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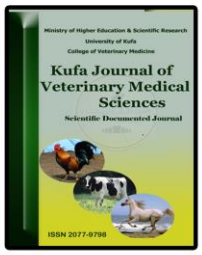

Campylobacter jejuni Carriage of Broiler Carcasses at Slaughter-house As "An Important Parameter of food Hygiene"

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Abstract

The aim of the study is to evaluate the contamination of poultry meat with *Campylobacter jejuni* during slaughtering. The study was performed from February to August 2011, at Brno –Czech Republic. Two hundred eighty slaughtered broiler carcasses were examined from 20 farms (at different time intervals), five different samples were collected from each carcass. Swab samples were collected from different parts of the carcass as follows: from outer surfaces of carcass (after defeathering); from inner surfaces after evisceration; from ileum; liver and Bile as well.

A total of 139 carcasses were positive from bacteriological isolation of *C. jejuni* of total carcasses examined. Particularly, the percentage of isolation from different organ samples were as follows: 7.85% of isolates were from the outer surface, 8.21% from internal surface, 28.57% from ileum, 21.07% from liver, and 14.28% from bile.

Also the frequency of isolation was varied according to different months and showed maximum level in May (63%), while the minimum isolation rate was reported in August (40%). The present date was indicated a high level of contamination of broiler carcasses with *C. jejuni* and give us an alarming signal about and preventive measures

الحمل البكتيري للعطفية الصائمة في ذبائح دجاج اللحم المذبوح في المسالخ ' مؤشر هام لصحة الغذاء .

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الخلاصة

ان الهدف من هذه الدراسة هي تقييم تلوث لحوم الدواجن ببكتريا العطفية الصائمة اثناء عملية الذبح , تم اجراء الدراسة من شهر شباط ولغاية شهر آب من عام 2011 في مدينة برنو, دولة التشيك . تم فحص 280 نموذجا من من ذبائح الدجاج المذبوح في المسالخ والمأخوذة من عشرين حقلا من حقول الدواجن المختلفة وعلى فترات زمنية متباينة.تم جمع خمسة عينات مختلفة من كل جثة. وكانت نماذج المسحات التي تم جمعها من الدجاج المذبوح في المسالخ هي كالأتي من السطح الخارجي للذبيحة بعد ازالة الريش من السطح الخارجي ومن السطح الداخلي بعد نزع الأحشاء الداخلية ومن الصائم والكبد والمرارة .

اظهرت النتائج ان 139 جثة كانت موجبة لعزل بكتريا العطفية الصائمة وكانت نسبة العزل موزعة كالأتي 7,85% من السطح الخارجي 8,21% من السطح الداخلي و 28,57% من الصائم، 21,07% من الكبد و 14,28% من المرارة.

اختلفت معدلات العزل تبعا لأختلاف الأشهر واظهرت لنا أعلى مستوى في شهر ايار63% واقل مستوى في شهر آب 40%، و هذا يشير الى مستوى عالي من التلوث الحاصل في ذبائح الدجاج المذبوح ويعطينا اشارة مثيرة للقلق حول تدابير الوقاية الصحية المتخذة .

Introduction

Campylobacter jejuni (*C. jejuni*) bacteria are found naturally in the intestine of poultry, cattle, swine, rodents, wild birds and house hold pets like cat and dog. The bacteria have also been found in untreated surface (caused by matter in the environment) and manure (1).

C. jejuni is well characterized as the leading cause of bacterial foodborne illness in many the western world and in the developing countries, people who eat food contaminated by *C. jejuni* bacteria can become ill with campylobacteriosis (2, 3).

C. jejuni is small, gram negative, curved rods bacteria with gull-wing appearance, which requires specific conditions for the growth, it was succefully isolated (from human cases of high incidence of diarrhea) by the decade of the 1970s in many countries throughout the world (4). The major sources of *C. jejuni* infection remain the handling and consumption of raw or undercooked poultry meat (5, 6).

Although *Campylobacter species* are commensal enteric bacteria found in cattle, sheep, swine, and avian species, *C. jejuni* usually colonize the chicken gut in high numbers without causing disease, thus the intestinal tract of chicken provides a reservoir from which *C. jejuni* may spread via fecal material before or during slaughtering ,most processing operation reduce but cannot eliminated the bacterial carriage. Therefore, retail poultry meat is often contaminated with campylobacter (7).

