Prevalence of *Arcobacter* spp. in Mechanically Deboned Turkey

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Summary and Implications

In the winter survey, *Arcobacter* spp. was isolated from 92% of the mechanically deboned turkey (MDT) samples with 80% of the samples positive for *A. butzleri*. The summer survey had 83% of the MDT samples positive for *Arcobacter* spp. The high rate of positives from the two surveys, clearly indicates that *Arcobacter* spp. is prevalent in MDT. This may be cause for concern, especially if food testing laboratories are relying on the traditional isolation methods for *Campylobacter* from meat. Some of the samples could be misinterpreted-*Campylobacter* for *Arcobacter* and *Arcobacter* for *Campylobacter*. This survey uses polymerase chain reaction (PCR) to detect the presence of *Arcobacter* spp. in the enriched samples, thus bypassing the typical plating and visual identification. *Arcobacter butzleri* species-specific probes were used to identify the *A. butzleri* positive samples.

Introduction

In 1977, Ellis et al. isolated aerotolerant and spiral or vibrio-like organisms from bovine and porcine aborted fetuses. The organisms were identified as aerotolerant campylobacters based on their morphology and DNA homology. However, after DNA-DNA hybridization and phenotypic examination the aerotolerant organisms were separated into two DNA homology groups, *Campylobacter cryaerophila* and *Campylobacter butzleri* sp. nov. (2). Further rRNA studies showed a distinct difference between *Campylobacter* and the aerotolerant *Campylobacter*, thus VanDamme et al. proposed the renaming of the aerotolerant *Campylobacter* as *Arcobacter* spp. (3).

Arcobacter butzleri has been isolated from both food sources and from humans and nonhuman primates suffering from enteritis (2). Proper identification of *Arcobacter* spp. is critical in order to understand the role *A. butzleri* may have in causing food borne illness. Traditional plating methods and dark field microscopy often do not effectively distinguish between *Campylobacter* spp. and *Arcobacter* spp.

The purpose of this study was to determine the prevalence of *Arcobacter* spp. and *A. butzleri* in mechanically deboned turkey. This survey along with the previous surveys by other researchers will show how prevalent *Arcobacter* spp. is in our food supply and if it could play a part in causing food borne illness.

Materials and Methods

Winter Survey. One hundred samples of MDT were obtained from an Iowa poultry plant on four separate dates in January and February, 1996.

Arcobacter Enrichment. Ten grams of each sample were placed in a 50 ml. plastic centrifuge tube containing 20 ml. of P-80 semisolid media. The enrichments were incubated for seven days at 30°C. After incubation, each enrichment was plated on BHI agar with 10 percent defibrinated blood using the following procedure. Sterile 0.45 μm, filters were aseptically placed on the BHI-plus-blood agar. Two drops of the enrichment were placed on the filter and allowed to sit undisturbed for one hour. The filters were removed and the plates were streaked for isolated colonies. The plates were incubated under microaerophilic conditions (10% CO_2, 5% O_2, 85% N_2) for five days at room temperature. Each enrichment was also subcultured (1 ml. of enrichment into 9 ml of fresh P-80) and incubated for three days at 30°C.

Arcobacter spp. Identification. The subcultures were used for PCR analysis to identify the *Arcobacter* spp. positive samples using the primers and conditions as described by Harmon et al. (1). The amplified DNA was analyzed using gel electrophoresis (120 V. for one hour) on 1.5% agarose gels with TBE as the running buffer. The gels were stained with ethidium bromide, visualized by UV light and photographed. To identify the *A. butzleri* positive samples, the gel was transferred using the Southern blotting technique onto a nylon membrane which was then hybridized with the *A. butzleri* species-specific probe as described by Wesley et al. (5).

Summer Survey. One hundred forty-five samples were obtained from three poultry plants on two separate dates in July and August, 1996. Fifty samples came from the same Iowa plant in the winter survey, 50 samples came from an Arkansas plant, and 45 samples came from a Michigan plant.

Arcobacter Enrichment. The enrichment set up was the same as in the winter survey with the following modifications. The initial enrichments were incubated for only three days before they were subcultured and incubated for another three days. The enrichments were not plated onto BHI-plus-blood agar.

Arcobacter spp. Identification. The same method used in the winter survey to identify the Arcobacter spp. positive samples was employed here. To identify the A.

butzleri positive samples, a cell suspension dot blot hybridization which uses the A. butzleri species-specific probe as described by Wesley et al. (5).

Results and Discussion

In the winter survey, 92% of the samples tested were positive for *Arcobacter* spp. with 80% positive for *A. butzleri*. In the summer survey, the three plants combined had a total of 83 % positive for *Arcobacter* spp. Individual plant numbers were as follows: Iowa had 100 % positive, Michigan had 80% positive and Arkansas had 70% positive for *Arcobacter* spp. As of this time, the summer survey samples are being analyzed for *A. butzleri*. The summer survey samples will also be ribotyped to see if there are strain similarities in the plants. The high rate of positives for *A. butzleri* clearly indicates that the organism is prevalent in mechanically deboned turkey.

References

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