrobials			21	4				

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from pig - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	Salmonella spp.																					
	Meat from pig - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	21																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	21	8	0	0	0	0	0	0	12	1	0	1	1	0	0	6	0	0	0	0		
Amphenicols																						
Chloramphenicol	21	1	0	0	0	0	0	0	0	13	7	0	0	0	0	1	0	0	0	0		
Cephalosporins																						
Ceftriaxon	21	0	0	0	12	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	21	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Quinolones																						
Nalidixic acid	21	0	0	0	0	0	0	0	1	16	4	0	0	0	0	0	0	0	0	0		
Sulfonamides																						
Sulfonamide	21	5	0	0	0	0	0	0	0	0	0	0	1	7	8	0	0	5	0	0		
Trimethoprim	21	3	0	0	0	13	5	0	0	0	0	0	3	0	0	0	0	0	0	0		
Aminoglycosides																						
Streptomycin	21	4	0	0	0	0	0	0	0	3	12	2	0	1	3	0	0	0	0	0		
Kanamycin	21	0	0	0	0	0	0	0	6	15	0	0	0	0	0	0	0	0	0	0		
Penicillins																						
Ampicillin	21	4	0	0	0	0	0	11	6	0	0	0	0	0	0	4	0	0	0	0		
Trimethoprim + sulfonamides	21	3	0	6	10	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0		

Table Antimicrobial susceptibility testing of Salmonella spp. in Meat from poultry, unspecified - Monitoring - quantitative data [Dilution method]

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	Salmonella spp.																					
	Meat from poultry, unspecified - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	132																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	132	18	0	0	0	1	1	24	69	19	0	1	5	0	2	10	0	0	0	0		
Amphenicols																						
Chloramphenicol	132	9	3	0	0	0	0	4	18	77	21	0	0	0	0	9	0	0	0	0		
Cephalosporins																						
Ceftriaxon	132	4	5	7	76	40	0	0	0	0	0	0	4	0	0	0	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	132	0	110	7	1	10	3	1	0	0	0	0	0	0	0	0	0	0	0	0		
Quinolones																						
Nalidixic acid	132	14	0	0	0	0	0	0	4	102	9	3	0	0	0	14	0	00	0	0		
Sulfonamides																						
Sulfonamide	132	18	0	0	0	0	0	0	0	0	0	2	6	30	69	7	0	18	0	0		
Trimethoprim	132	20	1	0	1	77	30	1	2	0	0	0	20	0	00	0	0	0	0	0		
Aminoglycosides																						
Streptomycin	132	17	0	0	0	0	0	10	40	31	27	7	6	7	1	3	0	0	0	0		
Kanamycin	132	0	0	0	0	0	0	8	69	53	2	0	0	0	0	0	0	0	0	0		
Penicillins																						
Ampicillin	132	19	0	0	1	3	4	80	22	3	0	0	1	0	0	18	0	0	0	0		
Trimethoprim + sulfonamides	132	18	0	12	86	13	1	0	2	5	0	0	13	0	0	0	0	0	0	0		

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol										
Florfenicol										
Tetracyclines										
Tetracyclin										
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin										
Quinolones										
Nalidixic acid										
Trimethoprim										
Sulfonamides										
Sulfonamide										
Aminoglycosides										
Streptomycin										
Gentamicin										
Neomycin										
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins										
Penicillins										
Ampicillin										

Table Breakpoints for antibiotic resistance testing in Food

Test Method Used

Disc diffusion

Agar dilution

Broth dilution

E-test

Standards used for testing

NCCLS

Salmonella	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Amphenicols										
Chloramphenicol	ATCC25922	8	16	16	0.016	256				
Florfenicol										
Tetracyclines										
Tetracyclin	ATCC25922	4	8	8	0.016	256				
Fluoroquinolones										
Ciprofloxacin	ATCC25922	1	2	2	0.002	32				
Enrofloxacin										
Quinolones										
Nalidixic acid	ATCC25922	16		16	0.016	256				
Trimethoprim	ATCC25922	8		8	0.002	32				
Sulfonamides										
Sulfonamide	ATCC25922	256		256	0.016	1024				
Aminoglycosides										
Streptomycin	ATCC25922	4		16	0.016	1024				
Gentamicin										
Neomycin										
Kanamycin	ATCC25922	16	32	32	0.016	256				
Trimethoprim + sulfonamides	ATCC25922	2		2	0.002	32				
Cephalosporins										
Ceftiofur										
Ceftriaxon	ATCC25922	8	16	16	0.002	32				
3rd generation cephalosporins	ATCC25922									
Penicillins										
Ampicillin	ATCC25922	8	16	16	0.016	256				

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

Campylobacter is a leading source of bacterial foodborne gastrointestinal diseases in humans in all parts of the world. It can also cause postinfectious complications as Guillain-Barré syndrome.
In 80% of the cases, the infection route of campylobacteriosis is food, but domestic animals including pets are also 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 main causes of enteritis in humans .
The contamination of poultry carcasses and meat with Campylobacter are 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. Campylobacteriosis in humans

2.2.3. Campylobacter in foodstuffs

A. Thermophilic Campylobacter in Broiler meat and products thereof

Monitoring system

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

B. C.,thermophilic in food

Monitoring system

Sampling strategy

A monitoring programme was organised 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, layer carcasses, and 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.

Table Campylobacter in poultry meat

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. coli	C. lari	C. jejuni	C. upsaliensis	thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
- at cutting plant - Monitoring - official sampling - objective sampling	FASFC TRA200	single	0.01g	326	40					40
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 821	single	0.01g	40	2					2
meat preparation										
intended to be eaten cooked	FASFC TRA202	single	0.01g	162	4					4
- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling	FASFC DPA003	single	0.01g	315	6					6
- at slaughterhouse - animal sample - faeces - Monitoring - official sampling - objective sampling	FASFC DPA019	single	25g	6443	3577					3577
carcass										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 820	single	0.01g	40	17					17
- at retail - Monitoring - official sampling - objective sampling (It concerns laying hens.)	FASFC DIS 819	single	0.01g	32	8					8
Meat from other poultry species										
carcass										

- at slaughterhouse - animal sample - neck skin - Monitoring - official sampling - objective sampling	FASFC DPA004	single	0.01g	246	16					16
Meat from poultry, unspecified										
meat preparation										
intended to be eaten cooked										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 826	single	0.01g	102	2					2

Table Campylobacter in other food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for thermophilic Campylobacter spp.	C. jejuni	C. coli	C. upsaliensis	C. lari	thermophilic Campylobacter spp., unspecified	Campylobacter spp., unspecified
Meat from pig											
minced meat											
intended to be eaten raw	FASFC TRA303	single	25g	50	1					1	
Meat from other animal species or not specified											
minced meat											
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 823	single	10g	26	0						
Live bivalve molluscs											
unspecified											
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 806	single	25g	55	1					1	
Meat, red meat (meat from bovines, pigs, goats, sheep, horses, donkeys, bison and water buffalos)											
carcass											
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling - objective sampling	FASFC DPA002	single	swabs 600 cm2	418	58					58	
Cheeses made from cows' milk											
soft and semi-soft											
made from raw or low heat-treated milk											
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 008	single	25g	75	0						
unspecified											

made from raw or low heat-treated milk												
- at retail - Monitoring - official sampling - objective sampling (It concerns soft, semisoft and fresh cheese.)		FASFC DIS 849	single	25g	55	0						
Crustaceans												
shrimps												
raw												
- at retail - Monitoring - official sampling - objective sampling		FASFC DIS 811	single	1g	53	0						

2.2.4. 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

Organs: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.

2.2.5. 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 used for detection for resistance

Antimicrobials included in monitoring

The antimicrobials tested and the breakpoints used are listed in the following table.
Antimicrobial Breakpoints(microg / ml)
Ampicillin 8 – 32
Tetracycline 4 – 16
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Erytromycin 1 – 8
Gentamycin 4 – 16
Campylobacter from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

In the C. coli isolates (49) from pork resistance was observed for all the antibiotics tested and only 2 strains were sensitive for all tested antibiotics. The resistance against tetracycline (86%) was high followed by ciprofloxacin and nalidixic acid (33%). Multi-resistance, which means resistance against 4 antibiotics or more was observed in 2 strains with following resistance profile (Cip-Ery-Nal-Tet).