The common route of transmission for the disease causing bacteria are fecal-oral route, person to person, ingestion of contaminated food and under cocked or poorly handled poultry (8). In broiler processing campylobacter numbers found on poultry carcasses usually vary among operations with a peak at defeathering and evisceration, steps followed by rapid reduction at post chilling (9).

The aim of the study is to evaluate the level of broiler carcass contamination with *C. jejuni* that will be helpful in the identification of critical point that needed to implement the control measures to reduce the incidence of campylobacter contamination in poultry industry.

Materials and Methods

A-Sampling Collection:

Total of 250 poultry samples were submitted to the Food Hygiene department, Veterinary College, Brno Czech Republic, during the period from February to August 2011. The samples were collected from 20 poultry farms in Brno city. Nearly ten carcasses of broilers were selected randomly at slaughterhouses each week.

The samples were collected from the following parts of the carcass: the outer surface of carcass after defeathering; the inner surface of carcass after evisceration; the content of ileum; the liver; and the bile.

Sterile swabs soaked in 10 ml Buffered peptone water (Merck) containing test tube was swiped over the carcass surface (outer/inner) for each sample and then immediately returned to the same test tube for preliminary enrichment.

Similarly, sterile swabs were used to collect samples from intestinal content and then immersed in Buffered peptone

water test tube. Bile content was collected aseptically using sterile syringe and then transferred into Buffered peptone water as above.

For liver sampling, one gram from liver parenchymal tissue was collected an added to Buffered peptone water.

All samples were incubated at 37°C for 24hour. In the next day, about 1 mL of incubated sample was added into 9 mL of Bolton Enrichment Broth (Merck), with supplement No.1.00079. Test tubes then incubated at 41°C for 24h. (10).

Subsequently, all samples were streaked on Campylobacter selective agar media, Camp Food ID agar (bioMerieux) and incubated at 41°C under microaerophilic conditions for 24-48h.

B-Isolation and Identification:

After incubation, the plates were inspected for presumptive colonies (colonies were small, dark red to orange red colour with a metallic Steen). Such colonies were selected and bacterial smears prepared for Gram staining. This showed curved or spiral rods with characteristic S-shaped or "seagull" appearance.

Oxidase test was done. BioMerieux API CAMPY was used according to manufactures instructions for the biochemical identification of Campylobacter Jejuni (11).

Result

Out of 280 slaughtered broiler carcasses collected during the period of study, 139 (49.6%) carcasses were positive for bacteriological isolation of *C. jejuni* from samples originated from all five organs.

Table 1 and graph 1, shows the findings of bacteriological isolation of *C. jejuni* from different broiler samples during the period from February to August 2011. The total number of isolates recovered from five organs was 224 isolates. Majority of isolates were recovered from ileum (80, 28.57%), followed by liver (59, 21.07%), Bile (40, 14.28%) and internal surfaces (23, 8.21%). Only 22 (7.85%) isolates were recovered from the external surfaces.

Particularly, the total quantity of contaminated broilers (by months) represented a parabolic curve with a peak in the month of May, when the frequency of finding reaches maximum 62,5 % while minimum at August month reaches 40 %. A parallel trend was observed among findings of *C. jejuni* isolation from the content of the ileum (45%) and in the liver Parenchyma 30% in the same month. While specimens of outer surfaces showed two peaks of isolation rate during January and May (15%). The frequency of occurrence of *C. jejuni* on the inner surface of the body was relatively low percentage (12.5 %) in May. Also, the results showed the discovery of *C. jejuni* in the bile, with a mean recovery of 14.28 % of total bile samples examined and the recovery was higher (30%) in April than other months of study.

Discussion

Poultry meat is frequently contaminated with *C. jejuni* throughout different areas of the world. Many survey studies have reported a high prevalence of *C. jejuni* in poultry meat (12).

