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OCCURRENCE OF *CAMPYLOBACTER JEJUNI* AND *CAMPYLOBACTER COLI* AND THEIR BIOTYPES IN BEEF AND DAIRY CATTLE FROM THE SOUTH OF CHILE

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ABSTRACT

The prevalence of *Campylobacter jejuni* and *Campylobacter coli* and their biotypes in beef and dairy cattle from the South of Chile was established. *Campylobacter* were statistically more prevalent among beef cattle (35.9%) than among dairy cattle (21.3%), being *C. jejuni* the species most frequently isolated.

Key words: *Campylobacter jejuni*, *C. coli,* beef cattle, dairy cattle

The thermotolerant species (*C. jejuni* and *C. coli*) of the genus *Campylobacter* are zoonotic bacteria with worldwide distribution. These bacteria are the primary causative agents of diarrhea in humans in industrialized countries, and are important causes of diarrhea in developing countries (4, 8, 10, 16).

Reservoirs for *C. jejuni* and *C. coli* include cows, sheep, pigs, and other species of domestic and wild animals, all of which can be direct or indirect sources of infection for humans. *C. jejuni* and *C. coli* are carried as commensal organisms in the intestines of these animals. *C. jejuni* may also cause abortion in some animal species (3, 4, 6, 14, 16).

In the southern Chile, beef and dairy cattle should be considered an important reservoir for *Campylobacter* contamination of milk, meat, and the environment (6). *Campylobacter* should also be considered a veterinary problem in production animals. *C. jejuni* has been reported to cause enteritis in calves and bovine mastitis and *C. fetus* subsp. *fetus* is responsible for abortion and infertility in cattle (1, 14).

In Southern Chile, it has been demonstrated that free reared domestic laying hens and pet and stray dogs are reservoirs of *Campylobacter*, and they contaminate the environment where these domestic animals live (5, 6, 7). However, there is little information on the relevance of cows in the transmission of *C. jejuni* and *C. coli* to humans.

Beef and milk production are important in this part of Chile, and it is therefore necessary to know the prevalence of *C. jejuni* and *C. coli* in cows in this geographical area, to establish its isolation frequency, common biotypes, and to determine if there are differences between the carriage for confined dairy cows and for beef cattle raised on grass.

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We studied 300 faecal swab samples collected from cows. These samples were collected at random from 220 cattle going to a slaughter house (Frival Valdivia), and from 80 confined dairy cattle from the same herd, kept indoors.

After collection, samples were transported in Cary-Blair medium (approximately 2 ml) under refrigeration for a period of no more than 18 hours. Samples were plated out on modified Skirrow agar plates (cit. 5, 6), which were incubated at 42°C for 48 hours under microaerobic conditions (6), for the isolation of thermotolerant *Campylobacter* species (*C. jejuni* and *C. coli*). The identification of the species was done with phenotypic tests using the API Campy® (bioMérieux. Marcy/Etoile, France.) test procedure. The biotyping was done using the method described by Lior (11) as adapted for use in our laboratory (6). Statistical evaluation was done through z test using Epidat 3.1 program (13).

Table 1 shows that 32.0% of the samples were positive for *Campylobacter* spp. Significant differences ($p < 0.05$) were found between the highest prevalence rate, observed in beef cattle (35.9%), and the lowest prevalence rate found in dairy cattle (21.3%). In all sample groups, *C. jejuni* was the most commonly isolated species (85 strains) with the remaining of the samples being *C. coli* (11 strains).

Within dairy cattle, 15 strains of *C. jejuni* were found, with biotype I showing the highest prevalence (60.0%) and biotype II making up the rest (40.0%). Only two strains of *C. coli* were isolated in this group, corresponding one strain to biotype I and the other, to biotype II.

Seventy strains of *C. jejuni* were isolated from beef cattle. Biotype I was the most frequent (58.6%), followed by biotype II (18.6%), biotype III (20%) and biotype IV (2.9%).

