

Occurrence of *Salmonella* in foods from animal origin in Belgium since 1997

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Introduction

Salmonella is among the most important meat pathogen worldwide. The prevalence and the level of contamination are essential for an efficient risk assessment program but all the different serovars have not the same virulence potentiality.

Material and Methods

Since 1997, the Belgian zoonosis surveillance program has assessed the contamination with *Salmonella* in cattle, pig, poultry, rabbit and fish. The number of samples was approximately 120 in 1997, 150 in 1998 and 1999 for each matrix. Each year, the analysed sample amount has been adjusted to obtain semi-quantitative results. The matrices investigated and the sample size investigated are shown in table 1.

The detection of *Salmonella* has been carried out with the official method from the Ministry of Public Health (SP-VG M002). Briefly, this method consist of a pre-enrichment into buffered peptone water (16-18h at 37°C) followed by a culture of 100µl onto a semisolid selective enrichment media (Diassalm incubated for 24h at 42°C). From typical migration zones, a loopful was streaked onto xylose lysine desoxycholate agar (XLD incubated for 24h at 37°C). Suspicious-looking colonies were confirmed by biochemical tests. The isolates were serotyped, lysotyped (results not shown) and the antibiotic resistance profile was established by MIC method.

Table 1: Matrixes and sample sizes since 1997.

	1997		1998		1999	
	Sample	Dilution	Sample	Dilution	Sample	Dilution
Cattle	Carcasses	400cm ²				
	Retail cuts	25g				
	Livers	400cm ²				
	Minced meat	25g				
Calf	Carcasses	400cm ²				
	Livers	400cm ²				
	Minced meat	25g				
Pork	Carcasses	600cm ²	600cm ²	24cm ²	600cm ²	2.4g
	Retail cuts	25g	25g	1g	25g	0.1g
	Livers	700cm ²	700cm ²	27cm ²		
	Minced meat	25g	25g	1g	25g	0.1g
Broiler	Carcasses	25g	25g	1g	25g	0.1g
	Livers	25g	25g	1g	25g	0.1g
	Breasts	25g	25g	1g	25g	0.1g
Layer	Carcasses	25g	25g	1g	25g	0.1g
Turkey	Carcasses	25g	25g	1g	25g	0.1g
Rabbit	Carcasses	600cm ²				
Fish	Flesh				25g	

Results and discussion

In cattle, calf, rabbit and fish, the study has been stopped after one year of investigation due to the very low prevalence (fig. 1).

In pork, prevalence seems to be at a constant level (carcasses: 21-28%; Retail cuts: 22-27%; Livers: 32-35% and minced meat: 14-23%) and isolated strains belonged to the same serotypes (Typhimurium: 22-39%; Derby: 17-24% and Brandenburg 16-22% except in 1997 when no Brandenburg was isolated but when Bovismorbificans represented 12% of the isolates) (fig. 2 and 4).

In poultry, the prevalence is also at a constant but higher level (broilers: carcasses: 37-47%, livers: 37-49% and breasts: 22-28%; layers: carcasses: 88-92%) except for turkeys which have a lower level (3-5%) (fig. 3) than those observed in pork. Enteritidis is the major serotype in poultry (33-100% in turkeys, 44-54% in layers and 16-35% in broilers). In broilers, the other serotypes are Hadar (16-21%), Virchow (7-12%) and Infantis (4-10%) whereas in layers these are Infantis (9-16%), Braenderup (4-10%) and Hadar has only been isolated in 1998 and 1999 (respectively 2 and 6%) (fig. 5 and 6).

In pork, the prevalence of *Salmonella* spp in the 25-fold dilution is between 1,7 and 3,6 times lower (except for minced meat 19 times) than in the sample itself while in poultry the diminution rate is cut into two parts: on the one hand a high diminution rate for broilers breasts, broilers livers and turkeys (3, 2 and 4 times respectively) and on the other hand only 1,25 for layers and 1,4 for broilers carcasses. In the 250-fold dilution, the diminution rate is yet more higher with the exception of layers for which it is only of 1,6 times. Antibiotic resistance seems to be lower in 1999 than in 1998 (table 2).

