

Isolation of Some Enteropathogens from Retailed Poultry Meat in Alexandria Province

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ABSTRACT

A total of 100 random samples of chicken meat, chicken nuggets, chicken paneehh and chicken luncheon (25 of each) were collected from different supermarkets in Alexandria province. The collected samples were subjected to bacteriological examination for detection of enteropathogens. The obtained results as following; *Salmonella* isolated from chicken meat, chicken nuggets, chicken paneehh and chicken luncheon as 56, 8, 12 and 8 %, respectively. *E.coli* was isolated by 68, 12, 12 and 8 % in chicken meat, chicken nuggets, chicken paneehh and chicken luncheon, respectively. While, *Campylobacter jejuni* was detected in 76, 16 in chicken meat and chicken paneehh, respectively and it could not be isolated from chicken nuggets and chicken luncheon. Also, *Bacillus cereus* could be isolated as 60, 8 and 90 % from chicken (meat, nuggets and luncheon), respectively but could not be isolated from chicken paneehh. *Aeromonashydrophila* isolated at percentages of 28 and 4 % in chicken meat and chicken paneehh and cannot isolate from chicken nuggets and luncheon.

INTRODUCTION

Poultry meat and its products are very popular food in Egypt as well as throughout the world. No wonder since it is delicious, nutritious and considered as a good and cheap source of protein characterized by good flavour and easily digested.

Escherichia coli, *Campylobacter* and *Salmonella* are often present on fresh tissues because the slaughtering process does not include bacterial steps. Since poultry is a major food source of *Salmonella*, its contamination may result in the development of human illness. Also, *Campylobacter* spp. has been recognized as one of the most common cause diarrhea or enterocolitis (Lee et al., 1998).

Cebedo et al., (2008) concluded that *Salmonella* are pathogenic bacteria that can contaminate food products during or

after processing. Ready-to-eat food dose not undergo any treatment to ensure its safety before consumption, and therefore risk of foodborne diseases must be considered if these pathogens are present in food.

Aruno et al., (2007) found that *E.coli* O157: H 7 is one of the major threats to public health due to consumption of insufficient cooked meat and meat products. The microorganism is known as a foodborne pathogens evening the presence of low levels.

Shriver-lake et al., (2007) mentioned that food poisoning causes untold discomfort to many people each year. One of the primary culprits in food poisoning is *E.coli* O157:H7, while most cases cause intestinal discomfort, up to 7 % of the incidence leads to a severe complication called hemolytic uremic syndrome which may be fatal.

Bacillus cereus causes two different types of foodborne illness, the diarrheal type and emetic type. The diarrheal type of foodborne illness is caused by enterotoxins produced during vegetative growth of *Bacillus cereus* in the small intestine, whereas the emetic toxic is produced by cells growing in the food. For both types of foodborne illness, the food involved has usually been treated and surviving spores are the sources of food poisoning. Although *Bacillus cereus* is not a competitive microorganism, it grows well after cooking and cooling (< 48 °C). Heat treatments causes spore germination and in the absence of competing flora *Bacillus cereus* grow well (Granum, 2001).

Aeromonas hydrophila has been found in red meat and poultry. The elaboration of toxin by the microorganism at low temperatures may have significance in foodborne disease when ingested as performed toxin in food (Biair et al., 2000).

From the previous information, the purpose of this study is to give an available assay about isolation of some enteropathogens from retailed poultry meat in Alexandria province. These microbes such as *Salmonella*, *E.coli*, *Campylobacter jejuni*, *Bacillus cereus* and *Aeromonas hydrophila*.

MATERIAL AND METHODS

A total of 100 samples from chicken meat, chicken nuggets, chicken paneeh and chicken luncheon (25 from each) were collected from different supermarkets in Alexandria province and transferred as quickly as possible and rapidly to the lab to avoid any change in the quality of sample due to microbial action.

Preparation of samples for bacteriological examination (ICMSF, 1978):

Chicken meat and chicken luncheon samples were firstly cauterized by using hot spatula (surface sterilization) then the cauterized parts were removed by using sterilized scalpel and forceps, while, the chicken paneeh and chicken nuggets samples were firstly thawed by holding in refrigerator at 3-4°C for 1 hour. Then under complete aseptic conditions 10 grams of each sample were weighed and transferred into a sterile homogenizer flask containing 90 ml of sterile peptone water 0.1 %. The contents of the homogenizer flask were homogenized for 2.5 minutes at room temperature. One ml of the original dilution (10^{-1}) was transferred to 9 ml of sterile peptone water (0.1%) to prepare further decimal dilutions up to 10^{-6} .

1- Isolation of *Salmonella* according to (APHA, 1992).

Sterile selenite F broth (Gibco) and Brilliant green agar (Biolife)

2- Isolation of *E.coli* according to (ICMSF, 1978).

MacConkey's broth (Adwic), Brilliant green bile 2 % (Oxoid) and Eosine methylene blue agar (Biolife).

3- Isolation of *Campylobacter jejuni* according to (Corry et al., 2001):

Bolton broth (Oxoid) and Charcoal cefoperazone deoxycholate agar (CCDA) (Oxoid).

4- Isolation of *Bacillus cereus* according to (APHA, 1992).

Polymexine pyruvate egg-yolk mannitol Bromothymol blue agar (PEMPA) (Oxoid).

