The prevalence of *Campylobacter* and *Arcobacter* in turkey and poultry meat

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Introduction

Raw poultry meat is known to be an important vehicle in the transmission of *Campylobacter* enteritis in humans. The most likely mechanisms of transmission are contamination from raw poultry meat to other ready-to-eat foods via the unwashed hands of the cook or via kitchen utensils, direct hand-to-mouth infection after handling of raw poultry, or insufficient cooking of poultry so that the organisms can survive (PARK et al., 1991).
Campylobacter jejuni subsp. jejuni and related thermophilic *Campylobacters* are common inhabitants of the intestinal tract of poultry and other food animals. BRYAN and DOYLE (1995) reported that the majority of raw poultry products are contaminated with thermophilic *Campylobacter spp.* and are therefore a potential hazard for humans.
The clinical importance of *Arcobacter (A.) spp.* is at present limited. Both *A. butzleri* and *A. cryaerophila* have been isolated from the faeces of humans with gastroenterits and stomach cramps (KISS and CSORIAN, 1995). *Arcobacter spp.* are morphologically similar to *Campylobacter spp.* but differ particularly in being able to grow in air rather than under micro-aerophilic conditions. Unlike the thermophilic *Campylobacters* (*C. jejuni, C. coli, C. lari*) *Arcobacters* are only able to grow at temperatures below 30°C.

Material and Methods

Turkey and poultry samples
Chilled and individually packed turkey carcasses from different slaughterhouses were acquired as was chilled poultry meat from different EU producers and different processing plants. All samples were kept refrigerated.
Microbiological culture methods
Atmosphere:
The gas replacement method (BOLTON et al. 1992) was used with anaerobic gas mixture to provide micro-aerobic atmosphere with hydrogen.

Isolation media (ATABAY et al. 1996):
Plating media: mCCDA (Oxoid) plus SR155 was prepared according to manufacturer`s instructions. CAT agar (ASPINALL et al. 1993) consisted of mCCDA basal medium (Oxoid) with CAT supplement (cefoperazone-amphotericin-teicoplanin) prepared by adding sterile solutions of the antibiotics (cefoperazone 8 mg/l^{-1}, amphotericin B 10 mg/l^{-1}, teicoplanin 4 mg/l^{-1}). Blood agar comprised 5% (v/v) defibrinated sheep blood in blood agar base No. 2 (Oxoid).
Enrichment broths: CAT broth was prepared using *Campylobacter* enrichment medium with 5% (v/v) laked horse blood (Oxoid) incorporating the CAT selective supplement described above. *Acrobacter* enrichment broth (AEB) was prepared as described by LAMMERDING et al. (1996).
In this protocol the isolation method used for poultry and turkey meat was modified to include direct plating of carcass rinse onto mCCDA (10 µl) and onto blood agar using the STEELE and MCDERMOTT membrane filter method.
Other modifications were: (a) omisson of CAT agar at 37°C after enrichment because the plates had been overgrown with competitive flora; (b) omission of *Arcobacter* enrichment broth followed by mCCDA at 30°C, because it offered no advantage over CAT broth followed by CAT agar (at 30°C) for isolating *Arcobacter spp.*

Results

380 samples of poultry meat were examined and *Campylobacter* could be detected in 131 samples. Of the 120 examined turkey samples 25 were found to be infected with *Campylobacter*. Differentiation of the *Campylobacter* isolates was done using the api Campy® system and computer program (bioMérieux).
Arcobacter could be isolated from 20 samples of turkey meat and from 81 samples of poultry meat. *Arcobacter* spp. were also differentiated using the api Campy® system (bioMérieux) and in addition also according to the scheme of BOLTON et al (1992).

The following *Campylobacter* strains were detected:
58,5% *Campylobacter jejuni biotype 1*
8% *C. coli*
18% *C. upsaliensis*
16% other *Campylobacters* (C. *sputorum, C. fetus, C. hyointestinalis, C. jejuni var. doylei, C. lari*)

The *Arcobacter* isolates were mainly found in skin samples and could be positively identified as *A. cryaerophila* and *A. butzleri*.
In addition to that 4% of all examined samples contained *Helicobacter cinaedi*.

Discussion

In Germany *Campylobacter spp.* are the second most important causative organisms of human enteritis. Only salmonellosis is diagnosed more often. However, it is very likely that *Campylobacter* is only considered to be of less importance than *Salmonella* because there is no official requirement for examination of samples for *Campylobacter* as there is for *Salmonella*. Furthermore cultural methods and differentiation of *Campylobacter* is far more complicated and is thus carried out less often. *Campylobacter* cells derived from food or environmental samples may be difficult to cultivate since they might be in a so called „viable but non-culturable" phase. Different methods for the detection of *Campylobacter spp.* and *Arcobacter spp* from food are described in literature.

In this study different cultural methods for the detection of *Campylobacters* and *Arcobacters* were tested.

Campylobacter spp were found in 34,4% of the examined poultry meat. This percentage seems to be rather low when one considers that in poultry flocks up to 90% of the animals are carriers of these organisms, nevertheless since the meat samples were kept refrigerated all the time this percentage is alarming and shows a potential risk for human infection.

Turkey meat is only rarely examined for contamination with *Campylobacter*. In 20,8% of the samples in this study *Campylobacter* could be detected.

Whereas *C. jejuni biotype 1* was isolated most often from poultry, *C. fetus subsp fetus.* was the most common serovar found in turkey meat.

The detection of *Arcobacter spp.*, especially *A. butzleri*, may well be of importance for food hygiene and the food producing industry, since *Arcobacter spp.* are able to grow at temperatures around 15°C. This means that *Arcobacter* can multiply in freshly merchantised broilers and thus potentially causes a risk for human health.

References

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