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(microg / ml)

Ampicillin 8 – 32
Tetracycline 4 – 16
Nalidixic acid 16 – 32
Ciprofloxacin 1 – 4
Erytromycin 1 – 8
Gentamycin 4 – 16
Campylobacter from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

From broiler meat or carcasses 91 Campylobacter strains were tested for their antimicrobial susceptibility, divided in 66 Campylobacter jejuni and 25 Campylobacter coli strains. In total 32% of the C. jejuni strains were sensitive for all tested antibiotics. Tetracycline resistance was present in 41% of the strains followed by ciprofloxacin and nalidixic acid (36%). Ampicillin resistance was noticed in 30% of the C. jejuni strains and 2% of the strains were resistant against erythromycin. Overall the antibiotic resistance within C. coli was greater than in C. jejuni, with a much higher percentage of resistance against ciprofloxacin, nalidixic acid and tetracycline. Resistance against erythromycin was found in 8% of the C. coli strains. No resistance was observed for gentamycin for Campylobacter isolates from broiler meat.
The ampicillin resistance is much higher in strains isolated from broiler meat and carcasses than in strains isolated from pork meat.
The same trends in antimicrobial resistance were observed as in previous years

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	C. coli																					
	Meat from pig - at slaughterhouse - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	49																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	49	42	0	1	0	2	0	1	1	1	1	4	7	2	7	22	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	49	16	3	15	9	6	0	0	0	0	1	1	14	0	0	0	0	0	0	0		
Quinolones																						
Nalidixic acid	49	16	0	0	0	0	0	4	21	7	1	0	0	1	2	13	0	0	0	0		
Aminoglycosides																						
Gentamicin	49	2	0	0	0	0	0	33	14	0	0	2	0	0	0	0	0	0	0	0		
Macrolides																						
Erythromycin	49	8	0	0	0	3	9	18	9	2	2	0	1	0	0	5	0	0	0	0		
Penicillins																						
Ampicillin	49	5	0	0	3	4	12	11	8	4	2	0	2	0	2	1	0	0	0	0		

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	C. coli																					
	Meat from broilers (Gallus gallus) - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	25																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	25	25	0	0	0	0	0	0	0	0	0	0	1	3	3	18	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	25	14	0	3	8	0	0	0	0	0	0	1	13	0	0	0	0	0	0	0		
Quinolones																						
Nalidixic acid	25	13	0	0	0	0	0	0	9	3	0	0	0	1	2	10	0	0	0	0		
Aminoglycosides																						
Gentamicin	25	0	0	0	0	0	9	15	1	0	0	0	0	0	0	0	0	0	0	0		
Macrolides																						
Erythromycin	25	2	0	0	0	1	5	15	2	0	0	0	0	0	0	2	0	0	0	0		
Penicillins																						
Ampicillin	25	6	0	0	0	2	2	7	7	1	0	0	1	2	1	2	0	0	0	0		

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

Number of resistant isolates (n) and number of isolates with the concentration µl/ ml) or zone (mm) of inhibition equal to																						
	C. jejuni																					
	Meat from broilers (Gallus gallus) - Monitoring																					
Isolates out of a monitoring programme	yes																					
Number of isolates available in the laboratory	66																					
Antimicrobials:	**N**	**n**	**<=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**
Tetracyclines																						
Tetracyclin	66	27	1	16	12	8	2	0	0	0	0	1	1	5	4	16	0	0	0	0		
Fluoroquinolones																						
Ciprofloxacin	66	24	6	18	13	5	0	0	0	1	0	2	21	0	0	0	0	0	0	0		
Quinolones																						
Nalidixic acid	66	21	0	0	0	1	2	10	21	8	2	1	0	0	1	20	0	0	0	0		
Aminoglycosides																						
Gentamicin	66	0	0	0	0	4	38	24	0	0	0	0	0	0	0	0	0	0	0	0		
Macrolides																						
Erythromycin	66	1	0	0	0	23	34	7	1	0	0	0	0	0	0	1	0	0	0	0		
Penicillins																						
Ampicillin	66	20	0	0	0	5	9	7	17	5	2	1	4	4	0	12	0	0	0	0		

Table Antimicrobial susceptibility testing of Campylobacter in food

n = Number of resistant isolates

Campylobacter spp., unspecified

	Meat from other poultry species		Meat from bovine animals		Meat from pig		Meat from broilers (Gallus gallus)	
Isolates out of a monitoring programme					yes		yes	
Number of isolates available in the laboratory					49		91	
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Tetracyclines								
Tetracyclin					49	42	91	52
Fluoroquinolones								
Ciprofloxacin					49	16	91	38
Quinolones								
Nalidixic acid					49	16	91	34
Aminoglycosides								
Gentamicin					49	2	91	0
Macrolides								
Erythromycin					49	8	91	3
Penicillins								
Ampicillin					49	5	91	26
Fully sensitive					49	2	91	21
Resistant to 1 antimicrobial					49	27	91	25
Resistant to 2 antimicrobials					49	7	91	18
Resistant to 3 antimicrobials					49	11	91	19
Resistant to 4 antimicrobials					49	2	91	8

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

- Disc diffusion
- Agar dilution
- Broth dilution
- E-test

Standards used for testing

- NCCLS

Campylobacter	Standard for breakpoint	Breakpoint concentration (microg/ ml)			Range tested concentration (microg/ ml)		Disk content	Breakpoint Zone diameter (mm)		
		Susceptible <=	Intermediate	Resistant >	lowest	highest	microg	Susceptible >=	Intermediate	Resistant <=
Tetracyclines										
Tetracyclin	E. coli ATCC 25922 en C. jejuni ATCC 33560	4	8	8	0.016	256				
Fluoroquinolones										
Ciprofloxacin	E. coli ATCC 25922 en C. jejuni ATCC 33560	1	2	2	0.002	32				
Quinolones										
Nalidixic acid	E. coli ATCC 25922 en C. jejuni ATCC 33560	16		16	0.016	256				
Aminoglycosides										
Gentamicin	E. coli ATCC 25922 en C. jejuni ATCC 33560	4	8	8	0.016	256				
Macrolides										
Erythromycin	E. coli ATCC 25922 en C. jejuni ATCC 33560	0.5	4	4	0.016	256				
Penicillins										
Ampicillin	E. coli ATCC 25922 en C. jejuni ATCC 33560	8	16	16	0.016	256				

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 for 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 programme was organised 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 matrixes were minced meat of pork, beef and poultry, cooked ham, pâté, salami and smoked salmon.

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, pâté, 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 programme was organised by the Federal Agency for the Safety of the Food Chain. 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 minced meat from beef and pork, chicken meat preparation, cooked ham, paté, salami and smoked salmon. 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 1 weeks

At retail

Every 1 weeks

Type of specimen taken

At the production plant

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

At retail

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

Methods of sampling (description of sampling techniques)

At the production plant

The samples were about 200g of meat. The detection of Listeria monocytogenes has been assessed in 1g for beef and pork minced meat and for salami, in 25g for ham, pate and smoked salmon.

At retail

Listeria monocytogenes was quantified in ready to eat foods at retail level through enumeration of colony forming units (except for infant formula and foodstuffs intended for special nutritional uses).

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

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

At retail

Other: 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 made in place 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 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	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g	L. monocytogenes - L. monocytogenes serovar 4b	L. monocytogenes - L. monocytogenes serovar 1/ 2a
Milk, cows'										
raw										
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 016	single	1ml	94	0					
pasteurised milk										
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 115	single	25ml	34	0					
Milk, sheep's										
raw										
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 011	single	1ml	6	0					
Milk, goats'										
raw										
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 011	single	1ml	19	0					
Cheeses made from cows' milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 008	single	1g	235	1	1			1	
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 133	single	25g	29	0					
made from pasteurised milk										

- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 022	single	1g	32	0					
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 134	single	25g	79	1	1				1
unspecified										
made from raw or low heat-treated milk										
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns soft, semisoft and fresh cheese.)	FASFC DIS 849	single		126	0					
made from pasteurised milk										
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns soft, semisoft and fresh cheese.)	FASFC DIS 818	single		144	0					
Cheeses made from goats' milk										
unspecified										
made from raw or low heat-treated milk										
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 851	single		10	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 023	single	1g	12	0					
Cheeses made from sheep's milk										
unspecified										
made from raw or low heat-treated milk										
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 850	single		10	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 024	single	1g	7	0					
Dairy products (excluding cheeses)										
butter										

made from raw or low heat-treated milk											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 858	single		37	0						
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 009	single	1g	118	0						
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 151	single	25g	112	0						
cream											
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 025	single	1g	23	0						
yoghurt											
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 007	single	1g	20	0						
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 142	single	1g	21	0						
ice-cream											
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 010	single	1g	66	0						
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 160	single	1g	68	0						
milk powder and whey powder											
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 123	single	1g	20	0						
dairy desserts											
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 190	single	25g	35	0						
Milk, mares'											
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 011	single	1ml	6	0						

Footnote

At retail level, Listeria monocytogenes was quantified in ready to eat foods through enumeration of colony forming units

(except for infant formula and foodstuffs intended for special nutritional uses).