The present isolation rate was higher than that reported in Denmark, Australia, Canada and Finland, but it was lower than that reported in Italy, the UK and the US (Saito et al.2005). Nearly, similar isolation rates (52.25%, 56.1%) were reported in Saudi Arabia and Iran, respectively (13, 14). Overall, the present results showed high prevalence of *C. jejuni* among poultry in Brono city Farms. Therefore, we

may need to an improved hygiene and a high level of biosecurity on these farms. A high level of biosecurity on the farm could protect against Campylobacter.

Poultry skin is considered to be one of the main sources of Campylobacter infection (15). Swabs taken from poultry carcasses were analyzed and showed lowest isolation rate from external surfaces followed by internal surfaces, this indicated the mechanical handling and processing of poultry carcass to avoid contamination of worker hands with *C. jejuni.*

On the other hand, current data revealed that ileum has showed higher contamination with *C. jejuni*. Higher levels of fecal contamination with *C. jejuni* in broiler chicken were detected in Romania (16).

Based on the Community Zoonoses Reports of the European Food Safety Authority (EFSA) 2010, clinical cases of campylobacteriosis are under-reported in the EU "there may be not less than 2 million and possibly as high as 20 million cases of clinical campylobacteriosis per year in the EU. Most cases of human campylobacteriosis occur sporadically. Nevertheless, many studies demonstrated that a leading risk factor for human Campylobacteriosis is the handling and consumption of contaminated poultry meat or crosses contaminated food (17).

However, the frequency of isolation of bacteria was showed maximum recovery rate in May and lowest in August. Previous studies showed a seasonal distribution was observed with a large peak in the summer months (18).

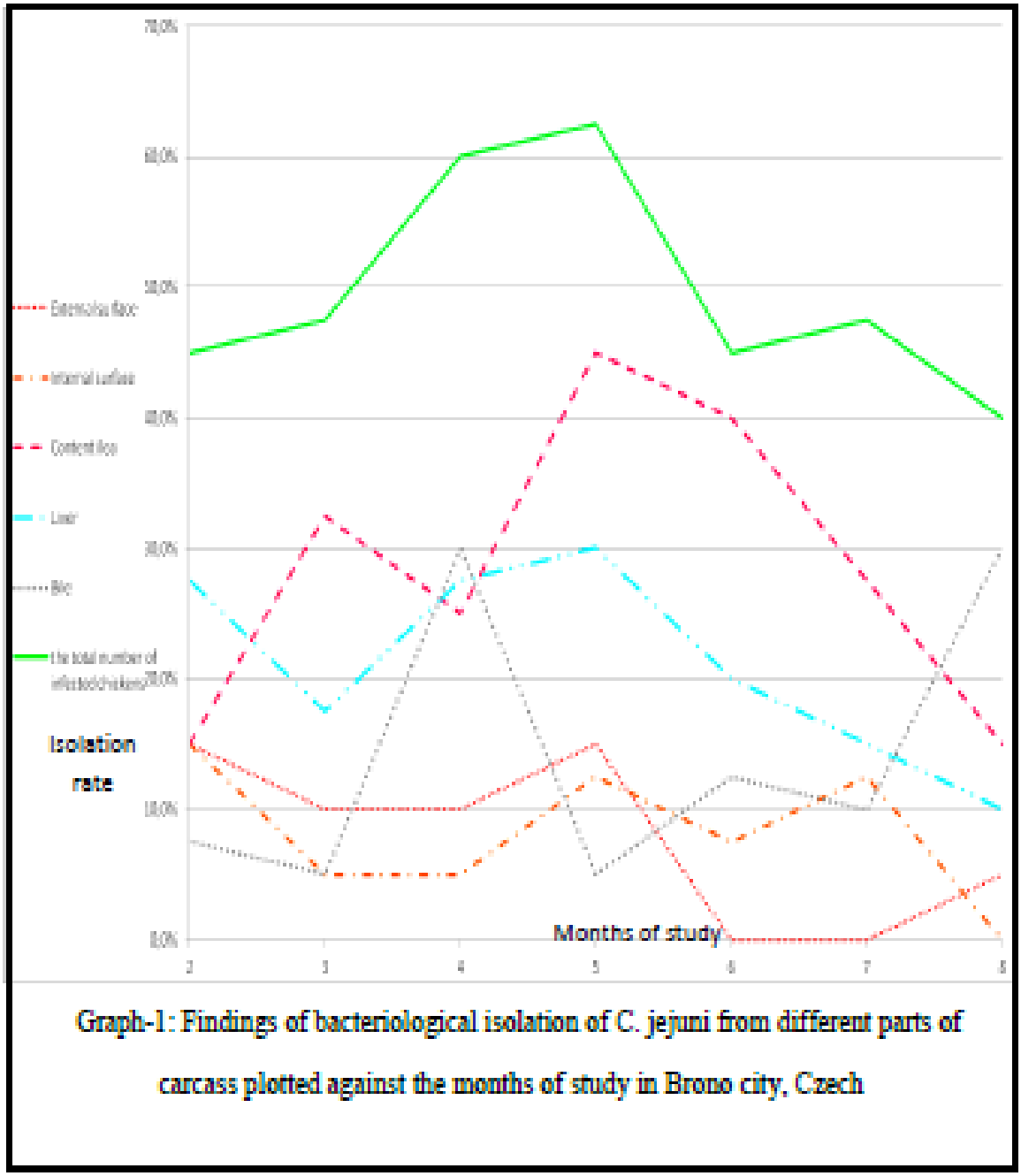
Discussion of the deeper causes of these differences in recovery rates among period of study that plotted in graph-1 is difficult. However they can reflect both the epizootological situation in the farms, as well as some factors such as temperature of scalding water, over all hygiene in slaughter houses.

