ANTIBIOTIC RESISTANCE OF ZOONOTIC BACTERIA ISOLATED FROM FRENCH HEALTHY CATTLE AT SLAUGHTER

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Introduction

Survey of antibiotic resistance of bacteria collected in healthy animals is useful to evaluate the prevalence of resistant bacteria in normal flora and the evolution of this resistance over years. It could also be a tool to appreciate veterinary use of antibiotics and risk factors spread for public health.

French surveillance programmes of resistance in commensal bacteria (*Escherichia coli* and *Enterococcus*) and zoonotic bacteria (*Salmonella* and *Campylobacter*) have been carried out in poultry and swine since 1999 [1]. In 2002, this surveillance programme of resistance was set up in cattle.

Materials and Methods

This survey was performed in three main types of French bovine production : calves, steers and culling cows. Isolation of zoonotic bacteria was performed on 600 faecal samples collected each year in 2002 and 2003 in nine French slaughterhouses representative of the bovine production. All isolated strains were identified : *Salmonella* were serotyped according to the Kauffmann-White scheme. Thermotolerant *Campylobacter* were isolated and characterization of *Campylobacter jejuni* and *coli* was realized by PCR.

Antimicrobial susceptibility testing for *Salmonella* was carried out by disk diffusion method according to the guidelines of the Antibiogram Commitee of the French Society of Microbiology [2]. The following antibiotics were tested : AMX, AMC, CAZ, CF, FOX, CFM, S, K, Apra, GM, TET, C, TMP, SXT, NAL, OA, ENR. *Campylobacter* isolates were screened for resistance to AM, GM, ERY, ENR, TET, NAL by the dilution method according to NCCLS guidelines.

Detection of resistance genes in *Salmonella* was performed by PCR.

Results

The prevalences of *Salmonella* isolated in 2002 and 2003 were quite similar (6/600 (1%) in 2002 and 9/600 (1.5%) in 2003). In 2002, all of the *Salmonella* were susceptible to the antimicrobials tested. In 2003, most *Salmonella* were susceptible excepting two *Salmonella* Typhimurium with the following multidrug resistance profiles : AMX/AMC/S/TET/C and AMX/AMC/S/Apra/GM/TET/C/SXT/TMP.

Both *Salmonella* Typhimurium showed a decreased susceptibility to cefalotin.

PCRs performed on these two strains assessed the presence of the multidrug resistance region (MDR) and *Salmonella* genomic island 1 (SGI1) described in multidrug resistant *Salmonella* Typhimurium DT 104 [3]. Moreover, additional resistances to gentamicin and trimethoprim were observed in one of the two strains harboring SGI1. Characterization of genes conferring this resistance is in progress to assess localization of these genes on MDR.

Campylobacter was isolated in 60/600 (10%) and 130/600 (21.6%) of faecal samples in 2002 and 2003 respectively. *C. jejuni* was the predominant species (49/60 in 2002 and 100/130 in 2003). This species was mostly isolated from calves (37/60 (75%) and 68/100 (68%) in 2002 and 2003) whereas the frequency of this species was lower in culling cows (5/49 (10%) and 17/100 (17%)), and in steers (7/49 (14.3%) and 15/100 (15%)).

Campylobacter coli was mainly isolated from calves (10/60 in 2002 and 30/130 in 2003).

The percentages of *Campylobacter* resistant strains are shown in Table 1.

	2002		2003	
	C. jejuni, (n=48)	*C. coli*, (n=10)	*C. jejuni*, (n=85)	*C. coli*, (n=30)
AM	20	0	12	16.6
GM	0	10	0	3.3
ERY	16	10	4.7	36.6
TET	56	80	49.4	96.6
NAL	35	20	28.2	43.3
ENR	23	30	27	43.3

Distribution of MICs showed that most of *C. jejuni* strains were sensitive or intermediately sensitive to ampicillin, erythromycin and enrofloxacin.

Discussion

The prevalence of *Salmonella* isolated from healthy animals in 2002 and 2003 was very low. However, isolation of multidrug resistant *S.* Typhimurium harboring SGI1 is particularly interesting. Indeed, SGI1 and variants were described in other *Salmonella* serovars [4, 5] suggesting an horizontal transfer of this element and its contribution to the rapid dissemination of multidrug-resistant strains of *Salmonella* serotypes.

A decrease in the percentage of resistance to erythromycin and ampicillin was observed for *C. jejuni*. However, distribution of MICS showed that most strains were sensitive or intermediately sensitive to these antibiotics. Surveillance of resistance of *Campylobacter* is important to monitor over time to appreciate evolution of resistance. Moreover, use of antimicrobials in cattle should be analysed to evaluate the influence on resistant *Campylobacter*.

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