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Listeria monocytogenes presence in x g	> detection limit but =< 100 cfu/ g	L. monocytogenes > 100 cfu/ g	L. monocytogenes - L. monocytogenes serovar 1/ 2a	L. monocytogenes - L. monocytogenes serovar 1/ 2c	L. monocytogenes - L. monocytogenes serovar 4b	L. monocytogenes - L. monocytogenes serovar 3a	L. monocytogenes - L. monocytogenes serovar 1/ 2b
Meat from broilers (Gallus gallus)													
meat preparation intended to be eaten cooked													
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA202	single	1g	386	77	77			28	13	6	6	22
Meat from pig													
meat products													
cooked, ready-to-eat **pâté**	FASFC TRA313	single	25g	68	4	4			1		3		

- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA301	single	25g	79	1	1								1
cooked ham														
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA300	single	25g	69	1	1				1				
sliced														
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 824	single		69	1		1							
raw and intended to be eaten raw														
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 860	single		41	0									
unspecified, ready-to-eat														
- at processing plant - Monitoring	FASFC TRA314	single	25g	58	3	3				2				1
raw but intended to be eaten cooked														
- at retail - Monitoring - official sampling - objective sampling ((detection method))	FASFC DIS 854	single	25g	14	2	2								
- at retail - Monitoring - official sampling - objective sampling ((enumeration method))	FASFC DIS 854	single		2	2		1							

- at retail - Monitoring - official sampling - objective sampling ((total: detection method + enumeration method)) (1)	FASFC DIS 854	single	25g	14	2	2	1						
minced meat													
intended to be eaten cooked													
- at processing plant - Monitoring	FASFC TRA303	single	1g	123	14	14			2				
Meat from bovine animals													
fresh													
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns carpaccio.)	FASFC DIS 810	single		68	0								
meat products													
cooked, ready-to-eat	FASFC TRA304	batch	25g	122	33	33			28	2	1		2
meat preparation													
intended to be eaten raw													
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns prepared steak tartare (filet americain).)	FASFC DIS 815	single		117	1		1						
minced meat													
intended to be eaten raw													

- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns unprepared steak tartare (filet americain nature).)	FASFC DIS 816	single		36	0									
- at processing plant - Monitoring	FASFC TRA304	single	25g	67	10	10				6	1	1		2
Fish														
smoked														
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns smoked salmon.)	FASFC DIS 847	single		186	1			1						
- at processing plant - Monitoring - official sampling - objective sampling (It concerns smoked salmon.)	FASFC TRA 400	single	25g	150	32									
Infant formula														
dried														
intended for infants below 6 months														
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 803	single	25g	73	0									
Foodstuffs intended for special nutritional uses														

dried dietary foods for special medical purposes intended for infants below 6 months											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 862	single	25g	71	0						
Spices and herbs											
fresh											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 802	single		62	0						
Vegetables											
pre-cut											
ready-to-eat											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 813	single		101	0						
non-precut											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns leafy vegetabels.)	FASFC DIS 841	single		71	0						
Dairy products (excluding cheeses)											

ice-cream											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns soft ice.)	FASFC DIS 804	single	80	0							
Meat from other animal species or not specified											
meat products											
pâté											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 825	single	72	0							
unspecified, ready-to-eat											
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns meat salad.)	FASFC DIS 801	single	26	0							
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling (It concerns dried sausages and salami.)	FASFC DIS 827	single	41	0							
Meat from poultry, unspecified											
meat preparation											

intended to be eaten cooked														
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 826	single	1g	377	153									

(1) : For the 3 lines concerning "source of information: FASFC DIS 854": in total 14 samples were taken. All samples were analysed by means of the detection method (detection in 25g). In 2 samples, the presence in 25g was detected. For these 2 samples, an enumeration was performed. In one of these samples, the detection limit for enumeration (10 cfu/ g) was not exceeded, in the other sample, the enumeration gave a result of 40 cfu/ g.

Footnote

At retail level, Listeria monocytogenes was quantified in ready to eat foods through enumeration of colony forming units (except for infant formula and foodstuffs intended for special nutritional uses).

2.3.4. Listeria in animals

2.4. E. COLI INFECTIONS

2.4.1. General evaluation of the national situation

A. Verotoxigenic Escherichia coli infections general evaluation

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 immunocompromised 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 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. E. Coli Infections in humans

A. Verotoxigenic Escherichia coli infections in humans

Relevance as zoonotic disease

Zoonotic verotoxin producing E. coli may cause life-threatening diseases in young children or in immunocompromised 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 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.

2.4.3. Escherichia coli, pathogenic in foodstuffs

A. Verotoxigenic E. coli (VTEC) in food

Monitoring system

Sampling strategy

A monitoring programme was organised 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, cuts and minced meat from beef. 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 centre of the Federal Agency for the Safety of the Food Chain and the laboratory take them at the dispatching centre for analyse.
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 to be positive after genetic confirmation of the pathogenicity of the 0157 E. coli 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, bioMérieux),
- 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 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 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.

Table VT E. coli in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Escherichia coli, pathogenic	E.coli, pathogenic, unspecified	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified	Verotoxigenic E. coli (VTEC) - VTEC O157:H7
Meat from bovine animals										
fresh	FASFC TRA305	single	25g	243	0					
- at retail - Monitoring - official sampling - objective sampling (It concerns carpaccio.)	FASFC DIS 810	single	25g	94	2		2			2
minced meat										
intended to be eaten raw	FASFC TRA304	single	25g	55	0					
- at retail - Monitoring - official sampling - objective sampling (It concerns unprepared steak tartare (filet americain nature).)	FASFC DIS 816	single	25g	31	0					
carcass										
- at slaughterhouse - animal sample - carcass swabs - Monitoring - official sampling - objective sampling	FASFC DPA001	single	swabs 1600 cm2	1214	11		11	3		8
meat preparation										
intended to be eaten raw										
- at retail - Monitoring - official sampling - objective sampling (It concerns prepared steak tartare (filet americain).)	FASFC DIS 815	single	25g	97	0					
Milk, cows'										
raw										
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 016	single	25ml	123	0					
Cheeses made from cows' milk										
unspecified										

made from raw or low heat-treated milk										
- at retail - Monitoring - official sampling - objective sampling (It concerns soft, semisoft and fresh cheese.)	FASFC DIS 850	single	25g	10	0					
soft and semi-soft										
made from raw or low heat-treated milk										
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 133	single	25g	27	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 008	single	25g	234	5		5			5
Cheeses made from sheep's milk										
unspecified										
made from raw or low heat-treated milk										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 850	single	25g	10	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 024	single	25g	7	0					
Cheeses made from goats' milk										
unspecified										
made from raw or low heat-treated milk										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 851	single	25g	10	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 023	single	25g	12	0					
Dairy products (excluding cheeses)										
butter										
made from raw or low heat-treated milk										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 858	single	25g	13	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 009	single	25g	79	0					
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 151	single	25g	70	0					
ice-cream										
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 160	single	25g	69	0					

- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 010	single	25g	66	0					
cream										
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 184	single	25ml	21	0					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 025	single	25g	42	0					

2.4.4. Escherichia coli, pathogenic in animals

A. Verotoxigenic Escherichia coli in cattle (bovine animals)

Monitoring system

Sampling strategy

In case E. coli O157 is isolated from a carcass at the slaughterhouse (official zoonosis programme), the farm of origin is traced back. Faecal samples are taken by the competent authority from 10 percent of the animals aged between 6 months and 2 years, with a maximum of 20 animals. In addition, samples of the available feed and of dust are collected. If one of the faeces samples is positive for E. Coli O157, new faeces samples are taken from 10% of the animals aged between 6 months and 2 years, with a maximum of 20 samples. Of these new samples, all animals which had positive faecal samples the first time, are resampled.

Type of specimen taken

Animals at slaughter (herd based approach)

Surface of carcasses

Diagnostic/ analytical methods used

Animals at farm

Bacteriological method: ISO 16654:2001

Animals at slaughter (herd based approach)

Bacteriological method: ISO 16654:2001

Measures in case of the positive findings or single cases

Hygienic and management measures are imposed on these farms during the period that the samples are analysed in the laboratory. The sale of not heat-treated milk or milk products is prohibited and animals can not be sold.
If results are positive, the animals with positive faeces samples are isolated and can only leave the farm, with permission of the competent authority, to be slaughtered. The sale of not heat-treated milk is prohibited. A resampling takes place after 6 weeks.

