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 2007

INFORMATION ON THE REPORTING AND MONITORING SYSTEM

Country: **Belgium**
Reporting Year: **2007**
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 2007. 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 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 slaughtered animals	Year*	Livestock numbers (live animals)	Year*	Number of holdings	Year*
Cattle (bovine animals)	dairy cows and heifers							10695	
	meat production animals			495492					
	calves (under 1 year)			306961					
	in total			802553		2699258		38690	
Deer	farmed - in total					12648		2907	
	wild - at game handling establishment - Surveillance - official controls			7173					
	wild - roe deer - at game handling establishment - Surveillance - official controls			3651					
Ducks	parent breeding flocks					800		1	
	meat production flocks					37080		16	
	in total					37880		17	
Gallus gallus (fowl)	breeding flocks, unspecified - in total (1)	702				2089933		221	
	laying hens (2)					9878202		347	
	broilers	8809				25311775		1036	
	in total			274505734					
Geese	parent breeding flocks					1400		2	
	meat production flocks					400		1	
Goats	in total					46950		13381	
Pigs	breeding animals (3)					632360			
	fattening pigs					5007614			
	in total			11536172				9950	
Rabbits	wild - at game handling establishment - Surveillance - official controls (4)			31191					
	farmed - at slaughterhouse - Surveillance - official controls			2888103					
Sheep	in total (5)			137492		220611		31523	
Solipeds, domestic	horses - in total			10064		59600			
Turkeys	meat production flocks					267555		45	
	parent breeding flocks					300		1	
	in total					267855		46	

Wild boars	wild - at game handling establishment - Surveillance - official controls			12648					

(1): rearing:
holdings: 71
flocks: 206
breeders in production:
holdings: 150
flocks: 496
(2): rearing holdings: 93
holding with layers in production: 347
(3): Gilts, sows and boars
(4): Rabbits and hares
(5): Number of slaughtered sheep and goats

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

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

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

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

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 in slaughterhouses and cutting plants.
Sampling was done by a specially trained staff. For most matrixes, approximatively 100 - 200 independent samples were taken per matrix in order to detect a minimal contamination rate of 1% with 95% confidence.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

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).

Definition of positive finding

At slaughterhouse and cutting plant

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

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 6579:2002

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

Frequency of the sampling

Samples have been taken every week from the first to the 52nd week, 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 a 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. Indiana	S. Paratyphi B	S. Virchow	S. Derby	S. Infantis	S. Agona	S. Manhattan	S. Braenderup	S. Banana	S. Rissen	Other serotypes	S. Montevideo	S. Hadar	S. Enteritidis	S. Typhimurium
Meat from broilers (Gallus gallus)																				
fresh																				
- at slaughterhouse	DPA 003	single	1g	58	6	1														
- at processing plant	TRA 200	batch	25g	170	11	1	1	2									1	1		2
with skin																				
- at retail - Monitoring	DIS 821	single	25g	131	12															
skinned																				
- at retail - Monitoring	DIS 822	single	25g	140	6															
minced meat																				
intended to be eaten cooked																				
- at retail (1)	DIS 880	batch	10g	70	9															
meat preparation																				
intended to be eaten cooked																				

- at processing plant	TRA 202	batch	10g	81	15	1	1	1										2	1	2
- at retail (2)	DIS 826	batch	10g	27	3															
- at retail - Monitoring	DIS 863	batch	25g	419	55															
meat products																				
raw but intended to be eaten cooked																				
- at processing plant	TRA 208	single	10g	32	0															
- at retail	DIS 876	single	10g	86	5				3											1
carcass																				
- at retail - Monitoring	DIS 820	single	25g	145	10															
- at slaughterhouse - animal sample - faeces - Monitoring ((caeca))	DPA 019	batch	25g	59	8		2								1			1		
Meat from other poultry species																				
carcass																				
- at slaughterhouse - animal sample - Monitoring	DPA 004	single	1g	176	80				1	8	4	2	2	1		4			48	8
- at retail - Monitoring (laying hens)	DIS 819	single	25g	113	12		1	2	1		1								6	1
- at slaughterhouse - animal sample - Monitoring (caeca laying hens)	DPA 020	batch	25g	142	66															

(1) : n=5,c=1
(2) : n=5,c=1

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

	Salmonella spp., unspecified	S. Mbandaka	S. Havana	S. Livingstone
Meat from broilers (Gallus gallus)				
fresh				
- at slaughterhouse	2	1		2
- at processing plant	3			
with skin				
- at retail - Monitoring	12			
skinned				
- at retail - Monitoring	6			
minced meat				
intended to be eaten cooked				
- at retail (1)	9			
meat preparation				
intended to be eaten cooked				
- at processing plant	6		1	
- at retail (2)	3			
- at retail - Monitoring	55			
meat products				

raw but intended to be eaten cooked										
- at processing plant										
- at retail		1								
carcass										
- at retail - Monitoring		10								
- at slaughterhouse - animal sample - faeces - Monitoring ((caeca))		3								1
Meat from other poultry species										
carcass										
- at slaughterhouse - animal sample - Monitoring		2								
- at retail - Monitoring (laying hens)										
- at slaughterhouse - animal sample - Monitoring (caeca laying hens)		66								

(1) : n=5,c=1
(2) : n=5,c=1

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
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at retail	DIS 849	single	25g	81	0			
made from pasteurised milk								
- at retail	DIS 818	single	25g	122	0			
Cheeses made from goats' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at retail	DIS 851	single	25g	10	0			
made from pasteurised milk								
- at retail	DIS 878	single	25g	20	0			
Cheeses made from sheep's milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at retail	DIS 850	single	25g	10	0			
made from pasteurised milk								
- at retail	DIS 879	single	25g	19	0			
Dairy products (excluding cheeses)								
butter								
made from raw or low heat-treated milk								
- at retail	DIS 858	single	25g	16	0			
milk powder and whey powder								
- at processing plant	TRA 123	single	25g	20	0			
ice-cream								
- at retail	DIS 887	single	25g	58	0			

Cheeses, made from unspecified milk or other animal milk									
soft and semi-soft									
made from raw or low heat-treated milk									
- at processing plant - Monitoring	TRA 133	single	25g	78	0				
made from pasteurised milk									
- at processing plant - Monitoring	TRA 134	single	25g	118	0				

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

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Hadar	S. Derby	S. Anatum	S. Rissen	S. London	S. Montevideo	S. Thompson	S. Agona	S. Bareilly	S. Coeln	S. Eboko	S. Freetown	S. Livingstone	S. Senftenberg	S. Virchow
Meat from pig																				
fresh																				
- at slaughterhouse	DPA 002	single 600cm2		293	47		8	2	1	1										
- at processing plant	TRA 306	single	25g	537	22		6			1								2		
meat products																				
raw and intended to be eaten raw																				
- at retail - Monitoring (raw ham)	DIS 817	single	25g	31	0															
unspecified, ready-to-eat																				
- at retail - Monitoring (dry sausages and salami)	DIS 827	single	25g	32	0															
raw ham																				
- at processing plant - Monitoring	TRA 317	single	25g	65	1															
carcass																				

- at slaughterhouse - animal sample - lymph nodes - Survey	DPA 028	single	25g	654	88		7	11	1		2	1	1	1	1	1	1	1	1	1
- at slaughterhouse - animal sample - carcass swabs - Survey	DPA 028	single	100cm2	386	75		15		1									3		
Meat from bovine animals																				
minced meat																				
intended to be eaten raw																				
- at retail	DIS 816	single	25g	128	2															
meat preparation																				
intended to be eaten raw																				
- at retail	DIS 815	single	25g	132	3		3													
Other products of animal origin																				
gelatin and collagen	TRA 357	single	25g	10	0															
Meat from bovine animals and pig																				
minced meat																				
intended to be eaten raw																				
- at retail - Monitoring	DIS 823	single	25g	129	8															
intended to be eaten cooked																				
- at retail - Monitoring	DIS 888	single	10g	136	10															
Meat from other animal species or not specified																				
meat preparation																				
intended to be eaten raw																				
- at retail - Monitoring	DIS 874	single	25g	47	1		1													
- at processing plant - Monitoring	TRA 316	single	25g	88	10															

intended to be eaten cooked																										
- at retail - Monitoring	DIS 875	single	10g	40	1																	1				
- at processing plant - Monitoring	TRA 312	single	10g	80	0																					
mechanically separated meat (MSM)																										
- at processing plant - Monitoring	TRA 209	single	10g	126	30	2	4						1													

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

	S. Senegal	S. Ohio	S. Brandenburg	S. Infantis	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified	Not typeable	S. Paratyphi B	S. Corvallis
Meat from pig										
fresh										
- at slaughterhouse						34	1			
- at processing plant						12	1			
meat products										
raw and intended to be eaten raw										
- at retail - Monitoring (raw ham)										
unspecified, ready-to-eat										
- at retail - Monitoring (dry sausages and salami)										
raw ham										
- at processing plant - Monitoring							1			
carcass										
- at slaughterhouse - animal sample - lymph nodes - Survey					3	50	5			

- at slaughterhouse - animal sample - carcass swabs - Survey	1	1	1	1		47	2	3		
Meat from bovine animals										
minced meat										
intended to be eaten raw										
- at retail							1			1
meat preparation										
intended to be eaten raw										
- at retail										
Other products of animal origin										
gelatin and collagen										
Meat from bovine animals and pig										
minced meat										
intended to be eaten raw										
- at retail - Monitoring						5	3			
intended to be eaten cooked										
- at retail - Monitoring							10			
Meat from other animal species or not specified										
meat preparation										
intended to be eaten raw										
- at retail - Monitoring										
- at processing plant - Monitoring						9	1			
intended to be eaten cooked										
- at retail - Monitoring										
- at processing plant - Monitoring										

mechanically separated meat (MSM) - at processing plant - Monitoring			2			2	10	8		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	S. Derby
Eggs									
table eggs									
- at retail	DIS 868	single	25g	117	0				
Egg products									
- at processing plant	TRA 105	single	25g	82	0				
liquid									
- at retail - Monitoring	DIS 885	single	25g	76	1				1
dried									
- at retail - Monitoring	DIS 886	single	25g	24	0				
Crustaceans									
unspecified									
cooked									
- at retail	DIS 852	single	25g	29	0				
raw									
- at processing plant	TRA 403	single	10g	32	0				
- at retail	DIS 811	single	10g	31	0				
Live bivalve molluscs									
- at retail - Monitoring	DIS 806	single	25g	60	1			1	
mussels									
non-depurated									
- at farm - Surveillance (1)	DPA 029	single	25g	6	0				
oysters									
non-depurated									
- at farm - Surveillance (2)	DPA 029	single	25g	6	0				
Fruits and vegetables									
precut									
ready-to-eat									
- at retail - Monitoring	DIS 813	single	25g	19	0				
- at processing plant - Monitoring	TRA 502	single	25g	22	0				
Juice									

fruit juice									
unpasteurised	DIS 872	single	25g	20	0				
Fish									
raw									
- at retail - Monitoring	DIS 873	single	25g	62	1		1		
- at processing plant - Monitoring	TRA 417	single	25g	30	0				

(1) : Samples from mussels are the at the production area (sea).
(2) : Samples of oysters are taken at the production area.