The two biotypes described for *C. coli* were found, with biotype I composing 66.7% of the isolates and biotype II making up the rest (33.3%).The overall prevalence of *Campylobacter* spp. was 32.0%, a prevalence that is similar to reports by Fernández (8) in Chile (39.3%). A higher prevalence rate has been reported by Giacoboni *et al* (9) in Japan (46.7%). In addition, lower prevalence rates have been found by Cabrita *et al* (3) in Portugal (19.5%), and Tresierra *et al* (15) in Peru. These results indicate, from the epidemiological stand point that intestinal carriage may be conditioned by the environment in each place. The higher prevalence of *C. jejuni* in relation to *C. coli* is a common pattern that is found in most studies and includes samples isolated from animals and humans (6, 8, 16).

Bailey *et al* (2), studing 19 herds in Australia, found that *Campylobacter* prevalence ranged from 0%–24% for dairy cattle and 0%–52% for pasture beef cattle. Padungtod and Kaneene (12) reported that *Campylobacter* prevalence was 14% in dairy cows in Thailand. In the two latter studies *C. jejuni* was also more frequent than *C. coli*.

The higher prevalence of *Campylobacter* in beef cattle is an epidemiological event that may be associated to the environment where these cattle have been raised. While beef cattle are raised on pasture and in contact with a diverse environment, dairy cattle are kept in confinement and under better environmental hygienic conditions. A direct correlation between poor environmental hygienic conditions and a higher prevalence rate for *Campylobacter* was reported by Fernández *et al* for laying hens (5) and dogs (7).

The fact that four biotypes of *C. jejuni* were isolated from beef cattle while only two biotypes were found in dairy cattle is also a result of the different environmental exposure between these two types of production (5, 7). In both group of animals (beef and dairy), biotypes I and II where the most prevalent, and they also happen to be the most prevalent biotypes isolated from other animals and humans in our region (6).

Based on these results, we believe there is a need for further studies aimed at elucidating the sources of

Table 1. Isolation frequency of *Campylobacter jejuni* and *C. coli*, and their biotypes in beef and dairy cattle.

				C. jejuni										*C. coli*					
						Biotypes										**Biotypes**			
Type of cattle	**Simples studied**	**Positive samples**		**Strains isolated**		I		II		III		IV		**Strains isolated**		I		II	
	N°	**N°**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**	**Nº**	**%**
Dairy	**80**	**17**	**21.3***	**15**	**100**	**9**	**60.0**	**6**	**40.0**	**0**	**0.0**	**0**	**0.0**	**2**	**100**	**1**	**50.0**	**1**	**50.0**
Beef	**220**	**79**	**35.9***	**70**	**100**	**41**	**58.6**	**13**	**18.6**	**14**	**20**	**2**	**2.9**	**9**	**100**	**6**	**66.7**	**3**	**33.3**
Total	**300**	**96**	**32.0**	**85**	**100**	**50**	**58.8**	**19**	**22.4**	**14**	**16.5**	**2**	**2.4**	**11**	**100**	**7**	**63.6**	**4**	**36.4**

environmental contamination for beef and dairy cattle. In addition, the environment of the processing facilities for these animals and the resulting foods should also be evaluated for the presence of *Campylobacter* spp. to implement specific control measures designed to improve the safety of these foods.

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RESUMO

Ocorrência de *Campylobacter jejuni* e *Campylobacter coli* e seus biotipos em bovinos de corte e de leite no sul do Chile.

Foi estabelecida a prevalência de *Campylobacter jejuni* e *Campylobacter coli* e seus biotipos, em bovinos de corte e de leite do sul do Chile. *Campylobacter* foi estatisticamente mais prevalente nos bovinos de corte (35,9%) do que nos bovinos de leite (21,3%), sendo *C. jejuni* a espécie mais frequentemente isolada.

Palavras-chave: *Campylobacter jejuni*, *C. coli*, bovinos de corte, bovinos de leite

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