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

The faecal, feed and dust samples were enriched in mTSB and treated by immunomagnetic separation. Subsequently, the suspected colonies on CT-SMAC were latex agglutinated for the detection of E. coli O157. Confirmation of serotype (O group) was done by means of slow tube agglutination after heating of the bacterial cultures. Virulence factors were determined by PCR for toxin genes vt1 and vt2, and for eae (intimin) specific sequences.
A typical E. coli O157 isolate is defined as a strain isolated by immunomagnetic separation and O157 specific agglutination and confirmed by PCR as vt2 and eae positive. An atypical E. coli O157 had either no eae or vt gene.

Laboratory findings are available on clinical E. coli strains sent to the National Reference Laboratory for VTEC, animal health for analysis. A VTEC strain was identified as a VT1 or VT2 positive E. coli strain.

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 treating production methods or pasteurisation of raw milk did stop this way of transmission.
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 lymphadenopathie, intestinal lesions, chronic skin tuberculosis (lupus vulgaris) and other nonpulmonary 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 on going 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.

Recent actions taken to control the zoonoses

The surveillance programme of tuberculosis is based on European 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 and may decide to re-examine (additional tests e.g. comparative tuberculine tests, interferon-gamma test) the animals or to kill them for additional analyses(test slaughter). In case a "TB suspecious" lesion is detected, a tissue sample is sent to the National Reference Laboratory for analysis. Consequently, if Mycobacterium bovis suspicion is confirmed by analyses, 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 perhaps help to a rapid detection of an infection in the concerned holding of destination.
Monitoring of the type of strains circulating in each country could have a valuable impact on the understanding of the spread of new 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

Reporting system in place for the human cases

National notification system by the National Reference Laboratory.

Case definition

Person from whom M. bovis has been isolated

Diagnostic/ analytical methods used

Human tuberculin skin test
Radiographie of the lungs
On clinical sample
- microscopic examination
- culture on solid medium
- identification: molecular or classic phenotypical method
- antibiotic sensitivity testing for M. tuberculosis
- PCR
- RFLP on IS6110
- spoligotyping
- MIRU VNTR

Notification system in place

National notification system / Notification of laboratory confirmed cases

History of the disease and/ or infection in the country

In 2002, 4 cases of M. bovis infection were detected in humans. Two of those patients were farmers and in both farms M. bovis was isolated from their cattle. Strains isolated from one patient and from his cattle were compared by means of RFLP and spoligotyping. Both strains had the same pattern, suggesting that bovine tuberculosis is still an occupational zoonosis in Belgium.
In 2003, 5 human cases of bovine tuberculosis were identified. Molecular typing of strains isolated from cattle and human cases was performed in order to evaluate the presence of similar strains in both species.
In 2004, 5 human cases of bovine tuberculosis were identified.
In 2005, 3 human cases of bovine tuberculosis were identified.
The number of human cases is underestimated because the specific identification of M. bovis of the Mycobacterium spp. group is only realised on special demand of the medical attendant. The identification method of Mycobacterium spp. is based on PCR of the 16SrRNA gene.

Results of the investigation

The incidence of tuberculosis shows little variation over the last years (10 to 13 per 100.000 inhabitants).
More then 50% of the TB cases are foreigners. The autochtonous TB cases are detected mostly in

elderly persons.
Groups at risk are marginals, asylum seekers, refugees and special risk factors are alcoholism and a co-infection with HIV.
Human TB cases are mainly concentrated in urban populations.

Relevance as zoonotic disease

Mycobacterium bovis still remains an important possible source of infection in case of bovine tuberculosis in cattle.

Additional information

Source of information on human TB cases:
Vlaamse Vereniging voor Respiratoire Gezondheidszorg en Tuberculose bestrijding (VRGT) en het Fonds des Affections Respiratoires (FARES) on webpage www.vrgt.be
Institute Public Health, section Epidemiology, infectious diseases, reports Mycobacteria www.iph.fgov.be

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 from 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 the 17th of October 2002.
The surveillance programme implies:
- skin testing of animals at purchase by the veterinary practician responsible for the epidemiological surveillance of the holding (contract between farmer and veterinarian);
- intensive skin testing in case of an suspected/ infected bovine on all animals of the holding
- intensive 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 analysis.
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 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 tuberculine 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

Blood

Methods of sampling (description of sampling techniques)

Tuberculin skin testing: single or comparative tests
Blood sampling: interferon-gamma tests
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 the 17th of October 2002.

Control program/ mechanisms

The control program/ strategies in place

National surveillance program by the Competent Authority (FASFC) on compulsary 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 of any lesion that could be 'suspected' 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 MS of origin after the date of

export. This information can eventually result in an early detection or can probably 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 them (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 compulsary 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 with an annual skin testing programme 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 reactors corresponded to the intensive testing of infected and contact farms.
In 2002, a total of 13 infected holdings were notified. A total of 799 animals reacted after tuberculination. 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 tuberculination. 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 generalised 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.

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

Additional information

In 2006, 833 tissue samples whereof 57 'suspicious' lesions were submitted to the Belgian National Reference Laboratory for Bovine Tuberculosis (Veterinary and Agrochemical Research Center). These samples (mainly taken at the slaughterhouses) originated from animals suspected of being infected with M. bovis, i.e. skin test reactors, animals in contact with M. bovis infected animals, or showing suspicious TB lesions at post-mortem meat inspection. M. bovis was isolated by culture from 8 herds. PCR tests were applied on tissue samples allowing rapid confirmation of the infection of a herd.
The Veterinary and Agrochemical Research center performs routine IS6110 RFLP typing and spoligotyping of M. bovis field isolates. Since August 1995 almost all outbreak herds had their isolates typed by both methods. More recently, MIRU-VNTR typing has also been performed in collaboration with Pasteur Institute, a department of the Science Institute of Public Health. All isolates typed by RFLP and spoligotyping were further analysed by MIRU-VNTR, resulting in a comprehensive database of the vast majority of M. bovis types circulating in Belgium since 1995. Between 1995 and 2005, 12 different genotypes (lineage) have been observed. One lineage was obviously dominant and appeared in 48% of the infected herds and was mainly related to a re-emerge of bovine tuberculosis in the province of Liège in the years 1995-1996. The other serotypes are more uncommon and some of them sometimes reappear after several years of absence. Moreover, in 2004 two new lineages have been detected. This means that, in addition to a 'classical' circulation of bovine tuberculosis between herds, other ways of introduction of bovine tuberculosis in some herds can be suspected. Molecular typing by MIRU-VNTR is of precious help to lead an epidemiological investigation and to decide on appropriate mesures.

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.

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 examinations at the slaughterhouses/ game handling establishment
- post-mortem examination at autopsy of hunted or accidentally killed "wild" deer in the Universitary Centre of Liège, Veterinary Medecine Faculty.

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

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

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

Table Tuberculosis in other animals

	Source of information	Sampling unit	Units tested	Total units positive for Mycobacterium spp.	M. bovis	M. tuberculosis	Mycobacterium spp., unspecified
Goats	VAR	animal	4	0			
Other mustelides	VAR	animal	16	0			
Cats	VAR	animal	18	0			
Hares	VAR	animal	4	0			
Wild boars							
wild (1)	VAR	animal	88	3			3

(1) : For these positive results, M. bovis could be ruled out as causal agent, further analyses are performed to identify of the Mycobacterium spp. complex the etiological agent.

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

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 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/ BELGIE (1)	40640	2697824	40632	99.98	8	0.02	5	250000	395000	833	88
Total	40640	2697824	40632	99.98	8	0.02		250000	395000	833	88

(1) : All 88 animals detected positive belonged to the infected herds.

Footnote

Since June 2003, Official Tuberculosis Free status by Commission Decision 2003/ 467/ EC. After several years of yearly succeeded by triennially testing, no more routine tuberculin testing is carried out. National surveillance programme is based on mandatory tuberculin testing at purchase and intense testing by tracing-on and tracing-back in case of an infected animal or infected herd. Also follow-up testing of an infected and/ or an eradicated herd is performed.

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

Table Tuberculosis in farmed deer

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/ BELGIE	2021	12805	2021	100	0	0				12	0
Total	2021	12805	2021	100	0	0		0	0	12	0

Footnote

Surveillance by post-mortem examination at slaughterhouse (farmed deer) and at game handling establishment (wild hunted deer).

(*) Legend:

In column "Interval between routine tuberculin tests" use the following numeric codes: (0) no routine tests; (1) tests once a year; (2) tests each two years; (3) tests each three years concerning 24 month-old animals; (4) tests each 4 years; (5) others (please give details).

