INCIDENCE OF SALMONELLA SP. AND *CAMPYLOBACTER* SP. IN IMPORTED FROZEN CHICKEN

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ABSTRACT

A total of 130 samples of frozen imported chicken were collected during the period from 2010 to 2011from those submitted to CLQP (Central Laboratory for Veterinary Quality Control on poultry Production. Samples were tested for Salmonella and Campylobacter according to ISO stander isolation methods. The results revealed that Campylobacter was present in 28 samples (21.54%), Salmonella were present in 12 samples (9.23 %), 3 samples (2.3%) were found to be mixed infection with both Campylobacter and Salmonella, and 87samples (66.92 %) were negative for both Campylobacter and Salmonella. Salmonella isolates were serotyped using commercial

kit (Sefin Germany) while Campylobacter isolates were typed biochemically.

INTRODUCTION

The genus *Campylobacter* family Campylobacteriaceae, class Epsilonproteobacteria species and eight subspecies, all of which are natural inhabitants of the intestinal tracts of poultry and warm-blooded domestic animals where microaerohpilic conditions and the warm body temperature constitute an ideal environment for their continuous growth. The consumption of contaminated food and water by some species causes gastrointestinal illness in human ***(El-jakee et al., 2008).*** In general the occurrence of human *Campylobacter* gastroenteritis has been largely attributed to consumption of contaminated food animal product especially poultry because of the high prevalence of *Campylobacter* in this animal ***(Gibreel and Taylor 2006).*** During slaughter and processing, cross-contamination of previously *Campylobacter*-negative carcasses may occur ***(Wassenaar et al., (1998).*** Mis-handling of raw poultry and consumption of undercooked poultry are the major risk factors for human campylobacteriosis. Efforts to prevent human illness are needed throughout each link in the food chain ***(Altekruse et al.,1999).*** Avian *Salmonella* infections are important as they cause clinical disease in poultry and constituted a source of food-borne illness to human. Moreover food-borne *Salmonella* outbreaks can lead to severe economic losses to poultry producers as a result of regulatory actions, market restrictions, or reduced consumption of poultry products ***(Waltman et al., 1998).*** It has been considered that contamination of carcasses by

Salmonella and *Campylobacter* may occur through a chain involving production through consumption ***(Isogai et al., 2005).*** *Salmonella enterica* and *Campylobacter jejuni* are amongst the most prevalent bacterial pathogens that cause food-borne diseases, these microorganisms are common contaminants of poultry and poultry products ***(Faúndez et al., 2004).*** There for screening of there incidence is important and this is the aim of the present manuscript**.**

MATERIAL AND METHODS

1. Material:

1.1. Samples:

A total of 130 chicken samples were collected from different kinds of imported frozen chicken. 25g of meat samples from different sites of the carcasses were used for *Salmonella* isolation while 1 ml of thawing jouce (drip) was used for *Campylobacter* isolation. (ISO stander isolation technique)

2.1. Preparation of samples:

Meat samples (25 g) from each carcass was cutted with sterile scissor into small parts and kept in sterile plastic bag for testing of *Salmonella* while the thawing jouce (drip) were collected in 2ml sterile eppindorfe tube for testing of *Campylobacter* presence.

2. Methods*:*

1.2.*Campylobacter*:

Isolation and identification was done According to ***ISO 10272 (1995)*** (Microbiology of feeding stuffs- horizontal method for detection of thermotolerant *Campylobacter* Sp.).

2.2.*Salmonella*

Isolation and identification was done According to ***ISO 6579(2002)*** (Microbiology of feeding stuffs- horizontal method for detection of *Salmonella* Sp.)

Salmonella was serotyped by using commercial antisera kits (Sifin Germany) according to ***(Popoff 2001).***

RESULTS

The comparison between isolation of *Salmonella* Sp. and *Campylobacter* Sp. by isolation method revealed that12 samples were *Salmonella* positive while 28 samples were *Campylobacter* positive by percent 9.23 %, 21.54% respectively. More over 3 (2.3%) were mixed infection with *Campylobacter* and *Salmonella*, while 87samples (66.92 %) were negative for both *Campylobacter* and *Salmonella* as shown in Table (1).

