

Exposure assessment of *Campylobacter* in animal foods in Belgium

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Introduction

Campylobacter is the most common cause of bacterial gastro-enteritis in several developed countries. The knowledge of the prevalence and of the level of contamination of the different *Campylobacter* species are essential for an efficient risk assessment program and in order to develop new preventive strategies.

Material and Methods

Since 1997, the Belgian zoonosis surveillance program has assessed the contamination with *Campylobacter* in cattle, pig, poultry, rabbit and fish. The number of sample was approximately 120 in 1997, 150 in 1998 and 1999, and approximately 300 in 2000 and 2001 for each matrix. Between 1997 and 1999, the analysed sample amount has been adjusted to obtain semi-quantitative results and determine the appropriate amount to investigate for each matrix. The matrixes investigated and the sample size investigated are shown in table 1. Since 2000, an optimal Belgian monitoring program was performed in order to follow the rate of contamination and to assess the preventive measure effectiveness.

The detection of *Campylobacter* has been carried out with the official method from the Ministry of Public Health (SP-VG M003). Briefly, this method consist of an enrichment into Preston broth incubated 48h at 42°C under micro-aerophilic atmosphere followed by a streaking of 10µl onto mCCDA. After an incubation of 24h and 120h, plates were read for the presence of typical colonies; a biochemical or PCR confirmation was performed in order to confirm the presence and determine the species of *Campylobacter*.

Table 1: Matrixes and samples size investigated for *Campylobacter* since 1997

		1997	1998	1998	1999	1999	2000 & 2001
		Sample	Sample	Dilution	Sample	Dilution	
Cattle	Carcasses	400cm ²					
	Retail cuts	25g					
	Livers	400cm ²					
	Minced meat	25g					25g
Calf	Carcasses	400cm ²					
	Livers	400cm ²					
	Minced meat	25g					
Pork	Carcasses	600cm ²	600cm ²	2,4cm ²	600cm ²	24cm ²	
	Retail cuts	25g	25g	0,1g	25g	1g	
	Livers	700cm ²	700cm ²	2,7cm ²			
	Minced meat	25g	25g	0,1g	25g	1g	25g
Broiler	Carcasses	25g	25g	0,1g	0,1g	0,01g	0,01g
	Livers	25g	25g	0,1g			
	Breasts	25g	25g	0,1g	1g	0,01g	1g
Layer	Carcasses	25g	25g	0,1g	0,1g	0,01g	0,01g
	Turkey	25g	25g	0,1g	0,1g	0,01g	
Rabbit	Carcasses	600cm ²					
Fish	Flesh						25g

Results and discussion

The semi-quantitative study of 1997 to 1999 has determined that the contamination level was low in pork and very high in poultry (Figures 1&2). In calf, rabbit and fish, the study has been stopped after one year of investigation due to the very low prevalence.

The following results are presented for the years 2000 and 2001 (Figures 3 - 5). The comparison between the years 2000 and 2001 shows that the value of chi squares were only significant for chicken breasts ($p < 0,05$).

In 2001, minced meat of cattle and pork had a very low prevalence of *Campylobacter* (respectively 0,7% and 3,7%). The determination of the species was not significant because of the very low number of isolates.

In poultry, the prevalence is at a higher level than in pork and in beef. In 2001, the contamination rate was of 27,1% in broiler carcasses, of 15,3% in broiler breasts and of 19,3% in layer carcasses. The main species of *Campylobacter* in poultry is *C. jejuni*, (89%). Other species are *C. coli* and *C. lari*.