2.6. BRUCELLOSIS

2.6.1. General evaluation of the national situation

2.6.2. Brucellosis in humans

A. Brucellosis in humans

Reporting system in place for the human cases

Notification of laboratory confirmed cases.

Notification system in place

Notification by the National reference laboratory and a surveillance network of laboratories.

History of the disease and/ or infection in the country

Zoonotic brucellosis (Brucella melitensis, Brucella abortus, Brucella suis) Bacteria of the genus Brucella may infect sheep, goats, cattle, deer, elk, pigs, dogs, and several other animals, where they cause disease. Humans become infected by contact with infected animals or with contaminated animal products. Brucella infections in humans may cause a range of symptoms that are similar to that of flu and may include fever, sweats, headaches, back pains, and physical weakness. Several infections of the central nervous systems or lining of the heart may occur.
The majority of brucellosis cases are imported and are caused by B. melitensis. The consumption of raw milk or raw cheese from sheep and goats is thought to be the major source of contamination.

2.6.3. Brucella in foodstuffs

Table Brucella in food

	Source of information	Sampling unit	Units tested	Total units positive for Brucella spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Milk, cows'								
raw milk for manufacture								
intended for manufacture of pasteurised/ UHT products (1)	FASFC	batch	73482	0				

(1) : Pools of bulk milk samples from 11747 dairy herds are analysed by a regular testing program.

2.6.4. 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 is officially free of bovine brucellosis during the reporting year.

Monitoring system

Sampling strategy

Since Belgium is officially free from bovine tuberculosis, the eradication programme has been changed in a surveillance programme. Beef cattle older than 2 years are monitored once every three years by means of serological tests. The herds for serological examination are selected by geographical localisation. Dairy cattle are checked at least 4 times a year via tank milk (milk ring test).
Furthermore, all animals are serologically tested at trade (purchase).
Each abortion or premature birth in animals at risk is 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 investigation exclude Brucella infections.
Pooled tank milk is 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 are done (at least 4 ring tests a year).
Bacteriological examination is done when serological and/ or epidemiological suspicion is present.
Allergic (brucellin) test may be carried out if serological cross-reactions are suspected. These tests are performed by the Federal Agency for the Safety of the Food Chain in collaboration with the National Reference Laboratory.
An animal is legally suspected of brucellosis in case of a positive ELISA. If, according to the epidemiology and the results of the skin 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 has been isolated, and a cattle holding is considered as an outbreak herd if one of its animals is bacteriologically positive for brucellosis.

Frequency of the sampling

Dairy cattle are checked at least 4 times a year by tank milk.
Beef cattle older than 2 years are monitored once every three years by means of serological tests. The herds for serological examination are selected by geographical localisation.

All cattle older than 1 year are tested at the moment of purchase.

Type of specimen taken

Blood

Methods of sampling (description of sampling techniques)

Blood sampling
Bulk milk sampling

Case definition

An animal is defined as infected if Brucella has been isolated.
A herd is defined as infected if one of its animals is bacteriollogically positive for brucellosis.

Diagnostic/ analytical methods used

- Milk ring test on bulk milk samples
- 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 compulsory surveillance programme organised by the Competent Authority

Recent actions taken to control the zoonoses

Annual serological follow-up of 'imported' bovines.

Measures in case of the positive findings or single cases

Dairy cattle: in case of a positive milk ring test all animals of the holding older than 2 years are serologically tested.
Beef cattle and dairy cattle: in case of a positive result in the micro-agglutination test the same blood sample is tested with an indirect ELISA to confirm. If this last test is also positive, the animal is considered to be infected and is compulsory slaughtered (test slaughter) for additional analyses to detect a Brucella infection.
Brucellin skin testing is sometimes performed as a confirmatory test before to decide test slaughter for further examinations.

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 programme 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.
The annual herd prevalence notified at the year end was 1,13% in 1988 and has fallen below 0.01% since 1998. In March 2000, the last case of bovine brucellosis was identified. No infected herd was recognised in Belgium since then.
In case of positive serological reactors the Federal Agency for the Safety of the Food Chain instructed the test slaughter for additional analyses. These analyses could not confirm brucellosis. All these animals were "false positive serological reactors (FPSR)" to the micro-agglutination tests. To reduce the number of FPSR to be slaughtered, the micro-agglutination test has been used as for routine testing whereas the indirect Elisa is accepted as the confirmatory test. This approach avoids the undeserved test slaughter of false positive reacting animals.

Additional information

B. 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 national monitoring for Visna-Maedi/ CAE and at export were examined for Brucella melitensis specific antibodies by means of ELISA. 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 analysed and/ or interpreted in RBT and/ or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025).
In case of positive test results, a skin test should be performed on the seropositive animals and the congeneers. A positive skin test leads to the bacteriological investigation of the animal.

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.

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 all notifiable animal diseases).

Results of the investigation

In 2001, 2002, 2003, 2004, 2005 and 2006 about 7 000 serum samples were tested at the National Reference Laboratory. In addition, serum samples from sheep for export were analysed. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of ovine brucellosis in Belgium.

C. 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 national monitoring for Visna-Maedi/ CAE and at export were examined for Brucella melitensis specific antibodies by means of ELISA.
Sheep and goats 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 where positive in the two confirmatory tests or that could not be analysed and/ or interpreted in RBT and/ or CFT were sampled a second time.
All brucellosis tests performed at VAR are officially accredited (ISO 17025)
In case of positive test results, a skin test should be performed on the seropositive animals and

the congeneers. A positive skin test leads to the bacteriological investigation of the animal.

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: Elisa, Rose Bengal test and Complement Fixation test.

Diagnostic/ analytical methods used

Complement Fixation Test CFT
Rose Bengal Test RBT
Indirect ELISA
Skin testing with brucellin
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 all notifiable animal diseases)

Results of the investigation

In 2001, 2002, 2003, 2004, 2005 and 2006 about 1500 caprine serum samples were tested at the National Reference Laboratory. The results confirmed those of previous years, i.e. the absence of any epidemiological or bacteriological evidence of caprine 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 centres 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 human, 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 analyses.

Diagnostic/ analytical methods used

Rose Bengal test RBT
Slow agglutination test according to Wright
Complement fixation test CFT
Indirect ELISA
Bacteriological examination

Control program/ mechanisms

The control program/ strategies in place

Regional monitoring programme.
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 analyse 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 spp.	B. melitensis	B. abortus	B. suis	Brucella spp., unspecified
Pigs	VAR	animal	236	1			1	
Alpacas	VAR	animal	13	0				
Water buffalos	VAR	animal	1	0				
Reindeers	VAR	animal	3	0				
Antelopes	VAR	animal	17	0				
Wild boars	VAR	animal	12	0				
Hares	VAR	animal	8	0				

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

Region	Total number of existing bovine		Officially free herds		Infected herds		Surveillance						Investigations of suspect cases								
							Serological tests			Examination of bulk milk samples			Information about abortions			Epidemiological investigation					
	Herds	Animals	Number of herds	%	Number of herds	%	Number of bovine herds tested	Number of animals tested	Number of infected herds tested	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
																		Serologically	BST		
BELGIQUE/ BELGIE	40640	2697824	40640	100	0	0	9631	500765	0	11747	73482	0	3535	0	0	171	0	70		44	0
Total	40640	2697824	40640	100	0	0	9631	500765	0	11747	73482	0	3535	0	0	171	0	70	0	44	0

Footnote

All serologically positive reacting animals (=FPSR, false positive serological reactors) were finally negative by repeated analysis with SAT and ELISA.

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

Region	Total number of existing ovine / caprine		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/ BELGIE	46570	263001	46570	100	0	0		7841	0	136	0	1	0	0
Total	46570	263001	46570	100	0	0	0	7841	0	136	0	1	0	0

Footnote

Repeated testing with ELISA, Rose Bengal test and Complement fixation test of 5 non-negative reacting ovines on CFT was performed.

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)

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.

2.7.2. Yersiniosis in humans

A. Yersinosis in humans

Reporting system in place for the human cases

Data were obtained from passive surveillance through sentinel laboratory findings. All cases were updated on a weekly base.

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 spp.	Y. enterocolitica	Yersinia spp., unspecified	Y. enterocolitica - O:3	Y. enterocolitica - O:9	Y. enterocolitica - unspecified
Meat from other animal species or not specified										
minced meat										
- at retail - Monitoring - official sampling - objective sampling	FASFC DIS 823	single	1g	85	0					
- at processing plant - Monitoring - official sampling - objective sampling	FASFC TRA 303	single	1g	103	0					

2.7.4. Yersinia in animals

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 organise analysis for Trichinella in pigs at the slaughterhouses. The analysis is generalised since 1991. Trichinella has not been detected in carcasses of pigs and horses produced for human consumption in Belgium. One autochtonous human case, probably caused by a home raised wild boar occured 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 occured 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 8000 sport-hunted wild boars are tested. Until now, only 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.
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 occured in 1979 following the consumption of meat from wild boar.