Table (1): Comparison between incidence of *Salmonella* Sp. and *Campylobacter* Sp.

	***Salmonella* Sp. only**		***Campylobacter* Sp. only**		***Salmonella* and *Campylobacter***	
	No. of samples	**%**	**No. of samples**	**%**	**No. of samples**	**%**
Positive	12	9.23	28	21.54	3	2.3

Negative	115	88.5	99	76.2	127	97.7
Total	**130**	**100**	**130**	**100**	**130**	**100**

The total 15 isolates of *Salmonella* were serotyped using commercial antisera(Sifin Germany) and revealed presence of 11 different isolates nominated *Salmonella chester*, *Salmonella Albany*, *Salmonella hadona*, *Salmonella agona*, *Salmonella senftenberg*, *Salmonella entertidies*, *Salmonella farsta*, *Salmonella bragny*, *Salmonella typhimurium*, and 1 isolate was untybed as shown in table (2).

Table (2): Serotyping of *Salmonella* Sp. ***(Popoff 2001).***

Salmonella Spp.	**Number of isolates**	**%**	**key**	
Salmonella chester	1	6.7	Somatic Flagler first Second	O4 h,e enx
Salmonella Albany	2	13.3	Somatic Flagler	O8, 20 z_4, z_{24}
Salmonella hadona	4	26.7	Somatic Flagler first Second	O4 1, z_{13}, [z_{28}] 1,6
Salmonella agona	1	6.7	Somatic Flagler first Second	O4 f,g,s 1,2
Salmonella senftenberg	1	6.7	Somatic Flagler first	O3 , 19 s, t, g
Salmonella entertidies	2	13.3	Somatic Flagler	O9 g , m
Salmonella farsta	1	6.7	Somatic Flagler first Second	O4 , 12 I enx
Salmonella bragny	1	6.7	Somatic Flagler first Second	O 8 ,20 i 1,5

Salmonella typhimurium	1	6.7	Somatic O 4 Flagler frist i Second 2
Untyped *Salmonella*	1	6.7	
Total positive samples	15	100	

The 31 isolates of *Campylobacter* was typed biochemically and found that 15 isolates were *Campylobacter jejuni* and 16 isolates were *Campylobacter coli* as shown in table (3)

Table (3): Typing of *Campylobacter* Spp.

***Campylobacter* Spp.**	**Number**	**%**
Campylobacter jejuni	15	48.4
Campylobacter coli	16	51.6
Total positive samples	31	100

DISCUSSION

In the production of poultry there are special hygienic risks to consider, such as disturbances by infection with *Salmonella* and *Campylobacter*. This fact has resulted in special interest from food authorities, who stress the importance of intensive control during many years, created a good situation regarding *Salmonella* in chicken and other pathogens like *Campylobacter*, bacteria which have been shown to be present in chicken ***(National food administration, 75126 Uppsala, Sweden (1981).*** Poultry and poultry by products are frequently contaminated with *Salmonella* that can be transmitted to human through the handling of undercooked poultry meat. Poultry meat is contaminated

with *Salmonella* not only by infected poultry but also by cross-contamination with feaces, water, instruments, and worker's hands during the slaughter process and handling. Chicken might thus provide the main transmission route of infection, especially with the increasing consumer demand for this food ***(Bonyadian et al., (2007).*** Infectious gastroenteritis is still a major public health burden indeveloping countries, although the related mortality is low. *Salmonella enterica* and *Campylobacter jejuni* are the most prevalent enteric bacteria pathogens responsible for infectious gastroenteritis. Guillain-Barre syndrome which is neurodegenerative disorder caused by *Campylobacter jejuni***.** ***(Schuurman et al., (2007).***

Firstly the aim of this study to determine the presence of *Campylobacter* and *Salmonella* in imported frozen chicken. Samples collected for isolation of *Salmonella* were 25 g of meat samples according to ***(ISO 6579(2002)*** in contrast ***(Bonyadian et al., (2007)*** collected samples for *Salmonella* from breast (skin and meat) after dressing, and from liver after evisceration. while the samples collected for *Campylobacter* is drip samples go a head with that mentioned by ***(Berndestton et al., (1992)***. ***(Berrang et al., (2001)*** collected samples for *Campylobacter* using skin swabs from breast, thigh and drumstick and muscles taken from breast, thigh and drumstick also. Comparison between results showed that percent of *Campylobacter* isolated were higher than the percent of isolation of *Salmonella* from poultry carcasses with incidence 23.8%, 11.5% respectively. ***National food administration, (1981)*** reported that where the percent of isolation of