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 4 and 16 weeks and every 2 weeks during production. An official control takes place at 22 weeks, 46 weeks and 62 weeks. A specific Salmonella control is performed 4 times a year in the hatcheries by the owner.

Laying hens flocks

As of july 2007, all laying hen flocks on farms with at least 200 laying hens are under a Salmonella control programme. Flocks are sampled by the owner at the age of day old chicks, 16, 24, 39 and 54 weeks and in the last 3 weeks of production.

Frequency of the sampling

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

Other: at the age of 4 and 16 weeks

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

Every 2 weeks

Laying hens: Day-old chicks

Every flock is sampled

Laying hens: Rearing period

At the age of 16 weeks weeks

Laying hens: Production period

Every 15 weeks

Laying hens: Before slaughter at farm

Every flock is sampled

Laying hens: At slaughter

Sampling distributed evenly throughout the year

Type of specimen taken

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

Internal linings of delivery boxes

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

Socks/ boot swabs

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

Socks/ boot swabs

Laying hens: Day-old chicks

Internal linings of delivery boxes

Laying hens: Rearing period

Faeces

Laying hens: Production period

Faeces

Laying hens: Before slaughter at farm

Faeces

Laying hens: At slaughter

Other: caeca

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

Samples are taken by the owner at 4 weeks and by one of the animal health organisations at 16 weeks, both in accordance with regulation (EC) Nr. 1003/ 2005.

Breeding flocks: Production period

All samples are taken in accordance with Regulation (EC) Nr. 1003/ 2005.

Laying hens: 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.

Laying hens: Rearing period

Samples are taken in accordance with Regulation (EC)Nr. 1168/ 2006.

Laying hens: Production period

Samples are taken in accordance with Regulation (EC)Nr. 1168/ 2006.

Laying hens: Before slaughter at farm

Samples are taken in accordance with Regulation (EC) Nr. 1168/ 2006.

Laying hens: 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 Salmonella.

Case definition

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

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

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

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

Laying hens: 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.

Laying hens: 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.

Laying hens: Production 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.

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: Rearing period

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)

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

Laying hens flocks

Vaccination against Salmonella Enteritidis is compulsory and vaccination against Salmonella Typhimurium is 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, biosecurity measures).

Laying hens flocks

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

Control program/ mechanisms

The control program/ strategies in place

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

The national control programme for Salmonella in breeding flocks is based on Regulations (EG) Nrs. 2160/ 2003, 1068/ 2005 and 1177/ 2006.

Laying hens flocks

The national control programme for Salmonella in laying hens is based on Regulations (EC) Nrs. 2160/ 2003, 1177/ 2006 and 1168/ 2006.

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 disinfection of housing after removal of the breeding flock.

Laying hens flocks

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

Notification system in place

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

Results of the investigation

In the parent flocks, 154 flocks of day-old chicks (egg and meat production) were tested of which 2 were positive for Salmonella. None were positive for S. Enteritidis, S. Typhimurium, S. Infantis, S. Hadar or S. Virchow. Two of the 154 flocks (egg and meat) tested positive at 16 weeks of which one for S. Typhimurium. 19 Flocks tested positive during production of which 1 for S. Enteritidis and 3 for S. Typhimurium. The differentiation between egg production and meat production is not made.
In laying hen flocks, one of the 163 day-old chicks flocks tested positive for Salmonella. At 16 weeks, 109 flocks were tested, 3 were positive for Salmonella of which one for S. Enteritidis. During production, 378 flocks were tested, 23 were positive for Salmonella of which 11 for S. Enteritidis and 2 for S. Typhimurium.

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.

Additional information

Laboratory information from the NRL Salmonella, AH is available.
In total 745 Salmonella strains from poultry origin were analysed in 2007, which is 24% less than in 2006, when the European co-ordinated monitoring programme in broilers was organised. In 2007, the EU programme sampled turkey farms, which is a relatively limited sector in Belgium. During both 2006 and 2007 the official monitoring of broilers at the abattoir was going on.

The proportion of serotype Enteritidis (38.5%), Infantis (10.5%) and to a lesser extent Typhimurium isolates (7.9%) increased as compared to 2006 (27.7%, 3.3% and 5.2%, respectively); that of Salmonella Paratyphi B decreased from 23.2% in 2006 to 11.3% in 2007.
The origin of 336 Salmonella poultry isolates was known in more detail. Only 15 strains were from breeders, and serotype Enteritidis was not identified. Three isolates belonged to serotype Typhimurium. The majority of layer isolates (n=36) were Salmonella Enteritidis (44.4%), but also serotypes Braenderup (11.1%) and Typhimurium (8.3%) were found. In addition, 3 Salmonella Gallinarum strains were typed. The majority of broiler isolates were Salmonella Enteritidis (64.2%), and also serotype Infantis (9.8%) was frequently identified. Other frequent serotypes were Paratyphi B (all var. Java) (7.7%) and Typhimurium (6.7%).
Evolution in Belgium. Yearly, the number of poultry isolates sent to the NRL was approximately 700 to 1 100, except for 2005 when the European co-ordinated monitoring among layers caused a significant rise of isolates (almost 1 500 in total). Salmonella Enteritidis is the most prevalent serotype, and its proportion is unmistakably raising, reaching its highest value in 2007. The proportion of Typhimurium strains fluctuates between 5.2% and 13.0%. The raise of Salmonella Virchow strains in 2000-2003 has come to an end, whereas Salmonella Paratyphi B and eventually Salmonella Infantis may become more important, especially in broilers.

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 4 and 16 weeks and every 2 weeks during production. An official sampling takes place at 16, 22, 46 and 56 weeks. 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

Other: at the age of 4 and 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

Broiler flocks: At slaughter (flock based approach)

Organs:caeca

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

Samples are taken by the owner at 4 weeks and by one of the animal health organisations at 16 weeks, both in accodance with regulation (EC) Nr. 1003/ 2005. The samples are analyzed in the laboratories of DGZ or ARSIA.

Breeding flocks: Production period

All samples are taken in accordance with Regulation (EC) Nr. 1003/ 2005.

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.

Broiler flocks: At slaughter (flock based approach)

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 Salmonella.

Case definition

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

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

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

A sample is considered positive if Salmonella Enteritidis, Typhimurium, Hadar,

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

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

Broiler flocks

There is no vaccination policy for broiler flocks.

Other preventive measures than vaccination in place

Broiler flocks

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

Control program/ mechanisms

The control program/ strategies in place

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

The national Salmonella control programme in breeding flocks is based on Regulations (EC) Nrs. 2160/ 2003, 1003/ 2005 and 1177/ 2006.

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. The house is cleaned and disinfected before a new flock may enter the house. If Salmonella is detected by the swab sampling performed after the cleaning and disinfection and before repopulation, the house has te be cleaned and disinfected until Salmonella can not be found.

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 before human consumption.
4) Positive breeding flocks are slaughtered within one month and at the end of the day.

5) Cleaning and disinfection of housing after removal of the breeding flock until Salmonella can not be found in a swabcontrol.

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

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

The results of the breeder flocks is discussed under 'Salmonella spp. in Gallus gallus - breeding flocks for egg production and flocks of laying hens'.
5121 flocks of broilers were sampled as one-day chicks, of which 14 were positive for Salmonella. 8809 flocks of broilers were sampled in the last three weeks of production. 275 flocks were positive for Salmonella.

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

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.

Additional information

Laboratory information is available from the NRL Salmonella, AH which receives isolates for serotyping and antibiotic resistenca testing.
The number of turkey strains (n=74) is relatively high due to the European co-ordinated monitoring organised in 2007. Of these, 41.9% were Salmonella Paratyphi B strains, of which only 1 isolate was tartrate positive (var. Java) and 30 tartrate negative. Another 41.9% belonged to serotype Kottbus, a serotype only identified among birds and poultry.

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

Breeding herds

For diagnostic purposes and in the framework of research projets, pigs are sampled and

isolates are sent to the NRL Salmonella, AH for serotyping and resistance anaysis.

Multiplying herds

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

Fattening herds

Blood samples from fattening pigs taken in the framework of the monitoring of Aujeszky's disease, are also analysed for Salmonella.
For diagnostic purposes and in the framework of research projets, pigs are sampled and isolates are sent to the NRL Salmonella, AH for serotyping and resistance anaysis.

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

The Belgian Federal Agency for the Safety of the Food Chain (FASFC) installed a national Salmonella surveillance and control programme in pigs in January 2005 which became compulsory by means of a Royal decree in July 2007.
Depending on the capacity of the farm, 10 to 12 blood samples are taken of the fattening pigs. The blood samples are taken of all ages.

Case definition

Fattening herds at farm

In a first stage of the Salmonella programme in pigs, the FASFC aimed to identify maximum 10% of the farms which keep fattening pigs with high levels of Salmonella-specific antibodies (risk farms with high SP ratio's). Since July 2007, risk farms are identified as farms with a mean SP ratio equal or higher than 0.6 for 3 consecutive sampling rounds.

Diagnostic/ analytical methods used

Fattening herds at farm

Serological method: indirect LPS--Salmonella ELISA

Vaccination policy

Breeding herds

In 2007, no vaccine was authorized in Belgium for the vaccination of pigs against Salmonellosis.

Multiplying herds

In 2007, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Fattening herds

In 2007, no vaccine was authorized in Belgium for the vaccination of pigs against salmonellosis.