Recent actions taken to control the zoonoses

Increased monitoring of wildlife
Routine examination of wild boars destinated for human consumption
Monitoring of infection through examining sentinel animals such as the fox.
Consumption of 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.

Suggestions to the Community for the actions to be taken

Considering the lasting negative results in pigs originating form industrial holdings, the creation of the status "Trichinella free Pig farm" could be implemented in some Member states.

2.8.2. Trichinellosis in humans

A. Trichinellosis in humans

History of the disease and/ or infection in the country

2005
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.

2.8.3. Trichinella in animals

A. Trichinella in pigs

Monitoring system

Sampling strategy

General

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

Frequency of the sampling

General

Systematic Trichinella examinations of all slaughtered pigs.

Type of specimen taken

General

Diaphragm muscle, 1 gramme for fattening pigs, 2 gramme for breeding sows and boars.

Methods of sampling (description of sampling techniques)

General

Pigs: 1 gramme of diaphragm muscle to be pooled

Case definition

General

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

Diagnostic/ analytical methods used

General

Artificial digestion method of collective samples.
The analysis is done by artificial digestion: the magnetic stirrer method of pooled 100 gramme sample as described in Commission Regulation (EC) No 2075/ 2005, 1 gramme per pig and 5 gramme per horse and wild boar.
Serology may be done in live pigs and for epidemiological studies and monitoring on wildlife.

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.

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 not been detected in wild boars from Belgium, despite serological evidence of the presence of anti-Trichinella antibodies in wildlife and previous reports of Trichinella larvae in this host species.
Nevertheless 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.

B. 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 gramme of diaphragm (or tongue, or masseter) for routine diagnosis, analyses on pooled samples, 10 to 25 gramme 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 pooled sample digestion as described in Commision Regulation (EC) No 2075/ 2005 was used on samples of 5 gramme of muscle for horses.

Results of the investigation including the origin of the positive animals

No positive animals were detected

Control program/ mechanisms

The control program/ strategies in place

Commision 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.

Table Trichinella in animals

	Source of information	Sampling unit	Units tested	Total units positive for Trichinella spp.	T. spiralis	Trichinella spp., unspecified
Pigs	FASFC	animal	10158164	0		
Solipeds, domestic						
horses	FASFC	animal	8205	0		
Wild boars						
wild	FASFC	animal	9284	0		
Foxes	ITG	animal	42	0		
Badgers	ITG	animal	15	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 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.
In 2006, no Echinococcus cases were registered at slaughterhouses.

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 macroscopic 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 were 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. Echinococcosis in humans

A. Echinococcus spp. in humans

History of the disease and/ or infection in the country

Only six human cases of alveolar echinococcosis have been detected in Belgium since 1999, thanks to an efficient information campaign in wooded areas.

2.9.3. Echinococcus in animals

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 inapparent 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 immunocompromised 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. Toxoplasmosis in humans

A. Toxoplasmosis in humans

History of the disease and/ or infection in the country

Toxoplasmosis during pregnancy can cause fetal infection. Manifestations of congenital toxoplasmosis in the fetus and newborn are unpredictable, they range from inta-uterine death, hydrocephalus and severe mental retardations to less severe lesions as ocular disorders. As the disease is generally asymptomatic, diagnosis relies on serological tests (Sabin Feldman dye test, Toxoplasma lysis test or RT multiplex qPCR). Primary measures intends to prevent the infection of the fetus, while secondary prevention aims at reducing the severity of sequelae. Although cats play a role in the epidemiology of the disease, there is no statistical correlation between toxoplasmosis infection and cat ownership.

The life cycle of this protozoan is fully known and theoretically prevention of the infection is possible. Humans are mostly infected by the oral route: by either ingestion of oocytes excreted by cats or by ingestion of cysts present in unadequately cooked meat. If seronegative pregnant women adopt measures aimed at avoiding the ingestion of potencially infectious items, the risk of infection can be reduced.

Prevention of congenital toxoplasmosis is most often based on the results of a serological screening program in pregnant women followed by prenatal and postnatal treatment of women and their newborns when infection is already established during pregnancy (secondary prevention).

Efforts are made for primary prevention of toxoplasmosis during pregnancy. Primary prevention is based on education by physicians about preventive measures and distribution of leaflets containing written recommendations on the nature of the disease and its avoidance.

The mode of acquiring toxoplasmosis from meat, cat faeces and contaminated soil is so circomscribed that simple measures are mostly preventive. It is realistic to ask pregnant women to apply simple hygienic measures over a short period. It is not difficult to persuade pregnant women to wash their hands after contact with cats, meat, soil and water. Heating meat until the color changes is the only other measure.

Prevention is better than cure. A primary prevention campaign can help to reduce the costs for screening and treatment of established toxoplasmosis during pregnancy.

2.10.3. Toxoplasma in animals

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 Luxemburg) in July 1999, Belgium obtained the official status of rabies-free country in July 2001 according to the WHO recommendations (1992) and the Office of Epizootics guidelines (1997).

Recent actions taken to control the zoonoses

Surveillance system and methods used.
Food 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 to the Agency for transmission for analysis to the Pasteur Institute, the National Reference laboratory for 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 Pasteur Institute.
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 south 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 Lyssavirus types (unspecified or EBL 1 or EBL 2).
Bat rabies is a public health concern. The public should be made aware of the danger of human exposure to bats, especially in case of abnormal behaviour of bats. Rabies is transmitted to humans and other animals through saliva, usually in a bite. Any person exposed to bats should be vaccinated preventively against rabies. No one should handle diseased or dead bats without protection such as gloves. Any one finding a bat behaving abnormally, in an unusual place, or under unusual circumstances, should not attempt te handle or move the animal but should contact official authority. Education and recommendations should be given to travellers 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 travellers. Currently available vaccines are safe and effective against both the classic 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 animals with nervous symptoms suspected of rabies are examined by direct immunofluorescence test and virus cultivation in neuroblasts at the Pasteur Institute, the National Reference Laboratory.

Frequency of the sampling

All suspected animals with clinical nervous symptoms are tested.

Type of specimen taken

Organs/ tissues: 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 tightly sealed packet to the Reference laboratory. In case of carcass transportation authorisation is required.
Samples storage period at the Reference lab 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

Other: Direct immunofluorescence for the derection of viral antigen, virus isolation in neuroblastoma cell culture, detection by RT-PCR, mouse inoculation test

Vaccination policy

In the South 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, Ministerial Decree fo 23 February 1967, Ministerial Decree of 30 December 1985 and Ministerial Decree of 28 February 2003).

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.

Table Rabies in animals

	Source of information	Sampling unit	Units tested	Total units positive for Lyssavirus (rabies)	unspecified Lyssavirus	European Bat Lyssavirus - unspecified	classical rabies virus (genotype 1)
Cattle (bovine animals)	Pasteur Institute	animal	191	0			
Sheep	Pasteur Institute	animal	47	0			
Goats	Pasteur Institute	animal	45	0			
Solipeds, domestic	Pasteur Institute	animal	1	0			
Dogs	Pasteur Institute	animal	5	0			
Cats	Pasteur Institute	animal	8	0			
Bats							
wild	Pasteur Institute	animal	21	0			
Foxes							
wild	Pasteur Institute	animal	94	0			
Deer	Pasteur Institute	animal	62	0			
Wild animals							
(other wild animals unspecified)	Pasteur Institute	animal	14	0			

Footnote

In total 488 animals were analysed for rabies, 191 wild and 297 domestic animals. All results of the analyses were negative.

2.12. Q-FEVER

2.12.1. General evaluation of the national situation

A. Coxiella general evaluation

History of the disease and/ or infection in the country

Only limited testing is performed of 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.

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

Q-fever is a zoonotic disease caused by Coxiella burnetii, a stable bacteria that resists to heat, drying and many common disinfectants. This resistance enables the bacteria to survive for a long period in the environment. Cattle, sheep, and goats are the main reservoirs but a wide variety of other animals can be contaminated, including domesticated pets. Coxiella burnetii does not usually cause clinical disease in these animals, although an increased abortion rate and fertility problems in cattle, sheep and goats are observed. The emergence of these common symptoms over a longer period of time leads finally to the diagnosis of Q-fever.
Organisms are excreted in milk, urine, and faeces by infected animals. Animals shed the organisms especially during parturition within the amniotic fluids and the placenta. Airborne transmission can occur in premises contaminated by placental material, birth fluids or excreta from infected animals. Airborne inhalation is the most important transmission route of infection.

