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FROZEN POULTRY AS A POTENTIAL SOURCE OF CAMPYLOBACTER (With One Table)

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تم الفحص الميكروبيولوجى لعدد خمسة وسبعون من الدجاج المجمد المتواجد بالسوبر ماركت بانحاء مدينة أسيوط لمعرفة مدى تواجد ميكروب الكامبيلوباكتري ولدراسة مدى إنتشار وتوزيع هذا الميكروب فى لحوم الدواجن ، ثم أخذ مائتان وخمسة وعشرون عينة من هذه الدواجن والتي إشملت على الجلد (جلد الرقبة ، الصدر ، البطن ، والمدرق) لحوم الدواجن (الصدر والفضد) والأجنحة . أثبتت النتائج وجود ميكروب الكامبيلوباكتري جيوجيناي فى عدد ٢٢ عينة (١٣ من الجلد ، إثنان من اللحوم وسبعة من الأجنحة) من المجموع الكلى للعينات المائتان وخمسة وعشرون بنسبة ٩.٧٨% . وجد أن إثنان من الدجاج تحوى على ميكروب الكامبيلوباكتري فى كل من الجلد واللحوم والأجنحة بنسبة ٢.٦٧% فى حين كانت نسبة وجود الميكروب فى الجلد واللحوم والأجنحة هى ١٧.٣٣% ، ٩.٣٣% ، ٢.٦٧% بالترتيب . وقد دلت نتائج عزل ميكروب الكامبيلوباكتري من لحوم الدواجن المجمدة على تحمل هذا الميكروب لدرجة التجميد فى أماكن البيع المختلفة . وقد تم مناقشة مايجب إتباعه فى تداول الدواجن المجمدة من اعداد وتجهيز وطهى لدرء خطر ميكروب الكامبيلوباكتري على صحة المستهلك .

SUMMARY

A total of 225 chicken skin, meat and wing samples obtained from 75 frozen poultry carcasses collected from different super-markets at Assiut Province were investigated for Campylobacter jejuni. 22 of 225 chicken samples (9.78%) were positive for Campylobacter. Skin, meat and wing samples in two (2.67%) of 75 poultry carcasses were found to be contaminated with the organism. Most Campylobacter isolates were recovered from the skin (17.33%), while from the meat and wing samples were 2.67% and 9.33% respectively. Campylobacter jejuni organisms on the surface of chicken meat were shown to be capable of surviving the freezing temperature in local retail stores. Sanitary handling of poultry including thawing, cooking, warm holding, handling after cooking, chilling and reheating are control measures for avoidance of campylobacteriosis.

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INTRODUCTION

Campylobacter jejuni has recently been recognized as a major bacterial cause of acute gastrointestinal infection in humans. The clinical manifestations have been described where the main site of infection is thought to be the caudal part of the small intestine, but the colon is also frequently involved. Occasionally, bacteremia or septicaemia and rarely arthritis, meningitis, endocarditis, and abortion have been reported (SKIRROW, 1977 and DOYLE, 1981).

Investigation of chicken processing plants in different countries have shown that large contamination with *Campylobacter jejuni* can exist on birds, equipment, hands of processing-line workers and in air samples from the processing facilities (OOSTEROM, et al. 1983 and WEMPE, et al. 1983). However, *Campylobacter jejuni* was found wide spread in different poultry slaughter-houses and slaughtering of heavily contaminated flocks may result in *Campylobacter jejuni* contamination rate up to 100% for end products and seems to be unrelated to the type of slaughtering (HARTOG, et al. 1983).

Poultry and poultry products have been found to be highly contaminated with *Campylobacter jejuni*, and some data are available concerning contamination during processing of poultry (GRANT, et al. 1980; LUECHTEFELD and WNAG, 1981; BLASER, 1982 and MEHLE, et al. 1982). The organism has been detected in fresh and frozen chicken and turkey obtained from supermarket-shelves and it is able to survive for extended periods in frozen or refrigerated meat (HANNINEN, 1981; BLANKENSHIP and CRAVEN, 1982; GILL and HARRIS, 1982; STERN and KOTULA, 1982; KINDE, et al. 1983; and RAYES, et al. 1983). Furthermore, several reports indicate the presence of *Campylobacter fetus* subsp. *jejuni* in the broiler carcasses, chicken wings, livers, gizzards, gall bladder and faecal material of poultry (SMITH and MULDOON, 1974; CHRISTOPHER, et al. 1982; SHANKER, et al. 1982; KINDE, et al. 1983 and NOUMAN, et al. 1986).