Control program/ mechanisms

The control program/ strategies in place

Fattening herds

Since July 2007, risk farms are identified as farms with a mean SP ratio equal or higher than 0.6 for 3 consecutive sampling rounds. Following mandatory measures are applied on risk farms:
1) completion of a checklist on biosecurity and other measures;
2) formulating and implementing a herd specific salmonella action plan, based on the result of the checklist;
3) bacteriological evaluation of the farm.

Measures in case of the positive findings or single cases

The measures are explained under control strategy in place.

Notification system in place

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

Results of the investigation

6978 were sampled in 2007. 2171 farms had at least once a mean S/ P ratio of more than 0.6. A total of 238 farms had 3 consecutive mean S/ P ratio's >06.

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

Laboratory findings from the NRL Salmonella, AH concerning isolates that were sent in for serotyping in 2007 are available. As compared to 2006, about 20% less pig strains were analysed (n=391; n=481 in 2006). Almost the same proportion of Typhimurium isolates was found (65.2%; 69.0% in 2006), but less Derby (7.2%; 16.4% in 2006).
Evolution in Belgium: Salmonella Typhimurium continues to be the most prevalent serotype among pig isolates, representing more than 60% of the total number of pig Salmonella. Serotype Derby is the

second most important serotype, but represents less than 10% of the strains.

G. Salmonella spp. in bovine animals

Monitoring system

Sampling strategy

There was no official monitoring of cattle in 2007 in Belgium. Isolates were diagnostic samples sent to the NRL Salmonella, animal health, for serotyping.

Methods of sampling (description of sampling techniques)

Animals at farm

Samples are taken for diagnostic reasons and analysed at regional laboratories. Isolates are sent to the NRL Salmonella, AH for serotyping (and resistance typing).

Vaccination policy

In 2007, no vaccine was authorized for the vaccination of cattle against salmonellosis.

Results of the investigation

The number of Salmonella isolates from cattle in 2007 (n=80) has almost doubled as compared to 2006 (n=46 in 2006). Most frequently found serotype is Dublin (66.3%), followed by serotype Typhimurium (20.0%)

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

In cattle, Salmonella Dublin continues to be the principal serotype since 2002, and reaching a proportion of more than 60%. Salmonella Typhimurium (about 30%) is the second most important serotype in 2007.

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	S. Hadar	S. Infantis	S. Virchow	Salmonella spp., unspecified
Gallus gallus (fowl)										
grandparent breeding flocks, unspecified										
during production period		flock	2	0						
parent breeding flocks, unspecified										
day-old chicks		batch	154	1						1
during rearing period		flock	206	2		1				1
during production period		flock	496	19	1	3			2	13

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
Gallus gallus (fowl)							
laying hens							
day-old chicks		batch	163	1			1
during rearing period		flock	109	3	1		2
during production period		flock	378	23	11	2	10
broilers							
day-old chicks		batch	5121	14			14
during rearing period		flock	8809	275			275
Ducks							
meat production flocks		flock	1	0			
Turkeys							
meat production flocks		flock	91	7			7

Footnote

Results of the Salmonella baseline study in turkeys are not included in the table. Following results were obtained in meat turkeys:
units: flocks
number of flocks sampled: 76
number of salm positive: 12
number of S. Enteritidis: 3
number of other salmonella's :9

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		flock	12	1			1

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	holding	6978	236			236

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
Feed material of land animal origin		single	25g	68	0			
Feed material of marine animal origin		single	25g	69	0			

Table Salmonella in other feed matter

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for Salmonella spp.	S. Enteritidis	S. Typhimurium	Salmonella spp., unspecified
Feed material of oil seed or fruit origin		single	25g	104	1		1	

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. Agona
Compound feedingstuffs for poultry (non specified)									
final product		single	25g	169	2				2
Compound feedingstuffs for poultry - laying hens									
final product		single	25g	81	0				
Compund feedingstuffs for poultry - broilers									
final product		single	25g	37	0				
Compound feedingstuffs, not specified									
final product		single	25g	118	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		Turkeys - at farm	
Sources of isolates (*)		M	C	M	C	M	C	M	C	M	C
Number of isolates in the laboratory	N=		80		391		745				74
Number of isolates serotyped	N=	0	80	0	391	0	745	0	0	0	74
Number of isolates per type											
S. Agona			0		4		11				2
S. Anatum			0		8		1				
S. Derby			0		28		0				
S. Dublin			53				3				
S. Enteritidis			0		0		287				
S. Hadar			0		0		33				
S. Indiana			0		0		20				
S. Infantis			1		13		78				
S. Kottbus			0		0		0				31
S. Livingstone			1		16		7				0
S. Paratyphi B			0		0		4				30
S. Rissen			0		5		13				0
S. Senftenberg			0		0		13				0
S. Typhimurium			16		255		59				
S. Virchow			0		0		15				0
S. Paratyphi B var. Java			0		0		80				1
Not typeable			1		1		24				0

Other serotypes				8			61		97	10

Footnote

(*) M : Monitoring, C : Clinical
Laboratory findings, NRL Salmonella, AH

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 2007.

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
(µg / ml)
Ampicillin 16
Ceftriaxon 2
Streptomycin 32
Kanamycin 64
Tetracycline 16
Sulfamethoxazol 256
Trimethoprim 16
Nalidixic acid 32
Ciprofloxacin 4
Chloramphenicol 32
Gentamicin 4
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 343 Salmonella strains from pork were tested for their susceptibility also the strains isolated from pork carcasses and ileocecale lymphenodes in the frame of the directive 2007/ 407/ EG were incorporated in the results. Salmonella Typhimurium (178) and Salmonella Derby (69) are the two most frequently isolated serotypes from pork. In total 33% of all the strains were sensitive to the tested antibiotics. A high degree of resistance was measured for tetracyclin 45%, sulfamethoxazol 45%, ampicillin 42% and streptomycin 36%. Only for ciprofloxacin no resistance was noticed. A low percentage strains were resistant against ceftriaxon (3%), kanamycin (1%) and nalidixic acid (3%). Only 1 strain was resistant against Chloramphenicol resistance was determined in 14 of the strains. Multi-resistance was observed in 30% of the strains (> 4 antimicrobials). Compared to previous years

in general the same level in antimicrobial resistance was observed, except for the 3rd generation cephalosporins it is the first year that 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)
Antimicrobial Breakpoints
(µg / ml)
Ampicillin 16
Ceftriaxon 2
Streptomycin 32
Kanamycin 64
Tetracycline 16
Sulfamethoxazol 256
Trimethoprim 16
Nalidixic acid 32
Ciprofloxacin 4
Chloramphenicol 32
Gentamicin 4
Salmonella from meat and meat products: list of antimicrobials tested. Minimum Inhibitory Concentrations were determined following the NCCLS standards.

Results of the investigation

In 2007, 459 Salmonella enterica isolates from poultry meat were tested for their antimicrobial susceptibility. Of all tested strains 40% were sensitive for all tested antibiotics. Most resistance was found to sulfamethoxazol (35%), tetracyclin (22%), streptomycin (32%) trimethoprim (36%), ampicillin (44%) and nalidixic acid (27%). Chloramphenicol resistance was observed in 6% of the Salmonella strains isolated from poultry. Twelve percent of the strains were resistant against the 3rd generation cephalosporin ceftriaxon. Only one strain was resistant for ciprofloxacin and 2% resistance was found against kanamycin. For the Salmonella isolates from broiler the percentage of resistance is higher then those observed in poultry. In total 30 different serotypes were isolated with the serotypes Typhimurium, Virchow, Hadar and Paratyphi B. The percentage resistance of Salmonella isolated from the carcasses of spent hens was much lower. The most prevalent serotype in these matrix was Salmonella Enteritidis which is fully sensitive for most tested antibiotics. Compared to previous years the percentage resistance is in the same range as these measured in 2004. The resistance against the 3rd generation cephalosporins increased and one strain was resistant against ciprofloxacin.

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 CODA - CERVA for isolation of Salmonella and for typing of Salmonella strains were routinely encoded in the Laboratory Management Information System (LIMS). Subsequently, the analytical results were introduced in the same database. The data on Salmonella isolation, serotyping and on antibiotic resistance as presented in this document were extracted from the LIMS files that were closed in 2007.

Laboratory methodology used for identification of the microbial isolates

Isolation of Salmonella at CODA - CERVA was done based on ISO6579:2002. The Salmonella isolates were serotyped following the Kauffmann-White scheme (see www.bacterio.cict.fr/ kauffmann-white/ scheme.html for information). In a limited number of cases strains were sent to the Scientific Institute for Public Health (www.iph.be) in Brussels for serotyping. Both isolation and serotyping at CODA - CERVA was done under Belac (www.belac.fgov.be) accreditation conditions (ISO 17025).

Laboratory used for detection for resistance

Antimicrobials included in monitoring

List of the antimicrobials tested
Abbreviation Antimicrobial Amount of antimicrobial
Ap Ampicillin 33microg
Cef Ceftiofur 30microg
Sm Streptomycin 100microg
Ne Neomycin 120microg
Gm Gentamicin 40microg
Tc Tetracycline 80microg
Su Sulfonamides 240microg
Tsu Trimethoprim - sulfonamides 5,2microg + 240microg
Nal Nalidixic acid 130microg
Enr Enrofloxacin 10microg
Cm Chloramphenicol 60microg
Ff Florfenicol 30microg
Susceptibility tests were performed by the disk diffusion test, using Neo-Sensitabs (Rosco). Tests and interpretation were done according to the manufacturers guidelines using an inoculum and breakpoints as described by CLSI (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.