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

Only about one-half of all people infected with C. burnetii develop signs of clinical illness. Pneumonia is the most frequent complication of acute Q-fever. Also hepatitis may occur. Chronic forms of the disease are rare but very severe, especially when an endocarditis develops. Q-fever infection results mainly from occupational exposure. Livestock farmers, dairy workers, weterinarians, slaughterhouse and meat processing plant workers, and researchers at laboratories or facilities housing susceptible animals are especially concerned and have to be informed about this disease, the possible transmission of infection and preventive measures to be respected.

Recent actions taken to control the zoonoses

The following measures could be used in the prevention and control of Q-fever:
- public education and information on sources of infection
- giving advice to high risk persons, especially with pre-existing cardiac valvular disease or individuals with vascular grafts and pregnant women
- restrict access to barns and laboratories used in housing potentially infected animals
- quarantine aborted animals
- appropriately disposal of placenta, birth products, foetal membranes, and aborted foetuses
- use only pasteurised milk and milk products
- infected holding facilities should be located away from populated areas. Measures should be

implemented to prevent airflow to other occupied areas.

2.12.2. Coxiella (Q-fever) in animals

Table Coxiella burnetii (Q fever) in animals

	Source of information	Sampling unit	Units tested	Total units positive for Coxiella burnetii
Cattle (bovine animals) (1)	VAR	animal	166	4
Sheep	VAR	animal	4	0
Goats	VAR	animal	2	0

(1) : Latent infected bovines detected at import.

2.13. CYSTICERCOSIS, TAENIOSIS

2.13.1. General evaluation of the national situation

A. Cysticerci general evaluation

History of the disease and/ or infection in the country

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)
The Belgian pig population is virtually free from Cysticercus cellulosae. Taenia solium (and Cysticercus cellulosae) is not autochtonous 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). The risk factor for bovine cysticercosis infection in cattle is the ingestion of vegetation contaminated with T. saginata eggs shed in human faeces. Cattle can become infected when grazing contaminated vegetation in or around the farm or close to railway or camping sites where human carriers of T. saginata have defecated, or grazing pastures where contaminated urban sewage sludge have been applied for fertilization. Accidental overflow of sewage polluted rivers onto pastures has also been identified as a risk factor for the transmission of bovine cysticercosis.
Humans contaminate themselves by the ingestion of raw or undercooked beef containing the larval form (cysticerci). Usually the pathogenicity for humans is low. However, it should be noted that T. saginata may cause reactive arthritis (enteropathic arthropathy) as a secondary disease state. 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 excrement on land should only be allowed after proper sanitation.

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 the slaughterhouse. Serological 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 destroyed.

Suggestions to the Community for the actions to be taken

The introduction of serological techniques for the detection of cysticerci antigens in the serum of animals (cattle, pigs) should be developed. This would allow the detection of more cases than visual

inspection of carcasses at the slaughterhouse.

2.13.2. Cysticerci in animals

Table Cysticerci in animal

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Cysticerci	Cysticerci of Taenia saginata
Cattle (bovine animals)						
adult cattle over 2 years	FASFC	animal		496181	1824	1824
calves (under 1 year)						
veal calves	FASFC	animal		327467	0	

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

Surveillance system: in case E.coli O157 was isolated from a carcass at the slaughterhouse (official zoonosis programme), the farm of origin was traced back.
Recommendations to control the zoonoses:
At the herd:
- testing of animals for E. coli O157 prior to transport and slaughter
- hygiene and management measures at the farm, cleaning and desinfection
- faecal sampling repeatedly in the epidemiological unit from a representative number of animals of different age.

At the slaughterhouse:
- logistic slaughtering of positive animals
- positive carcasses will be destinated for heat-treated products
- hygiene measures during slaughter of positive animals
- cleaning and desinfection after such slaughter

3.1.2. Escherichia coli, non-pathogenic in foodstuffs

A. E. coli in food

Monitoring system

Frequency of the sampling

Antimicrobial resistance in Escherichia coli as indicator organism isolated from meat and meat products.

Diagnostic/ analytical methods used

Antimicrobial susceptibility testing was performed by the disk diffusion method (Kirky-Bauer) following NCCLS recommendations.
The following antimicrobials were tested ampicillin, ceftiofur, tetracycline, ciprofloxacin, trimethoprim, neomycin, nalidixic acid, chloramphenicol, florphenicol, gentamycin, streptomycin, sulfonamides and apramycin.

3.1.3. Antimicrobial resistance in Escherichia coli, non-pathogenic isolates

4. INFORMATION ON SPECIFIC MICROBIOLOGICAL AGENTS

4.1. HISTAMINE

4.1.1. General evaluation of the national situation

4.1.2. Histamine in foodstuffs

A. Histamine in foodstuffs

Monitoring system

Sampling strategy

The sampling for histamine in fishery products is a part of the risk based national control programm of the Federal Agency for the Safety of the Food Chain (FASFC)which covers the whole Member State.
The sampling population represents fishery products from fish species associated with a high amount of histidine. In 2006 only samples of not enzyme maturated products were taken: fresh tuna, fresh sardines, frozen tuna, frozen sardines, canned tuna (in water, in brine, in oil), canned sardines (in water, in oil), canned mackerel (in brine, in oil).
The samples ware taken by the CA (FASFC) in retail, wholesale and at the border inspection posts (import). None of the canned products were manufactured in Belgium (origin 3rd countries or other MS).

Frequency of the sampling

Samples are taken according to the national control programm of the FASFC. The following number of samples were taken in 2006: retail 16, wholesale 19, border inspection post 6.

Type of specimen taken

Other: Fishery products

Methods of sampling (description of sampling techniques)

The samples were taken according to the Regulation 2073/ 2005.
At the level of wholesale and import (BIP) nine sample of 150g were taken out of a batch.
In retail only a single sample of 150g was taken.
In both cases, the same amount of product was taken for a possible counter analysis.

Definition of positive finding

To determine the conformity of a sample or a batch, the criteria laid down in the Regulation 2073/ 2005 are followed.

Diagnostic/ analytical methods used

The method laid down in Regulation 2073/ 2005 is used (HPLC).

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 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	FASFC DIS 508, TRA 410, IEC 007	batch	150g X 9	41	0	40	0	1	0

Footnote

At retail level:
- the sampling unit is single
- the sample weight is only 150g x 1

At the level of wholesale and import:
- the sampling unit is a batch
- the sample weight is 150g x 9

4.2. ENTEROBACTER SAKAZAKII

4.2.1. General evaluation of the national situation

4.2.2. Enterobacter sakazakii in foodstuffs

A. Enterobacter sakazakii in foodstuffs

Monitoring system

Sampling strategy

Tests for Enterobacter sakazakii were only performed after a positive sample for Enterobacteriaceae (presence in 10g).

Table Enterobacter sakazakii in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Enterobacter sakazakii
Infant formula					
dried					
intended for infants below 6 months					
- at retail - Surveillance - official controls (other than control and eradication programmes) - official sampling - objective sampling	FASFC DIS 803	single	10g	1	0
Foodstuffs intended for special nutritional uses					
dried dietary foods for special medical purposes intended for infants below 6 months	FASFC DIS 862	single	10g	1	0

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

Table Staphylococcal enterotoxins in food

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Staphylococcal enterotoxins
Cheeses made from cows' milk					
soft and semi-soft					
made from pasteurised milk - at farm - Monitoring - official sampling - objective sampling	FASFC DPA 022	single	1g	1	0
made from raw or low heat-treated milk - at farm - Monitoring - official sampling - objective sampling	FASFC DPA 008	single	1g	15	4
Cheeses made from sheep's milk					
- at farm - Monitoring - official sampling - objective sampling	FASFC DPA 024	single	1g	1	1

5. FOODBORNE OUTBREAKS

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

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, Public Health Medical Inspectors are carrying out an epidemiological investigation 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.
Data exchange between different competent authorities on food safety, animal health and public health is enhanced by a national "Platform Food-borne outbreaks", approved by the National Conference of Ministers of Public Health.
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 Centres for Food-borne outbreaks, Salmonella and Shigella ,Listeria and C. botulinum.
The reporting includes both general and household outbreaks, although this distinction is sometimes difficult to make. International outbreaks are included in the general 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 2006, a total of 116 outbreaks of food-borne infections and intoxications were recorded in Belgium. More than 1038 people were ill, at least 110 persons were hospitalised.