Campylobacter was higher than the percent of 22%, 1.2% respectively. ***Cardinal et al., 2003)*** isolated *Campylobacter* by 56 % and *Salmonella* by 32% out of 300 chicken carcasses. ***Sackey et al., (2001)*** reached to the results differ than our study where no *Campylobacter* was isolated from 87 (0.0 %) frozen chicken and *Salmonella* was isolated from 13 samples (6.8%). Also ***(Arsenault et al., 2007)*** reach to the same results of ***(Sackey et al., (2001))*** who found *Salmonella* in 50% of 81 broilers flocks and *Campylobacter* 35% of 81 of broilers flocks. Furthermore, the findings show that compared to *Salmonella*, chicken is more contaminated with *Campylobacter*, a finding that correlates with level of incidence of gastroenteritis caused by either of these two pathogens. From that we must bay an attention to *Campylobacter* Sp. as quarantine diseases because in our country more attention is made for *Salmonella* isolation. ***Suzuki and Yamamoto(2008)*** stated that *Campylobacter* species are common bacterial pathogens associated with human gastroenteritis in both developed and developing countries. Contaminated raw or undercooked poultry meats and/or by-products are particularly important to cause food-borne campylobacteriosis in humans. There are many reports describing *Campylobacter* contamination in retail poultry meats and/or by-products in the world.

REFERENCES

- ***Altekruse, S.F., N. J. Stern, P.I. Fields and D.L. Swerdlow (1999):*** *Campylobacter jejuni* – An Emerging food borne pathogen. Emerging Infectious Diseases Vol. 5 No. 1, P. 28:35.

- ***Arsenault Julie; Ann Letellier; Sylvain Quessy; Valérie Normand and Martine Boulianne (2007):*** Prevalence and risk factors for *Salmonella* spp. and *Campylobacter* spp. caecal colonization in broiler chicken and turkey flocks slaughtered in Quebec, Canada, Preventive Veterinary Medicine, Vol. 81, No 4, P. 250:264

- ***Berndeston Eva; Tivemo Maria and Anders Engvall (1992):*** Distribution and numbers of *Campylobacter* in newly slaughtered broiler chicken and hens, International Journal of Food Microbiology. Vol. 15, P. 45: 50

- ***Berrang , M. E.; Ladely, S. R.; Buhr, R.J. (2001):*** Presence and Level of *Campylobacter*, Coliforms, *Escherichia coli*, and total aerobic bacteria recovered from Broiler parts with and without Skin, Journal of food protection , Vol.. 64, No. 2, P. 184- 188

- ***Bonyadian M.; Ale Agha S. and Motaharifard A. (2007):*** isolation and identification of *Salmonella* from chicken carcasses in processing plants in Yazd province, central Iran , Iranian Journal of veterinary research, University of Shiraz, Vol. 8, No. 3, Ser. No. 20 , P. 275: 278

- ***Cardinale E.; J.D. Perrier Gros-Claude; F. Tall; M. Cissé; E.F. Guèye; G. Salvat, (2003):*** Prevalence of *Salmonella* and *Campylobacter* in Retail Chicken Carcasses in Senegal Revue.,lev. Méd. vét. Pays trop., Vol., 56, No. (1-2), P. 13-16

- ***El-Jakee J. , N. Atta, A. Hakim, S. Syame and Sh. Omara (2008):*** Validation of PCR for detection of Campylobacters isolated from chicken. American-Eurasian Journal of Agric. &Environ. Sci., Vol. 3, No. 5 P. 748:753

- ***Faúndez Gustavo; Miriam Troncoso; Paola Navarrete and Guillermo Figueroa (2004):*** Antimicrobial activity of copper surfaces against suspensions of *Salmonella enteric* and *Campylobacter jejuni*, Research article this article is available from: http://www.biomedcentral.com/1471-2180/4/19

- ***Gibreel Amera and Taylor Diane E. (2006):*** Macrolide resistance in *Campylobacter jejuni* and *Campylobacter coli*, Journal of Antimicrobial Chemotherapy, Vol., 58, P. 243–255

- ***ISO (1995):*** Microbiology of food and animal feeding stuffs – Horizontal method for the detection of thermotolerant *Campylobacter*. ISO 10272: 1995 (E) International Standards Organization, Geneva.