Breakpoints used in testing

Agar diffudion tests are used (ROSCO), with the following limits (in mm):
ampicillin: 17-19
ceftiofur: 20-22
streptomycin: 23-25
neomycin: 20-22
gentamicin: 20-22
tetracyclin: 20-22

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

Results of the investigation

The susceptibility of 891 Salmonella isolates was tested in 2007. Within the same LIMS dossier only one isolate belonging to the same serotype was selected for susceptibility testing, and therefore strains were likely to be independent from each other.
A total of 550 Salmonella isolates (61.7%) were fully susceptible to all antimicrobial drugs tested. Most resistance was found against Ap (27.6%), Su (26.8%), Tc (24.8%), St (24.5%), but also against TSu (16.6%) and Nal (11.6%). Seventy-two strains were found resistant against Cm (8.1%); about 57% of these isolates were also resistant against Ff. Moreover, twenty-nine isolates were found Cef resistant (3.3%). Most of the cephalosporin resistant strains originated from poultry (n=26) (14 Salmonella Infantis, 6 Salmonella Paratyphi B var. Java) and two from pigs. In addition, fife Enr resistant strains (0.6%) (two bovine Salmonella Typhimurium, two Paratyphi B from poultry and one Dublin) were detected. Finally, four strains were resistant to neomycin and one to gentamicin.
Most (88,6%) Salmonella Agona isolates (n=35) were fully susceptible for all antimicrobials tested. Three strains were multiresistant and had the profile Ap St Tc Su Cm Ff.
Most of Salmonella Derby strains (n=21) were sensitive (71.4%), although some resistance against Tc (23.8%), Su (19.0%), St (14.3%) and Ap (14.3%) was noticed.
As for Salmonella Dublin isolates (n=31; most from cattle), 41.9% were found completely susceptible. Resistance against Su (48.43%), Cm and St (both 45.2%) and Nal (32.3%) was noticed.
Most Salmonella Enteritidis isolates (n=105) were susceptible (95.2%). Resistance was only found against Ap (3.8%; 4 isolates) and against Nal (1.0%).
All Salmonella Hadar (n=19) strains were found resistant against Nal (100%). In addition, Tc (94.7%) and St (63.2%) were frequently found, and to a lesser extent against Ap (26.3%). Twelve isolates (63.2%; 12 isolates) were resistant to Nal St and Tc.
Less than 10% of the Salmonella Indiana strains (n=31) were fully susceptible. Twenty-six (83.9%) of these strains had the profile Ap St Tc Su TSu.
About three quarter (76.3%) of the Salmonella Infantis strains (n=59) were susceptible. All resistant strains (n=14) originated from poultry and were Ap and Cef resistant. Few strains showed co-resistance to St, TSu, Su and Tc.
As for Salmonella Paratyphi B (n=33) almost only tartrate positive (i.e. var. Java; n=30) strains were tested. Only 10% of variety Java were sensitive. Resistance was mainly observed against Su (76.7%), TSu (73.3%), St (70.0%) and Nal (66.7%). Also resistance against Ap was frequently observed (56.7%), and six strains (all from poultry) were Cef resistant. All three Salmonella Paratyphi B, tartrate negative isolates (2 from poultry, one from turkeys) had the profile Ap Su TSu Nal.
Fourty-four percent of Salmonella Typhimurium isolates (n=248) were found susceptible; classic variant (O5+) strains were found slightly more often susceptible (45.3%) than Copenhagen variant (O5-) isolates (41.6%). Pentaresistance Ap St Tc Su Cm was encountered in 13.8% and 20.2% of O5+ and O5- isolates, respectively. Cef resistance was found in one poultry O5+ and one pig O5- isolate.
Only 18.2% of the Salmonella Virchow isolates (n=11) were susceptible to the antimicrobials tested. Most resistance was found against Nal (72.7%) and Ap (54.5%).
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. Derby in Meat from pig - quantitative data [Dilution method]

	S. Derby
	Meat from pig
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	69

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	69	0	0	0	0	0	0	1	20	48	0	0	0	0	0	0	0	0	0	0		
Streptomycin	32	69	13	0	0	0	0	0	0	0	2	22	27	5	0	9	2	1	1	0	0		
Amphenicols																							
Chloramphenicol	32	69	0	0	0	0	0	0	0	1	9	59	0	0	0	0	0	0	0	0			
Cephalosporins																							
3rd generation cephalosporins	2	69	1	1	17	22	28	0	0	0	0	0	0	1	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	69	0	66	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	69	6	0	0	0	1	12	42	8	0	0	0	1	0	0	5	0	0	0	0		
Quinolones																							
Nalidixic acid	32	69	1	0	0	0	0	0	0	1	42	25	0	0	1	0	0	0	0	0	0		
Sulfonamides																							
Sulfonamide	256	69	14	0	0	0	0	0	0	0	0	0	0	7	26	13	9	0	14	0	0		
Tetracyclines																							
Tetracyclin	16	69	18	0	0	0	0	0	25	1	19	6	0	2	4	0	12	0	0	0	0		
Trimethoprim	16	69	5	0	0	0	3	39	22	0	0	0	0	5	0	0	0	0	0	0	0		

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

	S. Typhimurium Meat from pig - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	178

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	178	4	0	0	0	0	0	0	67	94	11	2	0	0	0	4	0	0	0	0		
Streptomycin	32	178	98	0	0	0	0	0	0	0	1	41	28	10	22	24	28	14	10	0	0		
Amphenicols																							
Chloramphenicol	32	178	46	0	0	0	0	0	0	0	94	29	7	2	12	1	33	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	178	2	0	55	76	44	1	0	0	1	0	0	1	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	178	0	153	20	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	178	112	0	0	0	0	9	48	8	1	0	0	17	0	0	95	0	0	0	0		
Quinolones																							
Nalidixic acid	32	178	0	0	0	0	0	0	0	1	108	60	7	2	0	0	0	0	0	0	0		
Sulfonamides																							
Sulfonamide	256	178	112	0	0	0	0	0	0	0	0	2	1	10	19	22	12	2	22	88	0		
Tetracyclines																							
Tetracyclin	16	178	102	0	0	0	1	24	4	30	3	0	14	31	9	62	0	0	0	0	0		
Trimethoprim	16	178	44	0	0	0	15	108	10	0	0	1	0	44	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		Gallus gallus (fowl) - laying hens		Gallus gallus (fowl) - broilers	
Isolates out of a monitoring programme												
Number of isolates available in the laboratory	52		256		392		18					
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides												
Gentamicin	52	1	256	0	392	0	18	0				
Neomycin	52	1	256	2	392	1	18	0				
Streptomycin	52	26	256	88	392	71	18	3				
Amphenicols												
Chloramphenicol	52	20	256	29	392	15	18	2				
Florfenicol	52	7	256	17	392	13	18	1				
Cephalosporins												
3rd generation cephalosporins	52	0	256	2	392	26	18	0				
Fluoroquinolones												
Enrofloxacin	52	2	256	0	392	2	18	0				
Fully sensitive	52	20	256	122	392	261	18	14				
Penicillins												
Ampicillin	52	15	256	98	392	93	18	4				
Quinolones												
Nalidixic acid	52	13	256	2	392	65	18	2				
Sulfonamides												
Sulfonamide	52	28	256	101	392	71	18	4				
Tetracyclines												
Tetracyclin	52	14	256	108	392	67	18	2				
Trimethoprim + sulfonamides	52	6	256	54	392	54	18	3				

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

	Salmonella spp.
	Meat from broilers (Gallus gallus) - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	341

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	341	10	0	0	0	0	0	3	121	185	13	8	1	0	1	9	0	0	0	0		
Streptomycin	32	341	132	0	0	0	1	0	0	3	22	83	54	46	80	28	6	12	6	0	0		
Amphenicols																							
Chloramphenicol	32	341	17	1	1	0	0	0	0	8	193	93	26	2	8	0	9	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	341	54	0	89	115	74	2	3	4	27	0	3	24	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	341	1	190	22	10	81	27	9	0	1	0	1	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	341	178	0	0	0	0	21	110	25	7	0	0	78	0	0	100	0	0	0	0		
Quinolones																							
Nalidixic acid	32	341	113	0	0	0	0	0	0	1	145	69	11	2	54	0	59	0	0	0	0		
Sulfonamides																							
Sulfamethoxazol	256	341	143	0	0	0	0	0	0	0	0	1	7	45	90	37	18	4	139	0	0		
Sulfonamide	256	341	143	0	0	0	0	0	0	0	0	1	7	45	90	37	18	4	139	0	0		
Tetracyclines																							
Tetracyclin	16	341	90	0	0	0	0	0	99	42	81	26	3	7	28	11	44	0	0	0	0		
Trimethoprim	16	341	155	0	0	0	29	131	18	5	3	0	0	155	0	0	0	0	0	0	0		

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

	Salmonella spp.
	Meat from pig - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	343

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	343	4	0	0	0	0	0	8	132	181	16	2	0	0	0	4	0	0	0	0		
Streptomycin	32	343	125	0	0	0	0	0	0	2	11	102	68	35	27	38	32	17	11	0	0		
Amphenicols																							
Chloramphenicol	32	343	49	0	0	0	0	0	0	1	150	125	15	3	13	1	35	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	343	12	1	82	146	100	1	1	0	3	0	0	9	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	343	0	301	25	6	7	4	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	343	145	0	0	0	1	22	139	34	2	0	0	24	0	0	121	0	0	0	0		
Quinolones																							
Nalidixic acid	32	343	9	0	0	0	0	0	0	2	209	111	10	2	1	0	8	0	0	0	0		
Sulfonamides																							
Sulfamethoxazol	256	343	155	0	0	0	0	0	0	0	0	2	2	31	79	46	28	3	152	0	0		
Tetracyclines																							
Tetracyclin	16	343	153	0	0	0	0	1	58	20	91	20	0	18	38	12	85	0	0	0	0		
Trimethoprim	16	343	75	0	0	0	25	183	57	2	0	1	0	75	0	0	0	0	0	0	0		

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

	Salmonella spp. Meat from pig - at slaughterhouse - Survey
Isolates out of a monitoring programme (1)	
Number of isolates available in the laboratory	137

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Gentamicin	4	137	0	0	0	0	2	117	17	1	0	0	0	0	0	0	0	0	0	0	0		
Kanamycin	64	137	5	0	0	0	0	0	0	86	45	1	0	0	0	0	5	0	0	0	0		
Streptomycin	32	137	54	0	0	0	0	0	0	0	6	53	21	3	13	4	17	14	6	0	0		
Amphenicols																							
Chloramphenicol	32	137	24	0	0	0	0	0	0	0	58	49	5	1	0	0	24	0	0	0	0		
Florfenicol (2)	16	137	15	0	0	0	0	0	0	0	0	0	122	15	0	0	0	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	137	2	1	2	81	51	0	0	0	0	0	0	2	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	137	0	116	17	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	137	61	0	0	0	0	0	58	17	1	0	0	0	0	0	61	0	0	0	0		
Quinolones																							
Nalidixic acid	32	137	1	0	0	0	0	0	0	0	65	68	3	0	0	0	1	0	0	0	0		
Sulfonamides																							
Sulfonamide	256	137	69	0	0	0	0	0	0	0	0	0	5	2	13	38	10	4	65	0	0		
Tetracyclines																							
Tetracyclin	16	137	67	0	0	1	0	0	0	2	54	13	0	2	4	6	55	0	0	0	0		
Trimethoprim	16	137	22	0	0	0	8	58	45	3	1	0	0	22	0	0	0	0	0	0	0		
Trimethoprim + sulfonamides	4	137	22	0	4	20	63	23	4	0	1	0	0	22	0	0	0	0	0	0	0		