Fig. 1 : Prevalence in cattle, calf rabbit and fish

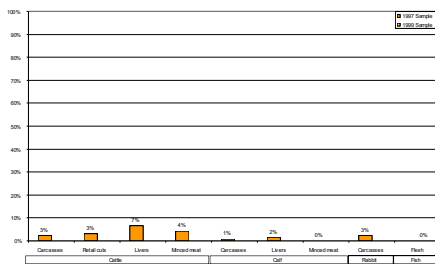


Fig. 2 : Prevalence in pork

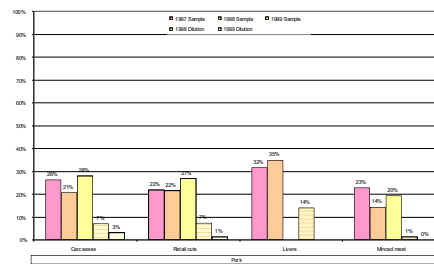


Fig. 3 : Prevalence in poultry

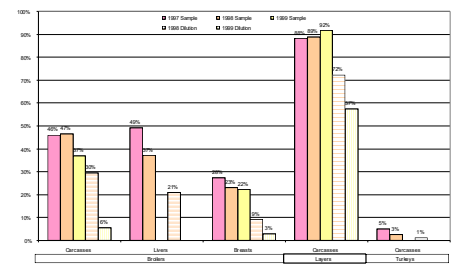


Fig. 4 : Major serotypes in pork

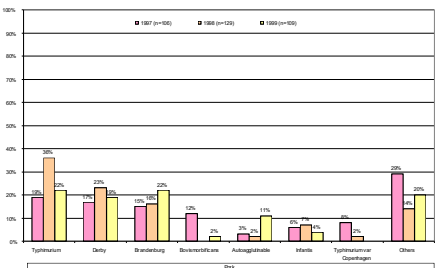


Fig. 5 : Major serotypes in broilers

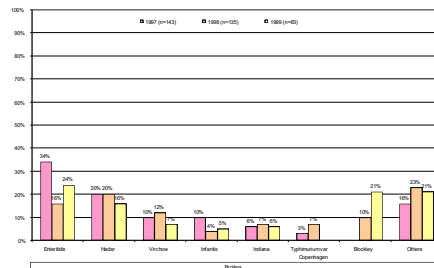


Fig. 6 : Major serotypes in layers

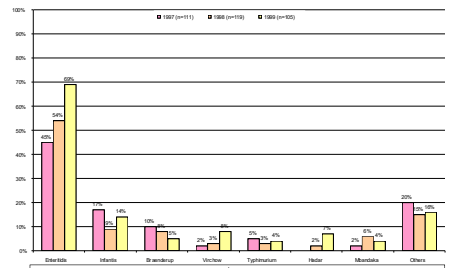


Table 2: Antimicrobials resistance in foods

	1998		1999		1998		1999	
	Pork (%)	Pork (%)	Layers (%)	Layers (%)	Broilers (%)	Broilers (%)	Broilers (%)	Broilers (%)
Ceftriaxone	0	0	0	0	0	0	0	0
Ampicillin	23,6	7,3	11,1	3,1	46,7	21,2		
Kanamycin	1,1	0	0,9	0	0,9	3,5		
Sulfamethoxazole	100	100	100	100	100			
Tetracycline	38,8	23,6	11,1	2,5	36,8	15,3		
Ciprofloxacin	0	0	0	0	0	0		
Nalidixic acid	6,2	0	6,5	5,7	32,5	28,2		
Chloramphenicol	10,1	2,7	3,2	0	11,8	3,5		

Conclusion

- *Salmonella* is a common pathogen found in pork and poultry.
- Isolated strains belong to same serotypes, lysotypes and have similar antibiotic resistance profiles that those isolated in human and animals.
- An advanced analyze of results is needed in order to precise the sources of human salmonellosis.
- The rate and the level, and thus the risk, is very higher in poultry than in pork.
- These results should be used to take preventive measures in order to lower the contamination rate and the resistance to antimicrobials of *Salmonella*.
- These results should be compared with those of others European countries (1).

Bibliography

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