- ***ISO (2002):*** Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella*. ISO 6579: 2002(E) International Standards Organization, Geneva.

- ***Isogai Emiko, Manda Silungwe , Patson Sinkala, Carol Chisenga, Charles Mubita, Michelo Syakalima, Bernard Mudenda Hang'ombeb Chitwambi Makungu, John Yabe, Martin Simuunzab, Andrew Nambota, Hiroshi Isogai, Hideto Fukushi, Jun Yasuda (2005):*** Rapid Detection of Salmonella on Commercial Carcasses by Using Isothermal and Chimeric Primer-Initiated Amplification of Nucleic Acids (ICAN)-Enzyme-Linked Immunosorbent Assay (ELISA) in Zambia, International Journal of Applied Research Vet Med • Vol. 3, No. 4,P.367 -371

- ***National food administration, 75126 Uppsala, Sweden (1981):*** Enteropathogens bacteria in frozen chicken, Journal of Applied and Environmental Microbiology, Vol. 42, No. 1, P. 32-34

- ***Popoff, M.Y. (2001):*** Antigenic formulas of the *Salmonella* Serovars. (8th edition)

- ***Sackey Ben Arhin; Patience Mensah; E. Collisonand E. Sakyi-Dawson(2001):*** *Campylobacter, Salmonella, Shigella* and *Escherichia coli* in live and dressed poultry from metropolitan Accra, International, Journal of Food Microbiology ,Vol. 71, No. 1, P. 21:28

- ***Schuurman T.; R. F. de Boer; E. van Zanten; K. R. van Slochteren; H. R. Scheper; B. G. Dijk-Alberts; A. V. M. Mo¨llerand A. M. D. Kooistra-Smid (2007):*** Feasibility of a Molecular Screening Method for Detection of *Salmonella enteric* and *Campylobacter jejuni* in a Routine Community-Based Clinical Microbiology Laboratory, Journal of Clinical Microbiology, Vol.. 45, No. 11, P. 3692–3700

- ***Suzuki Hodaka and Yamamoto Shigeki (2009):*** *Campylobacter* Contamination in Retail Poultry Meats and By-Products in the World: A Literature Survey Journal of Vet. Med. Sci., Vol. 71, No.3, P. 255:261

- ***Waltman W. Dougls; Richard K. Gast and Edward T. Mallinson (1998):*** avian pathology Vol. Chapter 2 (Salmonellosis) P. 4:13

- ***Wassenaar Trudy M; Barbara Geilhausen and Diane G(1998):*** Evidence of Genomic Instability in *Campylobacter jejuni* Isolated from Poultry, Journal of Applied and Environmental Microbiology, Vol. 64, No. 5, P. 1816:1821

مقارنه بين امكانيه وجود ميكروب السلمونيلا و ميكروب الكامبيلوباكتر فى الدواجن المجمدة المستورده

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أجريت هذه الدراسة على 130 عينه من الدواجن المستوردة والتى تم تجميعها خلال الفترة من 2010 الى 2011 والتى تأتى إلى المعمل المركزي للرقابة البيطرية للإنتاج الداجنى. العينات تم فحصها لوجود ميكروب السالمونيلا و ميكروب الكامبيلوباكتروالتى تم فحصها باستخدام طرق العزل القياسية. وأظهرت النتائج وجود ميكروب الكامبيلوباكتر فى 28 عينه (21,54%) ووجود ميكروب

السالمونيلا فى 12 عينه (9,23%) و3 عينات وجد انها تحتوى ميكروب الكامبيلوباكتر وميكروب السلمونيلا معا (2,3%) ووجد 87 عينه (66.92%) سلبيه لميكروب الكامبيلوباكترو السالمونيلا ومعزولات السالمونيلا تم تصنيفها سيرولوجيكالى (سفن , المانيا) والكمبيلوباكتر تم تصنيفها بيوكميكالى.