5- Isolation of *Aeromonas hydrophila* by using:

Aeromonas base medium (Ryan's formulation) (Oxoid).

Incidence of *Salmonella*, *E.coli*, *C.Jejuni*, *B.Cereus* and *A.hydrophila* from examined chicken meat, chicken nuggets, chicken paneeh and chicken luncheon (n=25).

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RESULTS

Samples	Salmonella		E.coli		C. jejuni		B. cereus		A. hydrophila	
	No	%	No	%	No	%	No	%	No	%
Chicken meat	14	56	17	68	19	76	15	60	7	28
Chicken nuggets	2	8	3	12	0	0	2	8	0	0
Chicken paneeh	3	12	3	12	4	16	0	0	1	4
Chicken luncheon	2	8	2	8	0	0	10	40	0	0

E.coli= Enteropathogenic Escherichia coli

C.jejuni= Campylobacter jejuni

B.C= Bacillus cereus

A.hydrophila= Aeromonas hydrophila

DISCUSSION

The muscle tissue and body fluids of healthy living animals are usually free from pathogenic bacteria, but during slaughtering and processing contamination occurs leading to introduction of pathogens into the meat. The source of these pathogens may be endogenous from the gastrointestinal tract or from surrounding environment in farm and/ or slaughterhouse. Poultry are the most common food vehicle of human infection with enteropathogens throughout the world.

Enteropathogens include:

A. Salmonella:

The results obtained in table (1) shows that the Salmonellae isolated from chicken meat, chicken nuggets, chicken paneeh and chicken luncheon at an incidences of 56 %, 8%, 12 % and 8% respectively.

The isolated Salmonella in chicken meat may be attributed to contamination during slaughtering and for processing from workers' hands which nearly similar to results achieved by **Carraminana et al., (1997)** who stated that the prevalence of Salmonella in environmental samples ranged from 30% in feces to 75% in scald water samples. The Salmonella organisms found on carcasses at the post-spray wash site.

Nearly similar results were reported by **Wilson et al., (1996)**. In contrary to our results **Uyttendale et al., (1999)** recorded that the samples which were frozen and kept at – 20 °C before analysis may have influenced the number of Salmonella recovered.

B- Escherichia coli:

E.coli was isolated with incidence of 68 %, 12 %, 12%, and 8% in chicken meat, chicken nuggets, chicken paneeh and

chicken luncheon, respectively. The highest incidence was in chicken meat which reveals that the high source of E.coli in the intestinal tract of the chicken which agree with **James et al., (1992)** who found that the average log of E.coli count in poultry carcasses was 2.04 before chilling and 1.2 after chilling. On the other hand, the incidence

of E.coli was the lowest in chicken luncheon due to heat treatment.

The incidence of E.coli in chicken nuggets and chicken paneeh was lowered due to the effect of freezing which minimize the total count of E.coli, this in-accordance to **James et al., (1992)** who found that the average log of E.coli count in poultry carcasses was 2.04 before chilling and 1.2 after chilling. On the other hand, the incidence of E.coli was the lowest in chicken luncheon due to heat treatment.

Generally the presence of E.coli in examined chicken meat and chicken meat products considered as an indicator for improper handling or unhygienic conditions which agreed with **Frazier and Westhoff (1983)** and **Hashim, (2003)**. In contrary to **Abd El - Haffeiz (1999)** who reported that the E.coli could not be detect from nuggets.

The most E.coli infection had been caused by serotype O157:H7 however, other serotypes had been identified and associated with outbreaks (**Thomas et al., 1993**). The transmission of **E.coli O157:H7** occurred primarily through the consumption of certain foods of particular importance to the chicken meat industry (**Chapman et al., 1993**).

C. Campylobacter jejuni:

Campylobacter jejuni was isolated from chicken meat and chicken paneeh, with incidence of 76 % and 16%, respectively. While could not isolated from chicken nuggets and chicken luncheon. These results indicated that chicken meat and chicken paneeh were

contaminated with *Campylobacter jejuni* from intestinal content during slaughtering, defeathering and evisceration (**Adams and Moss, 2000**) or due cross contamination during handling and processing.

D. Bacillus cereus:

Bacillus cereus isolated from chicken meat, chicken nuggets and chicken luncheon at an incidence of 60 %, 8% and 40 % respectively and could not be detected in chicken paneeh.

These results attributed to contamination during slaughtering and defeathering of chicken especially dirty chicken. While, in chicken nuggets and chicken luncheon may be due to use of contaminated additives, seasonings and spices with *Bacillus cereus* spores. These results in-accordance with **Konuma et al., (1988)** and **Kramer and Gilbert (1989)**.

E. Aeromonas hydrophila:

Aeromonas hydrophila only isolated from chicken meat and chicken paneeh at incidence of 28 % and 4 %, respectively. And could not be isolated from chicken nuggets and chicken luncheon. From these data we can conclude that, the contamination of meat and paneeh mainly from the water either used for drinking of chicken before slaughtering and / or water used for washing the carcass after evisceration where *Aeromonas hydrophila* could not be detected in chicken nuggets and chicken luncheon. These results agreed with (**Biair et al., 2000**) who reported that *Aeromonas hydrophila* has been frequently found in the red meat and poultry.

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