THE OCCURRENCE AND SUBTYPING OF CAMPYLOBACTER JEJUNI STRAINS ISOLATED FROM SLAUGHTERED POULTRY AND PIGS

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Background

*Campylobacter*iosis belongs among the most frequent foodborne infections in many underdeveloped and developed countries. Nowdays in the Czech Republic in the year 2000 twenty thousand cases of this infection were reported. That is nearly 200 cases per 100, 000 inhabitants. The regular monitoring of food sources does not reveal more frequent findings of *Campylobacter* sp. either. In contrast, *Campylobacter* sp. findings are very frequent in the environment of slaughter plants and meat processing units (Gerdemann 1996).

Objectives

The precise mechanism of *Campylobacter* sp. spreading in animal breedings, its transfer from animals, or from food sources to humans, is the subject of many studies and it has not been reliably explained so far. The aim of the present study was typing of *Campylobacter jejuni* strains isolated from slaughtered poultry and pigs using PCR-RFLP.

Material and methods

In all, nearly 156 strains isolated from poultry and pigs were examined. 280 samples swabs from poultry (carcass befiore evisceration, inside surface after evisceration, carcass after final washing, carcass after chilling, liver, eviscerating belt, plucking machine) and 316 samples (carcasses, ceacum, cutter, belt, dehairing machine, scalding machine, saw, handrail) from pigs were taken. Bacterial strains biochemically identified as *Campylobacter* sp. were tested by the PCR method. For specific PCR identification and differentiation of termophilic *Campylobacter* sp. primers THERM1 and THERM4 were used (Fermér and Engvall 1999). For specific amplification of the 702 bp PCR product primers published by (Nishimura *et al.*, 1996). PCR products were digested in 25 µl reaction buffer with 3 U of restriction enzyme *AfaI, MboI*, and *HaeIII*

Results and discussion

In total 182 *Campylobacter sp.* strains were examined in poultry; out of which were 159 (87%) *C. jejuni* strains and 23 (13 %) *C. coli* strains. From 316 samples originated from pigs were 109 strains *Campylobacter* sp.; out of which were 93 strains *C. coli* and 16 strains *C. jejuni* – Table 1.

In poultry most frequent findings of *Campylobacter* sp. were from inside surface after eviscerating (70 %), carcass before eviscerating (67 %) and liver (77 %). Majority of isolated strains were *C. jejuni* (87%) – Table 2.

The most frequent findings in pigs slaughter were from content of caecum (55 %) and from surface of carcasses in range of rectum immediately after slaughtering(18 %). Relatively frequent findings of *Campylobacter* sp. were from equipment of slaughters (cutter, belt, dehairing machine).

In despite that most of strains *Campylobacter* sp. isolated from pigs were identified as *C. coli* (85 %) pigs are not considered as a important risk of *campylobacteriosis* for human.

Based on restriction digest six types of RFLP patterns were detected with *AfaI*, five types with *MboI* and five types with *HaeIII*. The combination of these three enzymes proved 30 types (Cj. 1-30); out of which 17 types involved poultry strains.

The most frequently detected type in poultry strains was Cj.1 (31%). Occurrence of further types was Cj.21 - 10%, Cj.9 - 8% and Cj.11 and Cj. 12 - both 7 %. Further types were detected only in one to six strains.

From our results it is evident that some *C. jejuni* strains are more frequently occurred in poultry and some in human population (data are not published). One of the most frequently occurring type of human strains (Cj. 4) was identified in only two percent of poultry strains. On the other hand, the second most frequent type in human strains (Cj.1) was also most frequently found in poultry strains.

We compared our results with those of Nishimura *et al.* 1996, who performed typing of *C. jejuni* strains, using the same method. In our results we found 16 common types of human and poultry strains and 14 different types. It is probable that various *C. jejuni* strains have different pathogenicity in poultry and also in humans and thus a differing ability to colonise the intestine of the host (Korolik *et al.* 1997, Robinson *et al.* 2000).

Conclusion

Our findings and also the results reported by other authors confirm the assumption that poultry is a significant source of *Campylobacter* sp. for humans. At the same time, not all strains are probable the same pathogenic for humans. On the other hand, there are numerous other sources of *Campylobacter* sp., which can represent the source of human *Campylobacter*iosis.

Acknowledgements

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Pertinent literature

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Table 1
The occurrence of *Campylobacter* spp. in slaughtered pigs

	No. of samples	*Campylobacter* spp.	*C. coli*	*C. jejuni*
Scalding machine	15	0	0	0
Dehairing machine	18	2	2	0
Belt	20	3	3	0
Saw	6	0	0	0
Cutter	4	1	0	1
Handrail	2	0	0	0
Caecum	157	86	71	15
Carcasses	94	17	17	0
TOTAL	**316**	**109**	**93**	**16**

Table 2
The occurrence of *Campylobacter* spp. in slaughtered chicken

	No. of samples	*Campylobacter* spp.	*C. jejuni*	*C. coli*
Carcass before eviscerating	60	40	38	2
Inside surface after eviscerating	40	28	25	3
Carcass after final washing	40	23	20	3
Carcass after chilling	40	20	18	2
Liver	60	46	36	10
Eviscerating belt	20	15	13	2
Plucking machine	20	10	9	1
TOTAL	**280**	**182**	**159**	**23**