(1) : DPA028
(2) : by disque difusion and not by E-test

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

	Salmonella spp.
	Meat from broilers (Gallus gallus) - carcass - spent hens - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	118

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	118	0	0	0	0	0	0	3	32	81	2	0	0	0	0	0	0	0	0	0		
Streptomycin	32	118	14	0	0	0	0	0	0	20	48	15	12	9	2	9	1	2	0	0	0		
Amphenicols																							
Chloramphenicol	32	118	10	0	0	0	0	0	1	9	61	34	3	0	6	0	4	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	118	3	1	57	38	18	0	1	0	2	0	0	1	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	118	0	104	4	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	118	23	0	0	0	1	24	57	13	0	0	0	9	0	0	14	0	0	0	0		
Quinolones																							
Nalidixic acid	32	118	10	0	0	0	0	0	0	1	77	29	1	0	3	0	7	0	0	0	0		
Sulfonamides																							
Sulfamethoxazol	256	118	16	0	0	0	0	0	0	0	0	0	1	11	74	13	3	0	16	0	0		
Tetracyclines																							
Tetracyclin	16	118	12	0	0	0	0	0	60	12	26	2	6	0	4	4	4	0	0	0	0		
Trimethoprim	16	118	12	0	0	0	6	80	18	2	0	0	0	12	0	0	0	0	0	0	0		

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

	Salmonella spp.
	Meat from bovine animals - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	22

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Kanamycin	64	22	0	0	0	0	0	0	0	10	12	0	0	0	0	0	0	0	0	0	0		
Streptomycin	32	22	4	0	0	0	0	0	0	0	8	6	4	0	0	4	0	0	0	0	0		
Amphenicols																							
Chloramphenicol	32	22	1	0	0	0	0	0	0	0	12	9	0	0	0	1	0	0	0	0	0		
Cephalosporins																							
3rd generation cephalosporins	2	22	0	0	5	7	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	22	0	15	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	16	22	3	0	0	0	0	5	4	10	0	0	0	3	0	0	0	0	0	0	0		
Quinolones																							
Nalidixic acid	32	22	0	0	0	0	0	0	0	0	11	11	0	0	0	0	0	0	0	0	0		
Sulfonamides																							
Sulfamethoxazol	256	22	5	0	0	0	0	0	0	0	0	0	0	1	7	3	6	1	4	0	0		
Tetracyclines																							
Tetracyclin	16	22	5	0	0	0	0	0	5	2	10	0	0	1	3	0	1	0	0	0	0		
Trimethoprim	16	22	3	0	0	0	1	10	8	0	0	0	0	3	0	0	0	0	0	0	0		

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		yes			
Number of isolates available in the laboratory	22		343		459			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides								
Kanamycin	22	0	343	4	459	10		
Streptomycin	22	4		125		146		
Amphenicols								
Chloramphenicol	22	1		49		27		
Cephalosporins								
3rd generation cephalosporins	22	0		12		57		
Fluoroquinolones								
Ciprofloxacin	22	0		0		1		
Fully sensitive	22	17		115		183		
Penicillins								
Ampicillin	22	3		145		201		
Quinolones								
Nalidixic acid	22	0		9		123		
Resistant to 1 antimicrobial		1		40		23		
Resistant to 2 antimicrobials		0		21		38		
Resistant to 3 antimicrobials		1		23		65		
Resistant to 4 antimicrobials		0		42		58		
Resistant to >4 antimicrobials		3		102		92		
Sulfonamides								
Sulfonamide	22	5		155		159		
Tetracyclines								
Tetracyclin	22	5		153		102		
Trimethoprim	22	3		75		167		

Table Breakpoints for antibiotic resistance testing in Animals

Test Method Used

Disc diffusion

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							60			
Florfenicol							30			
Tetracyclines										
Tetracyclin							80			
Fluoroquinolones										
Ciprofloxacin										
Enrofloxacin							10			
Quinolones										
Nalidixic acid							130			
Trimethoprim										
Sulfonamides										
Sulfonamide							240			
Aminoglycosides										
Streptomycin							100			
Gentamicin							40			
Neomycin							120			
Kanamycin										
Trimethoprim + sulfonamides										
Cephalosporins										
3rd generation cephalosporins							30			
Penicillins										
Ampicillin							33			

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

Sampling strategy

At slaughterhouse and cutting plant

A monitoring programme was organised by FASFC to evaluate the level of Campylobacter spp. contamination of broiler meat in Belgian slaughterhouses and cutting plants.

Frequency of the sampling

At slaughterhouse and cutting plant

Sampling distributed evenly throughout the year

Type of specimen taken

At slaughterhouse and cutting plant

Surface of carcass

Methods of sampling (description of sampling techniques)

At slaughterhouse and cutting plant

The matrixes were carcasses, cuts and meat preparation of broilers. The Campylobacter spp. contamination levels were analysed : 0,01g carcasses, 1g cutting meat and 0,01g meat preparation.

Diagnostic/ analytical methods used

At slaughterhouse and cutting plant

Bacteriological method: ISO 10272:1995

B. C.,thermophilic in food

Monitoring system

Sampling strategy

A monitoring 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. upsaliensis	C. jejuni	Thermophilic Campylobacter spp., unspecified
Meat from broilers (Gallus gallus)										
fresh										
- at slaughterhouse	DPA 003	single	0.01g	235	53					53
- at processing plant	TRA 200	single	0.01g	257	24					24
with skin										
- at retail - Monitoring	DIS 821	single	0.01g	131	13					13
skinned										
- at retail - Monitoring	DIS 822	single	0.01g	140	5					5
minced meat										
intended to be eaten cooked										
- at retail (1)	DIS 880	single	1g	161	0					
meat preparation										
intended to be eaten cooked										
- at processing plant	TRA 202	batch	0.01g	79	7					7
- at retail	DIS 826	single	0.01g	138	5					5
- at retail - Monitoring (2)	DIS 863	single	1g	419	1					1
carcass										
- at retail - Monitoring	DIS 820	single	0.01g	144	28					28
- at slaughterhouse - animal sample - faeces - Monitoring (caeca)	DPA 019	batch	25g	236	121					121
Meat from turkey										
fresh										
- at slaughterhouse	DPA 005	single	0.01g	50	12					12
Meat from other poultry species										

carcass										
- at slaughterhouse - Monitoring (laying hens)	DPA 004	single	0.01g	149	53					53
- at retail - Monitoring (laying hens)	DIS 819	single	0.01g	113	21					21
- at slaughterhouse - Monitoring (caeca laying hens)	DPA 020	batch	25g	74	73					73

(1) : enumeration with M = 100 cfu/ g
(2) : enumeration with M = 100 cfu/ g

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
Meat from pig										
fresh										
- at slaughterhouse	DPA 002	single		213	26					26
Live bivalve molluscs										
- at retail	DIS 806	single	25g	60	0					
Meat from bovine animals and pig										
minced meat										
intended to be eaten raw										
- at retail - Monitoring (1)	DIS 823	single	1g	128	0					
intended to be eaten cooked										
- at retail - Monitoring (2)	DIS 888	single	1g	127	0					
Cheeses made from cows' milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at retail - Monitoring	DIS 849	single	25g	46	0					
Crustaceans										
shrimps										
raw										
- at processing plant - Monitoring	TRA 403	single	25g	32	0					
- at retail - Monitoring	DIS 811	single	25g	31	0					

(1) : An enumeration was performed (M=10 cfu/ g).
(2) : enumeration with M = 100 cfu/ g

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 (15) from pork, resistance was observed for all antibiotics except gentamicin. Only 2 strains were sensitive to all tested antibiotics.
The resistance against tetracyclin (81%) was high followed by ciprofloxacin and nalidixic acid (20%). Compared to previous year in general a decrease in the percentage resistance is noticed except for tetracyclin where the percentage resistance stays very high.

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
Gentamicin 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

185 Campylobacter strains were isolated in poultry meat and carcasses and tested for antimicrobial susceptibility (111 Campylobacter jejuni and 50 Campylobacter coli strains). In total 39% of the C. jejuni strains were sensitive for all tested antibiotics. Tetracycline resistance was present in 34% of the strains followed by ciprofloxacin (34%) and nalidixic acid (34%) resistance. Ampicillin resistance was noticed in 27% of the C. jejuni strains. No resistance was detected against erythromycin and gentamicin. Overall the antibiotic resistance within C. coli was higher than in C. jejuni, with a much higher percentage of resistance against ciprofloxacin (60%), nalidixic acid (60%) and tetracycline (70%). Resistance against erythromycin was found in 8% of the C. coli strains. The ampicillin resistance is much higher in strains isolated from broiler meat and carcasses than in strains isolated from pork meat. Eleven Campylobacter strains were isolated from turkey, 55% of the strains were fully sensitive and no resistance against ampicillin and gentamicin was measured. Resistance was observed for erythromycin (18%) ciprofloxacin (36%), nalidixic acid (36%) and tetracycline (27%).
Compared to the results of percentage resistance observed in previous years no great differences were noticed between the Campylobacter strains isolated from poultry

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

	C. coli
	Meat from pig - carcass - chilled - at slaughterhouse - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	15

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Gentamicin	16	15	0	0	0	0	0	5	10	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	15	3	0	3	5	4	0	0	0	0	0	0	3	0	0	0	0	0	0	0		
Macrolides																							
Erythromycin	8	15	1	0	0	0	0	1	2	8	3	0	0	0	0	0	1	0	0	0	0		
Penicillins																							
Ampicillin	32	15	1	0	0	0	1	1	6	4	0	2	0	0	0	0	1	0	0	0	0		
Quinolones																							
Nalidixic acid	32	15	3	0	0	0	0	0	1	3	3	5	0	0	0	0	3	0	0	0	0		
Tetracyclines																							
Tetracyclin	16	15	12	0	0	1	1	1	0	0	0	0	0	1	1	1	9	0	0	0	0		