Fig. 1 : Semi-quantitative evaluation of pork contamination (1997-1999) : carcasses, cutting meat and minced meat

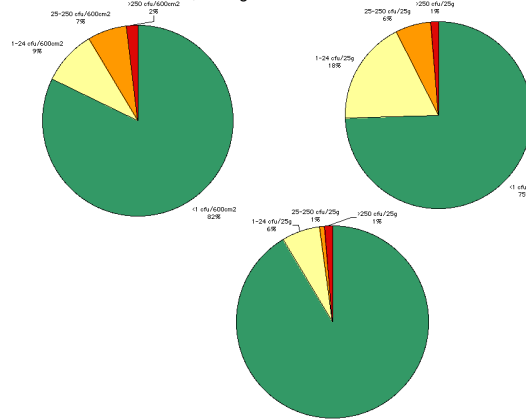


Fig. 3 : Prevalence in pork and beef (2000-2001)

Campylobacter prevalence of pork and beef in Belgium (2000-2001)

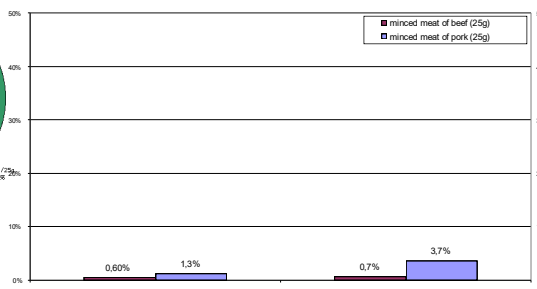


Fig. 4 : Prevalence in poultry (2000-2001)

Campylobacter prevalence of poultry in Belgium (2000-2001)

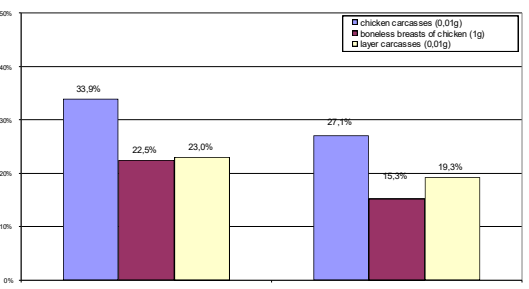


Fig. 5 : Major *Campylobacter* species in pork, beef and poultry (2001)

Species of *Campylobacter* in meat in Belgium (2000-2001)

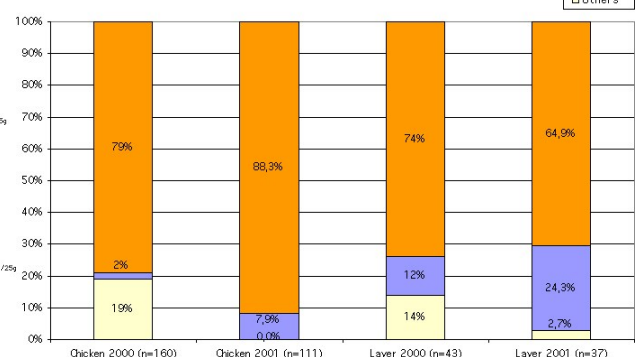
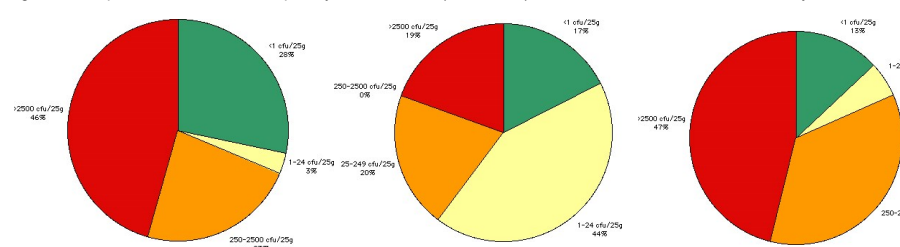


Fig. 2 : Semi-quantitative evaluation of poultry contamination (1997-1999) : carcasses and breasts of chicken, layer carcasses



Conclusion

- *Campylobacter* is frequently isolated from poultry but also in other meats.
- Isolated strains belong to same species that isolated strains from human.
- An advanced analysis of the results is needed in order to precise the sources of human diseased campylobacteriosis.
- The prevalence is statistically stable between 2000 and 2001 for pork and beef minced meat and for chicken and layer carcasses.
- The rate and the level of contamination, and thus the risk, are higher in poultry than in beef and pork, but pork and beef minced meat are often eaten raw.
- These results should be used to take preventive measures in order to lower the contamination rate of *Campylobacter*.
- These results should be compared with those of others European countries.