Campylobacter fetus subsp. *jejuni* has been incriminated in food borne illness (enteritis) associated with consumption of raw milk; undercooked poultry also has been implicated although the evidence was circumstantial (BLASER, et al. 1979; ROBINSON, et al. 1979 and TAYLOR, et al. 1979).

Much of what has been said about *Salmonella* on raw poultry is applicable to *Campylobacter fetus* subsp. *jejuni* therefore this study was initiated to assess the prevalence of *Campylobacter jejuni* in poultry carcasses in Assiut City.

MATERIAL and METHODS

75 frozen broiler chickens were purchased from local supermarkets and thawed by over-night refrigeration. Obtained samples from each poultry carcass were skin (neck, breast, abdominal and cloacal skin), chicken meat (breast and thigh) and chicken wings.

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Of the material that were examined for the presence of *Campylobacter jejuni*, 5 gm were put in BEM enrichment broth with Skirrow dried antibiotics described by RO'GOL, et al. (1985). The enrichment broth was incubated at 42°C under microaerophilic condition (anaerobic jar with GasPak, BBL Microbiology Systems, Cockeysville, Md) for 48 hours.

After enrichment, one loopful of the broth was streaked on blood agar base (Oxoid) supplemented with 5% human defibrinated blood and Skirrow dried antibiotics (RO'GOL, et al. 1985). The plates were incubated at 42°C for 48 hours under microaerophilic condition as described above.

Colonies resembling those of *Campylobacter* (smooth, convex, translucent, colourless to cream-coloured and pin-point from 2 to 4 mm) were checked for their biochemical reactions according to the methods outlined by PARK, et al. (1984) and cited in the Compendium of methods for the Microbiological Examination of Foods.

RESULTS

The isolation results of *Campylobacter jejuni* from frozen poultry carcasses are presented in Table (1). the organisms were isolated from chicken skin, meat and wings where chicken skin was the most contaminated (17.33%), while chicken meat showed the lowest contamination percent (2.67%). However, two out of 75 poultry carcasses (2.67%) were found to be contaminated with *Campylobacter jejuni* where the organism was isolated from each of skin, meat and wing samples.

DISCUSSION

Since the recognition of *Campylobacter jejuni* as an important human pathogen and its association with food animals, numerous reports have shown that commercially processed poultry is frequently contaminated by this organism. *Campylobacter fetus* was isolated from the intestinal contents and organs of several meat animals including cattle, sheep, chickens and turkeys (SMIBERT, 1964 & 1969; BRYNER, et al. 1972; and BLASER, 1982).

In this study, the *Campylobacter jejuni* contamination rate of deep frozen broiler carcasses samples in retail outlets appeared to be low (2.67%), probably because of damaging effect of freezing or the internal organs - as probably the contaminants are not associated with the allied frozen carcass. However, some investigators have reported that *Campylobacter jejuni* can survive frozen storage and shipment and the deleterious effect of freezing has been stated (SMITH and MULDOON, 1974; HANNINEN, 1981; STERN and KOTULA, 1982; HARTOG, et al. 1983 and STERN, et al. 1984).

Numerous reports revealed that *Campylobacter jejuni* was isolated from poultry and its products in varied percentages. In this respect, SMITH and MULDOON (1974) reported the isolation of three isolates of *Campylobacter fetus* subsp. *jejuni* obtained

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from 165 poultry meat samples purchased from local retail stores. Whereas, this organism was found in 82.9% and 15.5% of 94 chicken wing samples examined on the same day of arrival, and a few days later at supermarket respectively (KINDE, et al. 1983). Furthermore, *Campylobacter jejuni* was isolated from 18 of 40 processes broiler carcasses (SHANKER, et al. 1982).

The presence of low levels of the organism in food could constitute a public health problem as a volunteer study demonstrated that the infective dose was as low as 500 cells (ROBINSON, 1981).

The widespread occurrence of *Campylobacter fetus* subsp. *jejuni* on raw poultry emphasizes the need for proper food handling practices in food service establishments and in the home. These include (a) avoiding cross contamination of this organism to other foods (which may not receive further heating) by contact with contaminated utensils such as cutting boards and knives and (b) proper heat treatment of the foods (CHRISTOPHER, et al. 1982).

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Table (1)
Isolation rates for *Campylobacter jejuni* obtained
from the examined poultry carcasses

Samples	Positive/Total no. of samples	% Positive
Chicken skin	13/75	17.33
Chicken meat	2/75	2.67
Chicken wings	7/75	9.33
Total	22/225	9.78