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

	C. coli
	Meat from broilers (Gallus gallus) - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	31

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Gentamicin	16	31	0	0	0	0	4	15	12	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	31	15	1	7	4	4	0	0	0	0	0	0	15	0	0	0	0	0	0	0		
Macrolides																							
Erythromycin	8	31	1	0	0	0	1	4	12	7	6	0	0	0	0	0	1	0	0	0	0		
Penicillins																							
Ampicillin	32	31	6	0	0	0	0	3	4	5	10	2	0	1	0	0	6	0	0	0	0		
Quinolones																							
Nalidixic acid	32	30	14	0	0	0	0	0	0	7	8	0	1	0	14	0	0	0	0	0	0		
Tetracyclines																							
Tetracyclin	16	31	23	0	0	2	4	1	0	0	0	0	1	1	3	0	19	0	0	0	0		

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

	C. jejuni
	Meat from broilers (Gallus gallus) - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	64

Antimicrobials:	**Break point**	**N**	**n**	**Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to**																		
				<=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**
Aminoglycosides																							
Gentamicin	16	64	0	0	0	1	18	36	9	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	64	27	2	15	13	6	0	1	0	0	0	0	27	0	0	0	0	0	0	0		
Macrolides																							
Erythromycin	8	64	0	0	0	0	3	21	27	13	0	0	0	0	0	0	0	0	0	0	0		
Penicillins																							
Ampicillin	32	64	15	0	0	0	3	4	12	16	5	1	3	5	4	4	7	0	0	0	0		
Quinolones																							
Nalidixic acid	32	64	27	0	0	0	0	2	4	18	8	5	0	0	0	0	27	0	0	0	0		
Tetracyclines																							
Tetracyclin	16	64	29	0	4	7	18	3	2	0	1	0	0	5	1	2	21	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			
Number of isolates available in the laboratory					15			
Antimicrobials:	**N**	**n**	**N**	**n**	**N**	**n**	**N**	**n**
Aminoglycosides								
Gentamicin					15	0		
Fluoroquinolones								
Ciprofloxacin					15	3		
Fully sensitive						2		
Macrolides								
Erythromycin					15	1		
Penicillins								
Ampicillin					15	1		
Quinolones								
Nalidixic acid					15	3		
Resistant to 1 antimicrobial					15	9		
Resistant to 2 antimicrobials						1		
Resistant to 3 antimicrobials						3		
Tetracyclines								
Tetracyclin						12		

Table Antimicrobial susceptibility testing of Campylobacter spp., unspecified in Meat from turkey - at slaughterhouse - Monitoring - quantitative data [Dilution method]

	Campylobacter spp., unspecified
	Meat from turkey - at slaughterhouse - Monitoring
Isolates out of a monitoring programme	yes
Number of isolates available in the laboratory	11

Antimicrobials:	Number of resistant isolates (n) and number of isolates with the concentration (u/ ml) or zone (mm) of inhibition equal to																						
	Break point	**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**
Aminoglycosides																							
Gentamicin	16	11	0	0	0	0	1	8	2	0	0	0	0	0	0	0	0	0	0	0	0		
Fluoroquinolones																							
Ciprofloxacin	4	11	4	0	4	3	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0		
Macrolides																							
Erythromycin	8	11	2	0	0	0	0	1	5	2	1	0	0	0	0	0	2	0	0	0	0		
Penicillins																							
Ampicillin	32	11	0	0	0	0	2	0	4	4	1	0	0	0	0	0	0	0	0	0	0		
Quinolones																							
Nalidixic acid	32	11	4	0	0	0	0	0	0	3	4	0	0	0	0	0	4	0	0	0	0		
Tetracyclines																							
Tetracyclin	16	11	3	0	0	0	7	1	0	0	0	0	0	0	0	0	3	0	0	0	0		

Footnote

8 Campylobacter jejuni and 3 Campylobacter coli stains

Table Breakpoints used for antimicrobial susceptibility testing in Food

Test Method Used

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										
Fluoroquinolones										
Ciprofloxacin										
Quinolones										
Nalidixic acid										
Aminoglycosides										
Gentamicin										
Macrolides										
Erythromycin										
Penicillins										
Ampicillin										

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, were selected for this study. The samples assayed were minced meat from beef and pork, chicken meat preparation, cooked ham, paté, salami, smoked salmon and other foodstuffs. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

At the production plant

Every 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 and other

At retail

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

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 in 25g for ready to eat foods.

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	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Milk, cows'										
pasteurised milk										
- at retail	DIS 818	single	1g	123	0	0		123	0	0
Cheeses made from cows' milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at retail	DIS 849	single	1g	83	0	0		83	0	0
Cheeses made from goats' milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at retail	DIS 851	single	1g	25	0	0		25	0	0
made from pasteurised milk										
- at retail	DIS 878	single	1g	20	0	0		20	0	0
Cheeses made from sheep's milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at retail	DIS 850	single	1g	25	0	0		25	0	0
made from pasteurised milk										
- at retail	DIS 879	single	1g	19	0	0		19	0	0
Dairy products (excluding cheeses)										
butter										
made from raw or low heat-treated milk										
- at retail - Monitoring	DIS 858	single	1g	39	0	0		39	0	0
yoghurt										
- at retail - Monitoring	DIS 870	single	1g	50	0	0		50	0	0
ice-cream										
- at retail - Monitoring	DIS 887	single	1g	77	0	0		77	0	0

Cheeses, made from unspecified milk or other animal milk										
soft and semi-soft										
made from raw or low heat-treated milk										
- at processing plant - Monitoring	TRA 133	single	25g	48	0	48	0	0		
made from pasteurised milk										
- at processing plant - Monitoring	TRA 134	single	25g	136	0	136	0	0		

Table Listeria monocytogenes in other foods

	Source of information	Sampling unit	Sample weight	Units tested	Total units positive for L.monocytogenes	Units tested with detection method	Listeria monocytogenes presence in x g	Units tested with enumeration method	> detection limit but <= 100 cfu/ g	L. monocytogenes > 100 cfu/ g
Meat from pig										
meat products										
raw ham										
- at retail - Monitoring	DIS 817	single	1g	33	0	0		33	0	0
cooked ham										
- at retail - Monitoring	DIS 824	single	1g	56	0	0		56	0	0
- at processing plant - Monitoring	TRA 300	single	25g	58	1	58	1	0		
- at retail - Monitoring (dry sausages and salami)	DIS 827	single	1g	35	0	0		35	0	0
Meat from bovine animals										
meat preparation										
intended to be eaten raw										
- at retail - Monitoring	DIS 815	single	1g	157	6	0		157	1	5
minced meat										
intended to be eaten raw										
- at retail - Monitoring	DIS 816	single	1g	159	2	0		159	2	0
Fish										
smoked										
- at retail - Monitoring (smoked salmon)	DIS 847	single	1g	150	4	0		150	2	2
Foodstuffs intended for special nutritional uses	DIS 862	single	25g	99	0	99	0	0		

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, were selected for this study. The samples assayed were carcasses, cuts and minced meat from beef and other foodstuffs. Sampling was done by a specially trained staff of the Federal Agency for the Safety of the Food Chain.

Frequency of the sampling

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

Type of specimen taken

Meat

Methods of sampling (description of sampling techniques)

Sampling of beef carcasses was done by means of swabs (4 areas from the same half carcass constituting 1600 cm2 were putted in the same stomacher bag).
The samples were putted in a cool box and transported to a dispatching 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	Verotoxigenic E. coli (VTEC)	Verotoxigenic E. coli (VTEC) - VTEC O157	Verotoxigenic E. coli (VTEC) - VTEC non-O157	Verotoxigenic E. coli (VTEC) - VTEC, unspecified
Meat from bovine animals								
fresh								
- at slaughterhouse	DPA 001	single	1600 cm2	1611	6	4	2	
- at processing plant	TRA 305	single	25g	286	0			
minced meat								
intended to be eaten raw								
- at retail	DIS 816	single	25g	152	0			
meat preparation								
intended to be eaten raw								
- at retail - Monitoring	DIS 815	single	25g	150	0			
Cheeses made from cows' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at retail - Monitoring	DIS 849	single	25g	83	0			
Cheeses made from sheep's milk								
soft and semi-soft								
made from pasteurised milk								
- at retail - Monitoring	DIS 850	single	25g	25	0			
Cheeses made from goats' milk								
soft and semi-soft								
made from raw or low heat-treated milk								
- at retail - Monitoring	DIS 851	single	25g	25	0			
Dairy products (excluding cheeses)								
butter								
made from raw or low heat-treated milk								
- at retail - Monitoring	DIS 858	single	25g	25	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.
In 2007, a total of 5 infected holdings were detected. Three of these were eradicated by stamping-out. In total 487 animals were slaughtered. In the other two infected holdings, partial slaughter and intense follow-up by tuberculin testing was performed.

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

Number of infected herds since 2000

2000 : 24
2001 : 23
2002 : 13
2003 : 7
2004 : 8
2005 : 5
2006 : 8
2007 : 5

Additional information

In 2007, 832 tissue samples whereof 137 '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 animals of 5 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.

Type of specimen taken

Organs/ tissues: Suspicious lesions of lungs, lymph nodes, ...

Methods of sampling (description of sampling techniques)

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

Case definition

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

Diagnostic/ analytical methods used

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

Control program/ mechanisms

The control program/ strategies in place

Monitoring is done by:
- systematic post-mortem 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
Pigs	VAR	animal	2	0			
Wild boars	VAR	animal	22	0			
Cats	VAR	animal	1	0			
Hares	VAR	animal	1	0			

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	38690	2699258	38685	99.987	5	0.013	0	280000	395000	137	25
Total	38690	2699258	38685	99.987	5	0.013		280000	395000	137	25

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 intense follow-up testing of an infected herd 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	2907	12648	2907	100	0	0		0	0	5	0
Total	2907	12648	2907	100	0	0		0	0	5	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	70067	0				

(1) : Dairy cattle: examination of bulk milk samples, number of pools tested.