Conclusion

Poultry meat still a source of campylobacteriosis and effective control measures should be applied to reduce the prevalence of *C. jejuni* in poultry industry.

Table 1- the findings of bacteriological isolation of *C. jejuni* from different broiler samples during the period from February to August 2011

Month	Week	Chickens		Surface		Content Iles	Liver	Bile
		examination	positive	external	internal			
2	1	10	3	0	0	1	2	1
	2	10	10	5	6	5	5	1
	3	10	3	0	0	0	3	1
	4	10	2	1	0	0	1	0
Total		40	18 (45%)	6 (15.0%)	6 (15.0%)	6 (15.0%)	11 (27.5%)	3 (7.5%)
3	1	10	8	2	1	7	2	1
	2	10	1	0	0	0	1	0
	3	10	3	0	0	2	2	0
	4	10	7	2	1	4	2	1
Total		40	19 (48%)	4 (10.0%)	2 (5.0%)	13 (32.5%)	7 (17.5%)	2 (5.0%)
4	1	10	1	0	0	0	1	0
	2	10	8	2	0	2	6	1
	3	10	9	0	1	4	2	7
	4	10	6	2	1	4	2	4
Total		40	24 (60%)	4 (10.0%)	2 (5.0%)	10 (25.0%)	11 (27.5%)	12 (30.0%)
5	1	10	9	4	2	8	6	1
	2	10	6	0	0	5	2	0
	3	10	4	1	2	1	2	0
	4	10	6	1	1	4	2	1
Total		40	25 (62.5%)	6 (15.0%)	5 (12.5%)	18 (45.0%)	12 (30.0%)	2 (5.0%)
6	1	10	8	0	0	3	2	1
	2	10	4	0	0	5	4	2
	3	10	2	0	2	6	1	1
	4	10	4	0	1	3	1	1
Total		40	18 (45%)	0 (0.0%)	3 (7.5%)	16 (40.0%)	8 (20.0%)	5 (12.5%)
7	1	10	8	0	1	3	2	2
	2	10	1	0	0	5	1	0
	3	10	3	0	2	3	1	1
	4	10	7	0	2	1	2	1
Total		40	19 (48%)	0 (0.0%)	5 (12.5%)	11 (27.5%)	6 (15.0%)	4 (10.0%)
8	1	10	2	0	0	1	1	0
	2	10	9	1	0	4	0	1
	3	10	3	1	0	1	2	7
	4	10	2	0	0	0	1	4
Total		40	16 (40%)	2 (5.0%)	0 (0.0%)	6 (15.0%)	4 (10.0%)	12 (30.0%)
Overall total		280	159 (49.64%)	22 (7.85%)	23 (8.21%)	80 (28.57%)	59 (21.07%)	40 (14.28)



Graph-1: Findings of bacteriological isolation of C. jejuni from different parts of carcass plotted against the months of study in Brono city, Czech

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