Critical processing steps in the slaughterhouse for the control of *Campylobacter* in broilers

F. REICH, V. ATANASSOVA, L. BECKMANN and G. KLEIN

Institute for Food Quality and Food Safety, University of Veterinary Medicine Hanover, 30173 Hanover, Germany.

*Corresponding author: guenter.klein@tiho-hannover.de

*Campylobacter* spp. is of great importance as a pathogen in humans, especially poultry is of interest as it is regularly contaminated with high levels of this pathogenic germ. In the framework of an EU Project “POULTRYFLORGUT” 197 samples from a poultry slaughterhouse were collected over a period of one year. Following samples were collected: Scalding water, carcasses before and after evisceration and after chilling. 11 different flocks on 11 separate sampling days were tested during slaughtering and processing. The samples were examined according to ISO 10272. Positive samples were confirmed and differentiated by biochemical tests. The results of 197 samples examined from processing showed that 169 (85.8 %) were positive for *Campylobacter* spp., these were distributed as follows: scalding water 96.9 %, carcasses after scalding and defeathering 81.8 %, carcasses after evisceration 87.3 %, carcasses after chilling 81.8 %.

Keywords: Campylobacter; poultry; processing steps; slaughterhouse

Introduction:

The Campylobacteriosis is an important foodborne health problem in industrialized countries worldwide. Especially thermophilic *Campylobacter* are the cause for this zoonosis, inducing diarrhoea (Skirrow 1991 Altekruse et al.1998). *C. jejuni* accounts for the majority of cases of human infection, while *C. coli* is responsible for most of the remaining part. Thermophilic *Campylobacter* can be found in many natural sources, the main reservoir is the alimentary tract of birds and mammals. Poultry is considered as an important source for *C. jejuni* and *C. coli*.

The colonization levels of *Campylobacter* in ceacal content of chicken can be as high as log 7.0/g (Stern et al.1995). The transport from the farm and the processing at the abattoir leads to surface contamination of the birds and to cross-contamination even of negative flocks processed (Berrang et al. 2004). During the slaughtering and processing poultry can become contaminated with *Campylobacter* from their intestinal contents (Berndtson et al. 1992). The processing steps scalding, defeathering, evisceration and chilling cause the greatest changes in the contamination of carcasses with *Campylobacter* (Shane 1992, Stern and Robach 2003).

The aim of this study was to identify steps in the processing plant which have critical influence on the contamination and cross contamination of broiler carcasses with *Campylobacter*. In the framework of the EU project “POULTRYFLORGUT” a poultry processing plant was visited monthly from April ’05 to February ’06. Samples were collected from different processing steps and analysed for the presence of thermophilic *Campylobacter*.
Material and Methods:

11 Flocks were examined on 11 different sampling days for the prevalence of Campylobacter at different steps during slaughtering and processing. Carcasses after scalding/defeathering, after evisceration and after chilling were taken. Scalding water was taken in the course of processing. The samples were examined according to ISO 10272 by enrichment in Preston-Broth and additionally by direct plating. Media used were CCDA and Karmali plates, incubated for 48h at 42°C und microaerobic conditions (5% O₂, 10% CO₂, 85% N₂). Presumptive colonies were confirmed by motility testing, Gram-staining, oxidase and catalase reaction. Differentiation was performed biochemically with API campy.

Results and Discussion:

The results of 11 flocks tested during processing show 85.8% samples to be positive for Campylobacter spp., the results at the different processing steps are shown in table 1.

Table 1 Prevalence for Campylobacter spp. at different processing steps.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Number of samples examined</th>
<th>Campylobacter positive</th>
<th>Campylobacter positive in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalding water</td>
<td>32</td>
<td>31</td>
<td>96.9</td>
</tr>
<tr>
<td>Carcasses after scalding and defeathering</td>
<td>55</td>
<td>45</td>
<td>81.8</td>
</tr>
<tr>
<td>Carcasses after evisceration</td>
<td>55</td>
<td>48</td>
<td>87.3</td>
</tr>
<tr>
<td>Carcasses after chilling</td>
<td>55</td>
<td>45</td>
<td>81.8</td>
</tr>
<tr>
<td>Total</td>
<td>197</td>
<td>169</td>
<td>85.8</td>
</tr>
</tbody>
</table>

From the 11 flocks tested 3 had a negative Campylobacter status in the caeca (data not shown). The prevalence at the different processing steps is high. Especially in scalding water Campylobacter was found in all samples except one. This may contribute to a high contamination rate of carcasses after the scalding and defeathering procedure, where 81.8% of the carcasses were Campylobacter positive. A further increase is noticed after the evisceration (87.8%), in this processing step possible damages to the gut can spill contaminated faeces to the surface of carcasses. After chilling there was a reduction in the contamination rates of carcasses to 81.8%.

The scalding procedure is an important step in contamination of carcasses. Although there is a reduction in numbers of Campylobacter the water is contaminated at a high rate contributing to a redistribution on other carcasses, even from negative flocks. During defeathering and during evisceration amounts of faeces can be pressed out from the cloaca or caecal contents from ruptured viscera from positive birds and lead to an increase in Campylobacter contamination of carcasses (Bryan and Doyle 1995, Berrang et al. 2001). The process of chilling leads to a reduction in numbers of Campylobacter, either due to a washing effect or due to drying in air chilling, but still a high rate of carcasses can be contaminated with Campylobacter with over 90% positive samples after chilling when positive flocks were slaughtered. The high contamination in the processing plant finally results in contamination of the end product with about 49% and 80% (96/120) respectively. (Oosterom et al. 1983, Rosenquist et al. 2006).

References:


