



Original Contribution

PREVALENCE OF *CAMPYLOBACTER* SPP IN FROZEN POULTRY GIBLETS AT BULGARIAN RETAIL MARKETS

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ABSTRACT

The aim of this study was to investigate the presence of *Campylobacter* spp. in packed frozen poultry giblets available for the consumers at Bulgarian retail market. The assayed samples included 58 packets of livers, 55 packets of gizzards and 40 packets of hearts, from different retail shops. The obtained results showed that *Campylobacter* spp. was isolated in 15.5%, 41.8% and 22.5% of the samples of livers, gizzards and hearts respectively. *Campylobacter* isolates from the liver was identified in 77.8% as *C. coli* and in 22.2% as *C. jejuni*. From gizzards and hearts the species *C. jejuni* was differentiated in 78.2% and 55.6% of the obtained isolates, respectively.

Key words: Poultry, giblets, liver, gizzard, heart, *C. jejuni*, *C. coli*

INTRODUCTION

Campylobacter gastroenteritis in people is vector-conditioned infections mainly caused by poultry meat and products. Consumption of undercooked poultry meat appeared as the most common cause for gastroenteritis. *Campylobacter* bacteria are isolated in considerable share in the alimentary tract (up to 100%) and on skin surface of broilers. Therefore, there is significant risk of bacteria prevalence onto ready for packaging poultry cuts (1; 2) and poultry products (3; 4; 5) through contaminated processing equipment and workers hands during the processing of poultry meat. In a certain moment of poultry processing giblets are separated and appointed toward the related rooms for washing, sorting and packaging.

Giblets (livers, hearts, gizzards, etc.) are often highly contaminated with various bacteria, among which we can find *Campylobacter* (6; 7; 8). Denis et al. (2001) investigated poultry livers, of which they found 28.6% *Campylobacter* positive samples.

Campylobacter contamination is a significant

issue to be solved to meat consumers' requirements for food safety.

The aim of this study was to investigate the presence of *Campylobacter* spp. in packed frozen poultry giblets - livers, gizzards and hearts available for the consumer at Bulgarian retail market.

MATERIAL AND METHODS

For the purpose of our survey to investigate the presence of *Campylobacter*, multiple samples were taken from packed frozen poultry giblets - livers, gizzards and hearts. The assayed samples included 58 packets of livers, 55 packets of gizzards and 40 packets of hearts. After defrosting there were taken individual samples of each giblet package to be tested.

Enrichment broth (Merck) with antibiotic supplement and *Campylobacter* selective agar (Merck) containing selective antibiotic supplement (Merck) were used as selective medium.

Samples were incubated in microaerophilic atmosphere at 37°C and 42°C for 48 hours. Furthermore, the pure cultures were tested for cytochrome oxidase, catalase, hippurate hydrolysis and indoxyl acetate hydrolysis. Bacteria with cell and colonial morphology and biochemical profiles identical with *Campylobacter* were differentiated by API Ca Campy® (Bio Mérieux, 20800).

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RESULTS AND DISCUSSION

Our study found presence of significant contamination with *Campylobacter* in giblet

products. *Campylobacter* positive samples in livers, gizzards and hearts were 15.5%, 41.8% and 22.5%, respectively (**Table1**).

Table 1. *Campylobacter* positive samples in giblets

Samples	n	<i>Campylobacter</i> positive, n (%)	<i>C. jejuni</i>	%	<i>C. coli</i>	%
Livers	58	9 (15,5%)	2	22,2	7	77,8
Gizzards	55	23 (41,8%)	18	78,2	5	21,7
Hearts	40	9 (22,5)	5	55,6	4	44,4

Campylobacter spp. differentiation of the isolates of liver showed that 77.8% of all were *C. coli* and 22.2% *C. jejuni*. In gizzards we found 21.7% *C. coli* and 78.2% *C. jejuni*. The result for the 9 *Campylobacter* positive poultry hearts showed that 55.6% of all were *C. jejuni* and 44.4% *C. coli*.

The results in this study showed slightly lower presence of *Campylobacter* spp. in poultry liver (15.5%) compared to the results obtained by other studies. Oosterom et al. (1983) and Denis et al. (2001) investigated *Campylobacter* contamination in broiler livers from 28.6% up to 73.0%.

Liver hygiene highly concerns food safety mainly in two directions. First, there is huge risk of many people to be infected after consuming insufficiently cooked liver with *Campylobacter*. Besides, the contaminated poultry liver is a potential source for transferring *Campylobacter* in further stages of poultry processing.

Misawa et al. (1996) investigated that *C. jejuni* caused necrotic lesion in quail livers. The lesion appeared from 1 to 7 days after inoculating the bacteria in pancreatoduodenal vein. At the same time such lesion is not observed if *C. jejuni* is put through the alimentary tract. Other surveys (9) also investigated similar dependence between the presence of *Campylobacter* and pathologic lesion of poultry liver. The authors isolated *Campylobacter* in 21% from liver with necrotic lesion, and only in 12% of the samples the liver was with no lesion.

Fernandez and Dison (1996) found *Campylobacter* in a large number of tested samples of frozen poultry liver. They isolated *Campylobacter* in 92.9% of all samples as

prevailing isolated species was *C. coli* (78.6%) followed by *C. jejuni* - in 21.4% of the samples.

Wieliczko (1994) detected *Campylobacter* deliberately more often in liver with necrotic lesion (97%) than in liver with no lesion (54%). Such lesion was proved in 22% of the poultry in all tested flocks. According to the results of that study *C. jejuni* appeared as the most commonly isolated species (60.3%), followed by *C. coli* (39.7%).

Campylobacter are isolated in both from the surface and in depth from poultry liver (13). Taking into account that commonly liver passes short heat treatment at temperature not high enough to eliminate *Campylobacter*, the food-safety risk emerging from liver consumption seems to be bigger than one in meat.

Khalafalla (1990) isolated *C. jejuni* from gizzard, hearts, livers and spleen in, respectively, 28%, 10%, 40% and 16% of tested samples of broilers.

Sotirova et al. (1984) found *C. jejuni* in 24.1% of tested samples of poultry liver and in 60% of all gizzards.

Presence of *Campylobacter* in ready packaged-goods of frozen poultry giblets shows the necessity of additional elimination of *Campylobacter* during their treatment at home. Appropriate heat treatment, as well as ceasing further contamination and cross contamination would be adequate measures to increase food safety, and more precisely to ready-to-eat foods from giblets.

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