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 brucellosis, 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.
In March 2000, the last case of bovine brucellosis was identified. No infected herd was detected in Belgium since then.
In case of positive serological reactors the Federal Agency for the Safety of the Food Chain can instruct follow-up testing or 'test slaughter' for additional analyses. These analyses could not confirm brucellosis. To reduce the number of FPSR (False positive serological reactors) to be slaughtered, the micro-agglutination test has been used as for routine testing whereas the indirect Elisa is accepted as 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, 2006 and 2007 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, 2006 and 2007 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	259	1			1	
Sheep	VAR	animal	31	0				
Alpacas	VAR	animal	101	0				
Deer	VAR	animal	5	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	38690	2699258	38690	100	0	0	9332	587478	0	10967	70067	0	3926	0	0	167	0	0	0	24	0
Total	38690	2699258	38690	100	0	0	9332	587478	0	10967	70067	0	3926	0	0	167	0	0	0	24	0

Footnote

All serological 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 microbiologically	Number of animals positive microbiologically	Number of suspended herds
BELGIQUE/ BELGIE	44904	267561	44904	100	0	0		7243	0	147	0	0	0	0
Total	44904	267561	44904	100	0	0	0	7243	0	147	0	0	0	0

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 bovine animals and pig										
minced meat										
intended to be eaten raw										
- at retail - Monitoring	DIS 823	single	1g	129	0					
intended to be eaten cooked										
- at retail - Monitoring	DIS 888	single	1g	131	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 10000 sport-hunted wild boars are tested. Until now, one animal, in 2004, originating from Mettet (province of Namur), was found to harbour a light infection. The larvae, isolated by artificial digestion were identified by PCR to be Trichinella britovi, a species previously not demonstrated in Belgium. T. britovi has sylvatic carnivores as main hosts. Even if wild boars are not the preferred host they can acquire the infection and consequently pass it to humans. Both T. spiralis and T. britovi have been associated with human infection. One larva was recovered from a pooled sample (originating from three wild boars from a hunting party from Alle-sur-Semois)in 2007. Consecutive digestions could not reveal the causative animal, and unformtunately PCR failed to identify the Trichinella species.
The routine examination of wild boars devoted to the market has proved to be a good measure to protect the consumer against sylvatic trichinellosis. In addition, monitoring of infection through examining sentinel animals, such as the fox, is recommended to access the prevalence of trichinellosis and to follow trends in time. Serological examination might be an alternative for muscle digestion but needs further evaluation. An extra measure to protect the consumer is to eat meat of wild boar "well done", or to freeze the meat at -20°C for 4 weeks. An important measure to avoid spreading of the infection among wildlife is not to leave offal of animal carcasses in the field after skinning.

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

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

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	11512404	0		
Solipeds, domestic						
horses	FASFC	animal	10064	0		
Wild boars						
wild	FASFC	animal	13713	1		1
Foxes	ITG	animal	62	0		
Badgers						
- Monitoring - monitoring survey	ITG	animal	35	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.

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).

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

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

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.

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

In October 2007, a suspicion of rabies on clinical symptoms in a dog illegally imported from Morocco. The clinical diagnosis was confirmed by laboratory testing after euthanasia of the animal. Finally 32 persons and 18 pet owners with possible contact with the rabic animal were detected. Medical information and follow-up by experts of the Pasteur Institute of all 'contact' persons was realised.

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	196	0			
Sheep	Pasteur Institute	animal	116	0			
Goats	Pasteur Institute	animal	44	0			
Dogs (1)	Pasteur Institute	animal	18	1			1
Cats	Pasteur Institute	animal	9	0			
Bats							
wild	Pasteur Institute	animal	23	0			
Foxes							
wild	Pasteur Institute	animal	141	0			
Deer	Pasteur Institute	animal	41	0			
Other mustelides							
- Clinical investigations	Pasteur Institute	animal	4	0			
Wild animals							
- Clinical investigations	Pasteur Institute	animal	10	0			

(1) : Dog illegally imported from Morocco.

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 on individual animal level of genetic selected bulls of Artificial Insemination centers and for confirmation of clinical suspicion in case of an increased number of abortions of ruminants.

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 (Q-fever)	C. burnetii
Cattle (bovine animals)	VAR	animal	220	73	73
Sheep	VAR	animal	1	0	
Dogs					
- Clinical investigations	VAR	animal	1	1	1

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)
2007 total 1.527 (1.517 lightly, 10 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)						
meat production animals	FASFC	animal		802453	1527	1527

Footnote

Total 1527 cases detected at post-mortem examination at the slaughterhouse (1517 lightly and 10 heavily contaminated bovine carcases).

3. INFORMATION ON SPECIFIC INDICATORS OF ANTIMICROBIAL RESISTANCE

3.1. ENTEROCOCCUS, NON-PATHOGENIC

3.1.1. General evaluation of the national situation

3.1.2. Antimicrobial resistance in Enterococcus, non-pathogenic isolates

3.2. ESCHERICHIA COLI, NON-PATHOGENIC

3.2.1. 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

3.2.2. 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.

3.2.3. 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 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. In 2007 some samples were taken outside the scope of the control programm: for example in the case of suspicion, following complaints, follow-up of RASFF, in execution of Decision 2006/ 236/ EC (safeguard measures for imported fishery products from Indonesia)...
The sampling population represents fishery products from fish species associated with a high amount of histidine. All samples taken in 2007 were not enzyme maturated products of the following species: tuna, mackerel, sardines, anchovy and herring. Fresh, frozen and canned (in water, in brine, in oil) products were sampled.
The samples were taken by the CA (FASFC) in retail, wholesale, processing 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. In total 44 samples were taken in 2007:
- retail 6,
- wholesale and processing 10,
- border inspection post 28.

Type of specimen taken

Other: Fishery products

Methods of sampling (description of sampling techniques)

The samples were taken according to the Regulation 2073/ 2005.
In general nine sample of 150g were taken out of a batch (37 batch samples).
In some cases only a single sample of 150g was taken (7 single samples).
In both cases, the same amount of product was taken for a possible counter analysis.
The samples are transported in a sealed plastic bag:
- chilled (fresh products)
- frozen (frozen products)
- at ambient temperature (canned products).

Definition of positive finding

To determine the conformity of a sample or a batch, the criteria laid down in the Regulation 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	37	0	37			
(Single samples)		single	150g	7	0	7			

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).

4.3. STAPHYLOCOCCAL ENTEROTOXINS

4.3.1. General evaluation of the national situation

4.3.2. Staphylococcal enterotoxins in foodstuffs

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) that deal with person related matters as human health, can start an epidemiological investigation by its Public health medical inspectors in case of a food-borne outbreak.
-The Scientific Institute of Public Health IPH (National reference laboratory on Food-borne Outbreaks) analyses all suspected food samples, collects all data on food-borne outbreaks and gives scientific support to the FASFC officers and the Public Health Inspectors.
A national "Platform Food-borne outbreaks", approved by the National Conference of Ministers of Public Health, brings together the different competent authorities on food safety, animal health and public health. Furthermore in 2007, for a better communication, a protected web application was made available to exchange outbreak data and laboratory results in “real time” between the different authorities dealing with FBO. In this web-application a common file is created for each individual outbreak, and the data and laboratory results are shared between food inspectors and human health inspectors.
Data in this report came from the Federal Agency for the Safety of the Food Chain, the Flemish Community , the sentinel laboratories network for human microbiology, and the Federal Reference Centres for Food borne outbreaks, for Clostridium botulinum, for Salmonella and Shigella and for Listeria.

Description of the types of outbreaks covered by the reporting:

A food -borne outbreak is defined as an incidence, observed under given circumstances, of two or more human cases of the same disease and/ or infection, or a situation in which the observed number of human cases exceeds the expected number and where the cases are linked, or are probably linked, to the same food source (Directive 2003/ 99/ EC, Article 2(d)). Data are collected from FASFC, the Flemish Community, the French community, the Brussels Common Community Committee, the sentinel laboratories network for human clinical microbiology, and the Federal Reference Centres for Food-borne outbreaks, Salmonella and Shigella , Listeria and C. botulinum.
The reporting includes both general and household outbreaks.
The causative agents covered are Salmonella spp., Shigella spp., Campylobacter spp., Verotoxigenic E.coli, Listeria monocytogenes, Clostridium botulinum, Staphylococcus aureus, Bacillus cereus, Clostridium perfringens, Giardia, Norovirus, enterotoxins of Staphylococcus aureus and Bacillus cereus and histamine

National evaluation of the reported outbreaks in the country:

Trends in numbers of outbreaks and numbers of human cases involved

During 2007, a total of 75 outbreaks of food-borne infections and intoxications were recorded in Belgium. More than 846 people were ill and at least 67 persons were hospitalised. Until 2006 , all listeriosis cases with a possible food link were included in the total number of outbreaks, even if only one human case was reported, together with perinatal cases affecting a mother and a newborn baby. However, according to the instructions of the reporting manual those were not considered as food-borne outbreaks any more in 2007. This is partially the reason for the decrease in the number of food-borne outbreaks in Belgium in 2007.

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

For the first time Norovirus became the most frequently detected food-borne pathogen in food-borne outbreaks: 10 outbreaks were reported. The virus was detected both in the food and human samples (n=2), in the food (n=3) only or in human samples only (n=5)
In 11% of the outbreaks Salmonella was the causative agent (n=8), 99 persons were affected and 20 hospitalised. This confirms the decrease in importance of Salmonella as causative agent noticed in 2004 (53%), 2005 (20%) and 2006 (12%) . Salmonella Enteritidis was still the most dominant serotype and was detected in 87.5 % of the Salmonella outbreaks. In 4 of the 7 Enteritidis outbreaks the link could be made with desserts made with fresh eggs (Tiramisu (n=3)and chocolate mousse(n=1)). The person who prepared the chocolate mousse however, was carrier of the same strain, so that it is difficult to conclude if it where the eggs or the food handler that contaminated the chocolate mousse, since the contamination was only found at the outside of the egg-shell. One was linked with minced meat from a contaminated cutter and one was linked to travelling to Kroatia.
The only other serovar isolated in food-borne outbreaks was Typhimurium var. Copenhagen and was linked with consumption of pitta meat.
Coagulase positive Staphylococcus spp caused 7% of the outbreaks in 2007(n=5). Toxine A was produced by most of the strains.
Thermotolerant Campylobacters were responsible for 3 % of the outbreaks.
B. cereus was the causative agent in zeven outbreaks (9% of the outbreaks) and 57 persons became ill. Only in one outbreak the emetic type was detected, the six other outbreaks were caused by enterotoxin producing strains.
Verotoxinogenic E.coli were detected in 2 outbreaks. O 157 was the causative agent in the first one and the food source was unknown. Both O145 and O26 were detected in the second outbreak due to farm-made ice-cream birthday cakes, with 8 human cases of HUS. This outbreak was published in eurosurveillance.
In 53% 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.
Most food-borne outbreaks (56%) were due to the consumption of meals composed of different ingredients. Meat and meat based products were responsible for 19 % of the outbreaks. Bakery products, including preparations with raw eggs such as tiramisu and chocolate mousse were responsible for 5% of the outbreaks. These preparations were the only egg related outbreaks in 2007, all with S. Enteritidis, and count for 4 % of the total outbreaks. In 2006, 2005 and 2004 this was respectively 4%, 8% and 36%. This shows that the decrease in egg-related illness is

maintained. Sandwiches were the vehicle in 4 out of 10 norovirus outbreaks.

