Quantification of thermophilic *Campylobacter* spp. in broiler meat from the slaughterhouse

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Product safety and consumer protection are important tasks in modern food production. In this regard the knowledge of risks and hazards is of great value. Emerging food borne pathogens like *Campylobacter* are a cause of gastrointestinal infections worldwide. In total 275 samples were collected at a poultry slaughterhouse between April ´05 and February ´06. During slaughtering carcasses after scalding and defeathering and carcasses after evisceration were taken. Furthermore, carcasses were taken after chilling and during cutting samples of breast meat and pairs of breast filets were collected. The samples from the different production steps were examined quantitatively for thermophilic *Campylobacter* spp. according to ISO 10272-2:2002. The quantitative examination resulted in *Campylobacter* counts (mean log): for carcasses after scalding and defeathering between log 4.0 cfu/sample – log 8.3 cfu/sample (6.1 cfu/sample), for carcasses after evisceration between log 4.2 cfu/sample – log 7.8 cfu/sample (5.7 cfu/sample), for carcasses after cooling between log 4.2 cfu/sample – log 6.7 cfu/sample (5.1 cfu/sample), breast meat with skin between log 3.7 cfu/sample – log 5.5 cfu/sample (4.4 cfu/sample) and filets between log 3.7 cfu/sample – log 4.8 cfu/sample (4.1 cfu/sample).

Keywords: thermophilic *Campylobacter*, quantification, broiler meat

Introduction:

Undercooked poultry and cross contamination during kitchen handling of poultry meat is considered to be one of the main sources for sporadic *Campylobacter* infections. The number of reported human cases in Europe is increasing (EFSA 2004). Risk assessment studies have implicated a connection between the contamination and numbers of *Campylobacter* on poultry and the risk of acquiring campylobacteriosis. A reduction in numbers of *Campylobacter* on chicken products has great impact on reducing the risk of illness (Rosenquist et al.2003).

During slaughter and processing intestinal contents can contaminate the surface of chicken carcasses, leading to a contamination with *Campylobacter*. Although different processing procedures have influence on the number of *Campylobacter* on the surface of carcasses, a total elimination is not possible.

For the estimation of numbers of thermophilic *Campylobacter*, samples were collected at a slaughterhouse before and after different processing operations. The aim of the study was to show the influence of each processing step on the change of *Campylobacter* counts on the surface of broiler carcasses and broiler meat.

Material and Methods:

275 samples of broiler carcasses and broiler meat were collected on 11 sampling days at a poultry slaughterhouse between April ´05 and February ´06. Samples were collected after scalding and defeathering, after evisceration and after chilling. In the process of cutting samples of breast meat with bone and skin and pairs of breast filets were taken. In total 55 samples from each processing step were

examined. Carcasses and cuts from poultry meat were rinsed in 500ml of sterile water. For the quantitative examination according to ISO 10272-2: 2002 serial dilutions were prepared from the rinse and a 0.1ml aliquot was spread plated in duplicate onto CCDA and Karmali agar plates. Incubation for 48h at 42°C was performed under microaerobic conditions (5% O_2, 10% CO_2, 85% N_2). Presumptive colonies were counted and confirmed by phase contrast microscopical observation, gram staining, oxidase and catalase reaction.

Results and Discussion:

The results of the quantification of thermophilic *Campylobacter* spp. are shown in table 1. The numbers of *Campylobacter* are highest on the carcasses after scalding and defeathering, they are steadily decreasing in the following processing steps, leading to a mean value that is 1.0 log cfu/carcass lower for carcasses after chilling than for carcasses from the first step examined.

Table 1 Enumeration of thermophilic *Campylobacter* spp. from samples of broiler carcasses and broiler meat collected after different processing steps.

Sample	Number of samples examined	*Campylobacter* mean number log cfu/sample	*Campylobacter* range log cfu/sample
Carcasses after scalding and defeathering	55	6.1	4.0 – 8.3
Carcasses after evisceration	55	5.7	4.2 – 7.8
Carcasses after chilling	55	5.1	4.2 – 6.7
Breast meat with bone and skin	55	4.4	3.7 – 5.5
Pairs of breast filet	55	4.1	3.7 – 4.8
Total	**275**		

Thermophilic *Campylobacter* spp. can be found throughout the entire processing operations in a broiler slaughterhouse. The numbers of *Campylobacter* are higher at the beginning of the processing and lower at the end before the packaging of the products. The highest numbers of Campylobacter were found on carcasses after defeathering and evisceration. These are mainly caused by spillage of intestinal contents during these processing steps. Berrang et al. (2004) report the impact of feacal spillage on the surface of broiler carcasses, where even a small amount of intestinal content can lead to a significant increase of numbers of *Campylobacter*. Although some studies report an increase of *Campylobacter* after the evisceration process (Oosterom et al. 1983, Rosenquist et al. 2006), this could not be confirmed here. A further decrease was noted after the air chilling, where surface drying may contribute to the reduction. *Campylobacter* were still found in cut chicken parts with and without skin prior to packaging in mean numbers between 4.1 and 4.4 cfu/sample. This leads to the conclusion, that still a considerable amount of chicken meat can get into retail contaminated with high numbers of *Campylobacter*.

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