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

In 12% of the outbreaks Salmonella was the causative agent (n=14) and 134 persons were affected. This figures confirm the decrease in importance of Salmonella as causative agent noticed in 2004 (53%) and 2005 (20%). Salmonella Enteritidis was still the most important serotype and was detected in 64.5 % of the Salmonella outbreaks. The only other serovar isolated in food-borne outbreaks was Typhimurium. In only one outbreak the serovar was unknown.
The consumption of contaminated eggs or egg products was the most important source of salmonellosis especially in outbreaks where the serotype Enteritidis was involved.
The second most isolated agent was coagulase positive Staphylococcus spp.. Toxine A and C were produced by most of the strains. Thermotolerant Campylobacters were responsible for 4 % of the outbreaks which is the same as in 2005.
B. cereus was the causative agent in six outbreaks (5% of the cases) and 175 persons became ill. A general outbreak was observed in a hospital where 60/ 280 persons became ill after eating spaghetti bolognaise which was contaminated with a B. cereus strain, that produced the emetic toxin cereulide.
Four food-borne Norovirus outbreaks were identified. In two cases Norovirus could be detected in the stool samples from human patients and in three cases Norovirus could be detected in the food. All the Norovirus outbreaks reported were linked with institutional catering. In all Norovirus outbreaks an infected person that prepared or distributed the food was at the origin.
Other causative agents were Giardia (n=4), Shigella (n=5), E. coli O157 (n=1) histamine (n=2). Listeria monocytogenes (n=3) was responsible for the stillbirth of 3 babies.
In 56% of the outbreaks no causative agent could be identified. An important reason for this is the absence of rests of the meal in most of those outbreaks.
In only 4 % of the outbreaks, preparations with raw eggs were identified as the source of the illness. In 2005 and 2004 this was respectively 8% and 36%. Meat and meat based products were responsible for 17% of the cases. Remarkable was the growning importance of pasta (5%), pizza (4%), pita donor kebab(7%) and Chinese food (7%) as food vehicles.

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

Restaurants were the most important location of exposure. It was the setting of 32 % of food-borne outbreaks in Belgium in 2006, with almost one fourth of it Chinese restaurants. Take-away restaurants were responsible for 13% of outbreaks. Private households were as important locations as institutional catering with each 10% of food-borne outbreaks. Shops (butchers', bakeries,…) were at the origin of 9% of it. Other locations of exposure were camping (4%), a recreation place (1%) and a farm (1%) with a small outbreak of E.coli O157. In 20% of the outbreaks the place of exposure was unknown .

Descriptions of single outbreaks of special interest

In the summer of 2006 there was a large Salmonella Enteritidis PT 21 outbreak in a Chinese restaurant in a place close to the French border, with 59 ill persons and 28 hospitalised. An analytical epidemiological study was done by the French authorities that pointed to duck as the source of the contamination. However in Belgium, where no analytical epidemiological study was done, only Salmonella Indiana was detected in fresh duck meat from the same producer, but more than 106 CFU/ g Salmonella Enteritidis PT 21 were found in whole eggs from the restaurant kitchen. The phage type and PFGE pattern of the strains matched perfectly with those of the strains isolated from the patients and the strains isolated from 4 carrier persons detected in the kitchen staff. So eggs were probably the primary source of the contamination and the human carriers in the kitchen may have played their role in the transmission of Salmonella to the different dishes served, with the duck as the most important one.

Table Foodborne outbreaks in humans

Causative agent	General outbreak	Household outbreak	Total Number of persons			Food implicated			Type of evidence for implication of the food	Place where food was consumed	Contributing factors
			ill (in total)	died	in hospital	Food (sub)category	Suspected as a source	Confirmed as a source			
1	2	3	4	5	6	7			8	9	10
Bacillus - B. cereus	x		4	0	0	vegetables		x	laboratory confirmed	restaurant	lack of hygiene during preparation
Bacillus - B. cereus	x		5	0	0	mixed		x	laboratory confirmed	restaurant	
Bacillus - B. cereus	x		9	0	0	bakery		x	laboratory confirmed	school	temperature abuse
Bacillus - B. cereus	x		27	0	0	mixed		x	laboratory confirmed	restaurant	
Bacillus - B. cereus	x		60	0	0	cereals		x	laboratory confirmed	institutional catering	cross contamination
Bacillus - B. cereus	x		70	0	0	milk		x	laboratroy confirmed	camping	temperature abuse
Campylobacter		x	2	0	0	mixed	x		descriptive epidemiology	restaurant	
Campylobacter	x		2	0	0	unknown	x			unknown	
Campylobacter	x		2	0	0	unknown	x			unknown	
Campylobacter	x		2	0	0	unknown	x			unknown	
Campylobacter	x		40	0	8	turkey meat	x		ldescriptive epidemiology	camping	
Escherichia coli, pathogenic - Verotoxigenic E. coli (VTEC) - VTEC O157:H7		x	2	0	2	milk	x		descriptive epidemiology	farm	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		12	0	0	mixed		x	laboratory confirmed	institutional catering	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		17	0	0	vegetables		x	laboratory confirmed	institutional catering	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		50	0	0	mixed		x	laboratory confirmed	institutional catering	
Food borne viruses - calicivirus (including norovirus) - norovirus (Norwalk-like virus)	x		75	0	0	mixed	x		descriptive epidemiology	recreation place	
Giardia	x		2			unknown	x			unknown	
Giardia	x		2			unknown	x			unknown	

Giardia		x			2			unknown		x				unknown	
Giardia		x			3			unknown		x				unknown	
Histamine				x	7	0	2	fish				x	laboratory confirmed	household	
Histamine		x			1	0	1	fish				x	laboratory confirmed	take away restaurant	
Listeria - L. monocytogenes				x	2	1	2	unknown		x					
Listeria - L. monocytogenes - L. monocytogenes serovar 4b				x	2	0	2	unknown		x					
Listeria - L. monocytogenes - L. monocytogenes serovar 4b				x	3	2	3	unknown		x					
Salmonella - S. Enteritidis				x	2	0	1	mixed		x			descriptive epidemiology	restaurant	
Salmonella - S. Enteritidis				x	6	0	6	egg based product		x			descriptive epidemiology	household	
Salmonella - S. Enteritidis		x			2	0	0	egg based product		x			descriptive epidemiology	institutional catering	
Salmonella - S. Enteritidis		x			2	0	1	mixed		x			descriptive epidemiology	institutional catering	
Salmonella - S. Enteritidis		x			3	0	0	egg based product		x			descriptive epidemiology	unknown	
Salmonella - S. Enteritidis		x			3	0	0	eggs		x			descriptive epidemiology	unknown	
Salmonella - S. Enteritidis - PT 21		x			18	0	9	pastry				x	laboratory confirmed	household	
Salmonella - S. Enteritidis - PT 21		x			59	0	28	eggs				x	laboratory confirmed	restaurant	4 human carriers in kitchen staff
Salmonella - S. Enteritidis - PT 7a		x			3	0	2	mixed				x	laboratory confirmed	restaurant	
Salmonella - S. Typhimurium		x			2	0	2	unknown		x				unknown	
Salmonella - S. Typhimurium		x			3	0	0	unknown		x				unknown	
Salmonella - S. Typhimurium		x			4	0	0	mixed		x			descriptive epidemiology	restaurant	
Salmonella - S. Typhimurium		x			7	0	0	unknown		x				unknown	
Salmonella - Salmonella spp., unspecified		x			20	0	0	unknown		x			descriptive epidemiology	unknown	
Shigella		x			2			unknown		x				unknown	
Shigella		x			2			unknown		x				unknown	
Shigella		x			2			unknown		x				unknown	
Shigella		x			3			unknown		x				unknown	
Staphylococcus - S. aureus				x	2	0	0	cereals				x	laboratory confirmed	take away restaurant	bad hygienic conditions
Staphylococcus - S. aureus				x	2	0	0	mixed				x	laboratory confirmed	restaurant	
Staphylococcus - S. aureus				x	3	0	0	mixed				x	laboratory confirmed	take away restaurant	
Staphylococcus - S. aureus				x	6	0	6	mixed				x	laboratory confirmed	camping	non respect of cold chain
Staphylococcus - S. aureus		x			2	0	0	mixed				x	laboratory confirmed	take-away	bad hygienic conditions

Staphylococcus - S. aureus	x		5	0	0	mixed		x	laboratory confirmed	crèche	temperature abuse
Staphylococcus - S. aureus	x		28	0	28	dairy		x	laboratory confirmed	camping	
Unknown	19	47	436	0	6	mixed	x		descriptive epidemiology		