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

In most food-borne outbreaks (91%) the setting was known. Restaurants were the most important location of exposure, being the setting of 38 % of food-borne outbreaks in Belgium in 2006. Catering was as important as institutional catering with respectively 11% and 13 % of food-borne outbreaks. Shops (butchers', bakeries,…) were at the origin of 21% of it. Other locations of exposure were camping (3%) and one farm with an outbreak of E.coli O145 and O26.

Descriptions of single outbreaks of special interest

1-A food-borne outbreak caused by Staphylococcus aureus in frozen hamburgers in the summer of 2007 at a Scouts' camp in the south of Belgium.
At least 15 children and adults became ill, exposing severe symptoms of nausea, vomiting and diarrhoea shortly after eating lunch. The inspectors of the Belgian Food Agency sampled all leftovers of the suspected food (milk, hamburgers, cheese, ketchup and pasta) as well as hamburgers of the same production date, sampled at the supermarket, and submitted the samples to the National reference laboratory for food-borne outbreaks for microbiological analysis and detection of their toxins. Since the production site was in the Netherlands, an inspection was performed at the production plant of the hamburgers by the Dutch Authorities. An extensive review of production and handling procedures and laboratory testing of different lots of snacks from the production plant were performed. All S. aureus isolates from the food and the production plant were subjected for further molecular typing (PFGE, MLST).
The hamburgers served at the camp were contaminated with high levels of S. aureus, and tested positive for S. aureus enterotoxin type A. The hamburgers sampled at the supermarket as well as the hamburgers sampled at the production plant contained varying levels of S. aureus, but no enterotoxins could be detected in those samples. All food isolates and isolates from the production plant belonged to the same PFGE type indicating a common source of contamination. The inspection revealed that the cooling system used to rapidly cool the cooked hamburgers was contaminated with S. aureus and could not be properly cleaned.
2.An outbreak of verocytotoxin-producing E. coli O145 and O26 infections associated with the consumption of ice cream produced at a farm
De Schrijver K. et al, Euro Surveill. 2008 Feb 28; 13 (9)
In October 2007, an outbreak of verocytotoxin-producing E. coli (VTEC) O145 and E. coli O26 occurred among consumers of ice cream produced and sold in September 2007 at a farm in the province of Antwerp (Belgium). The ice cream was consumed at two birthday parties and also eaten at the farm. Five children, aged between two and 11 years, developed haemolytic uraemic syndrome (HUS), and seven other co-exposed persons contracted severe diarrhoea. In three of the five HUS cases VTEC O145 infections were laboratory confirmed, one in association with VTEC O26. Identical isolates of E. coli O145 and O26 were detected with PCR and PFGE in faecal samples of patients and in ice cream leftovers from one of the birthday parties, in faecal samples taken from calves, and in samples of soiled straw from the farm at which the ice cream was produced. Ice cream was made from pasteurized milk and most likely contaminated by one of food handlers.

Control measures or other actions taken to improve the situation

Logistic slaughtering is applied for poultry which means that poultry with a Salmonella-free certificate are slaughtered before other poultry. The vaccination of laying hens against salmonellosis, that started in 2003 is almost complete.

Foodborne Outbreaks: summarized data

	Total number of outbreaks	Number of possible outbreaks	Number of verified outbreaks
Bacillus	7	0	7
Campylobacter	2	2	0
Clostridium	0	0	0
Escherichia coli, pathogenic	2	1	1
Foodborne viruses	10	5	5
Listeria	0	0	0
Other agents	0	0	0
Parasites	0	0	0
Salmonella	8	5	3
Staphylococcus	5	0	5
Unknown	40	40	0
Yersinia	1	1	0

Verified Foodborne Outbreaks: detailed data

B. cereus

	Value
Code	25
Subagent Choice	Bacillus; B. cereus
Outbreak type	Household
Human cases	5
Hospitalized	0
Deaths	0
Foodstuff implicated	Other or unspecified poultry meat and products thereof
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

	Value
Code	5
Subagent Choice	Bacillus; B. cereus
Outbreak type	Household
Human cases	11
Hospitalized	0
Deaths	0
Foodstuff implicated	Sheep meat and products thereof
More Foodstuff	merguez
Type of evidence	Laboratory detection in implicated food
Setting	Household
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

	Value
Code	17
Subagent Choice	Bacillus; B. cereus
Outbreak type	Household
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Crustaceans, shellfish, molluscs and products thereof
More Foodstuff	shrimps
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	
Outbreaks	1
Comment	

B. cereus

	Value
Code	51
Subagent Choice	Bacillus; B. cereus
Outbreak type	General
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Other foods
More Foodstuff	mashed potatoes
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Unknown
Outbreaks	1
Comment	

B. cereus

	Value
Code	49
Subagent Choice	Bacillus; B. cereus
Outbreak type	General
Human cases	10
Hospitalized	0
Deaths	0
Foodstuff implicated	Fish and fish products
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Camp, picnic
Place of origin of problem	Unknown
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

B. cereus

	Value
Code	64
Subagent Choice	Bacillus; B. cereus
Outbreak type	Household
Human cases	2
Hospitalized	0
Deaths	0
Foodstuff implicated	Cereal products including rice and seeds/pulses (nuts, almonds)
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Inadequate heat treatment
Outbreaks	1
Comment	production of entertoxin by the isolaes

B. cereus

	Value
Code	72
Subagent Choice	Bacillus; B. cereus
Outbreak type	General
Human cases	30
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

Verotoxigenic E. coli (VTEC)

	Value
Code	70
Subagent Choice	Bacillus; Bacillus spp., unspecified
Outbreak type	General
Human cases	13
Hospitalized	5
Deaths	0
Foodstuff implicated	Dairy products (other than cheeses)
More Foodstuff	ice-cream bought on farm
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Household
Place of origin of problem	Farm (primary production)
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Outbreaks	1
Comment	

Calicivirus (including norovirus)

	Value
Code	1
Subagent Choice	Escherichia coli, pathogenic; Verotoxigenic E. coli (VTEC); VTEC O139
Outbreak type	General
Human cases	74
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Camp, picnic
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	Infected food handler
Outbreaks	1
Comment	

Calicivirus (including norovirus)

	Value
Code	18
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Unknown
Outbreaks	1
Comment	

Calicivirus (including norovirus)

	Value
Code	20
Subagent Choice	
Outbreak type	General
Human cases	32
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	sandwiches
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Unknown
Contributory factors	
Outbreaks	1
Comment	

Calicivirus (including norovirus)

	Value
Code	30
Subagent Choice	
Outbreak type	General
Human cases	70
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	Residential institution (nursing home, prison, boarding school)
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	
Outbreaks	1
Comment	

Calicivirus (including norovirus)

	Value
Code	48
Subagent Choice	
Outbreak type	General
Human cases	49
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	sandwiches
Type of evidence	Laboratory detection in implicated food
Setting	Canteen or workplace catering
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	11
Subagent Choice	
Outbreak type	General
Human cases	10
Hospitalized	0
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	tiramisu
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Canteen or workplace catering
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Unknown
Contributory factors	Infected food handler
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	55
Subagent Choice	Salmonella; S. Enteritidis; PT 1
Outbreak type	Household
Human cases	3
Hospitalized	2
Deaths	0
Foodstuff implicated	Bakery products
More Foodstuff	chocolate mousse
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Catering services, restaurant
Origin of foodstuff	Domestic
Contributory factors	
Outbreaks	1
Comment	

S. Enteritidis

	Value
Code	67
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	4
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff	minced meat
Type of evidence	Laboratory detection in implicated food, Laboratory detection in human cases
Setting	Household
Place of origin of problem	Retail sale outlet
Origin of foodstuff	Domestic
Contributory factors	Cross-contamination
Outbreaks	1
Comment	contaminated meat cutter

S. aureus

	Value
Code	7
Subagent Choice	
Outbreak type	General
Human cases	17
Hospitalized	0
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff	hamburgers
Type of evidence	Laboratory detection in implicated food
Setting	School, kindergarten
Place of origin of problem	Processing plant
Origin of foodstuff	Domestic
Contributory factors	Inadequate heat treatment
Outbreaks	1
Comment	

S. aureus

	Value
Code	28
Subagent Choice	
Outbreak type	General
Human cases	29
Hospitalized	0
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	
Type of evidence	Laboratory detection in implicated food
Setting	School, kindergarten
Place of origin of problem	Unknown
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

S. aureus

	Value
Code	10
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	3
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	chinese meal-chicken with sauce and rice
Type of evidence	Laboratory detection in human cases
Setting	Canteen or workplace catering
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

S. aureus

	Value
Code	58
Subagent Choice	
Outbreak type	General
Human cases	15
Hospitalized	1
Deaths	0
Foodstuff implicated	Other or mixed red meat and products thereof
More Foodstuff	frozen hamburgers
Type of evidence	Laboratory detection in implicated food
Setting	Camp, picnic
Place of origin of problem	Processing plant
Origin of foodstuff	Intra community trade
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	

S. aureus

	Value
Code	68
Subagent Choice	
Outbreak type	General
Human cases	4
Hospitalized	1
Deaths	0
Foodstuff implicated	Mixed or buffet meals
More Foodstuff	hot zakouskis
Type of evidence	Laboratory detection in implicated food
Setting	Restaurant, Cafe, Pub, Bar, Hotel
Place of origin of problem	Household, domestic kitchen
Origin of foodstuff	Domestic
Contributory factors	Storage time/temperature abuse
Outbreaks	1
Comment	wedding party