Dept. Veterinary Clinical Sciences
Faculty Vet. Med., Jordan University of Science & Technology
Irbid, Jordan

PREVALENCE OF *SALMONELLA* IN BROILER CECA AND CARCASSES IN NORTHERN JORDAN

(With 3 Tables)

By

L. SHARIF; T. ABDUL-AZIZ and M.F. SEDIK

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تواجد السالمونيلا في الأعورين ولحم دجاج اللحم في شمال الأردن

لبيب الشريف، تحسين عبد العزيز، محمد صديق

فحصت ١٥٠ عينة من محتويات الاعور وكذلك ٢٠٠ عينة من جلد دجاج اللحم المذبوح جمعت بصورة عشوائية من حوانيت ذبح الدجاج المحلية حول مدينة أربد ألاردن. أظهرت الدراسة أن معدل وجود جرثومة السالمونيلا فى الاعور كان ٢٤ ٪ ويتراوح مابين صفر الى ٨٠٪ فى قطعان دجاج الحم. كما ان معدل وجود جرثومة السالمونيلا فى جلد دجاج اللحم المذبوح كان ٤٩٪ ويتراوح ما بين ٢٥٪ الى ٥ر٧٧٪ فى حوانيت الذبح. تدل هذه النتائج على أن معدل حاملى السالمونيلا عالية فى دجاج اللحم وان معدل تلوث جرثومة ذباتح دجاج اللحم بالسالمونيلا عالياً ايضا فى حوانيت الذبح المحلية. كما تم مناقشة مدى خطورة دجاج اللحم كمصدر للتسمم الغذائى بالسالمونيلا للانسان.

SUMMARY

A total of 150 cecal samples and 200 broiler carcass skin samples were collected randomly from local broiler slaughter shops around Irbid, Jordan. The prevalence rate of different *Salmonella* serogroups was 24% and ranged from 0 to 80% in the broiler ceca. The prevalence rate of *Salmonella* in the broiler carcasses was 49% and ranged from 25% to 77.5%. These results indicate the high prevalence rate of *Salmonella* carriers in broilers and a high contamination rate of broiler carcasses with *Salmonella* in the local broiler slaughter-shops. The risk of human *Salmonella* food poisoning from broiler was discussed.

Key words: *Salmonella*- Broiler carcasses- Jordan..

INTRODUCTION

Salmonella cause three important diseases in poultry: Pullorum disease, fowltyphoid and paratyphoid or *salmonellosis (ASHTON, 1990)*. The first two diseases are very important economically for poultry industry because they cause high morbidity and mortality but not important as potential pathogens to man *(BARROW, 1993 and COOPER, 1994)*. However, about 2000 serotypes of identified *Salmonellae* are pathogenic to man with various degrees in disease severity ranged from asymptomatic carrier to food poisoning or septicemia *(COOPER, 1994)*. *Salmonellosis* in man is one of the most common meat associated disease *(SILLIKER, 1980 and ANON, 1992)*. Poultry is the most potential source of *Salmonella* food poisoning to man *(SUPHABPHANT et al. 1983)*.

The sources of *Salmonella* infections in poultry are: Feedstuffs, water, breeding eggs, hatcheries, flock house environment, and transport cages. *(WILLIAMS, 1978; BRYAN, 1979; RIGBY et al. 1980 and BARROW, 1993)*. However contamination of the poultry meat with *Salmonella* in the poultry slaughtering houses is very important *(ASHTON, 1990 and MOCHIZUKI, 1992)*.

Poultry industry has been in fast development since early nineteen eighties in Jordan. The situation concerning prevalence of *Salmonella* infection in poultry is not known. Jordanians generally, consume broiler meat more than red meat because it is less expensive. The objective of this study is to explore the prevalence of *Salmonella* in broilers and broiler meat in Jordan.

MATERIAL and METHODS

A-Cecal Samples:

A total of 150 cecal samples were collected from five broiler slaughter shops in the area around Irbid city. The source of chickens was 10 broiler flocks in the Northern Jordan supplying such shops. From each broiler flock 12-18 cecal samples were collected randomly (one cecum per bird) in a separated plastic bags. The bags were carried in ice box and processed in the laboratory within few hours.

B- Skin Samples:

A total of 200 broiler skin samples were collected randomly from the same five broiler slaughter-shops from which cecal samples were collected. From each shop, 40 skin samples of about 10 gms per carcass were placed in plastic bags before packing without interfering with the routine procedure of the butcher man. After defeathering and evisceration, three to six broiler

carcasses were dipped in a pocket of water together with their spleen, liver and gizzard. Then, the carcasses washed with running water.

Isolation procedure:

The standard procedure for isolation of *Salmonella* spp was as follow: Each cecum was opened aseptically and about one gram of the cecal contents scraped by sterile glass slide and were inoculated into 10 ml selenite broth, incubated at 42°C for 18 hours. Also, each 10 gms of the skin sample was homogenized in 90 ml of selenite broth and incubated at 42 °C for 18 hours. A loopfull of the selenite broth was cultured on 3 plates of Desoxycholate Agar (DCA). *Salmonella* Shigella Agar (SSA), and MacConkey Agar and incubated at 37°C for 24 hours. Three to the five suspected colonies were inoculated separately in triple sugar iron agar (TSI) and urea broth and incubated at 37°C for 24 hours. If urea broth was negative and (TSI) gave the characteristic reaction of *Salmonella*, the isolate was tested serologically by *Salmonella* somatic group sera of Rhone Merieux Company. *(FINEGOLD et al. 1979).*

RESULTS

Out of 150 broiler cecal samples, 36 (24%) Salmonellae were isolated (Table. 1). Six out of the 10 broiler flocks (60%) were positive for *Salmonella* in the ceca. Among the *salmonella* positive flocks, the isolation rate ranged from 13.3% to 80% (Table. 1). The serogroups of the 36 *Salmonella* isolates from the ceca were 30 (83.3%) group E, and 6 (16.7%) group A. One serogroup was isolated from each *Salmonella* positive flock, except flock number 4 where both serogroups E and A were isolated. (Table. 1).

In broiler carcasses, *Salmonella* were isolated from 98 skin samples out of 200 samples (49%). The prevalence rates of *Salmonella* 4 in the skin of broiler carcasses in the local broiler slaughter-shops ranged from 25% to 77.5% (Table. 2). Four *Samonella* serogroups E.A.B. and D were identified in the 98 *Salmonella* strains isolated from the skin of brioler carcasses. The distribution of these serogroups were: group E 66 (67.3%), group A 20 (20.4%), group B 8 (8.2%), and group D 4 (4.1%) (Table. 3). From each slaughter-shop, at least two *Salmonella* serogroups were isolated from the broiler carcasses (Table. 3), and *Salmonella* serogroup E was the predominate serogroup isolated from broiler carcasses of the five slaughter-shops (Table. 3).

Table. 1: Prevalence of *Salmonellae* in the ceca of Broilers in Northern Jordan, 1995.

Flock. No.	No. Birds	Salmonella No.	Positive (%)	Serogroup
1	12	0	0	
2	15	2	13.3	E
3	15	3	20	E
4	18	6	33.3	E+A*
5	15	0	0	
6	15	0	0	
7	15	9	60	E
8	15	12	80	E
9	14	0	0	
10	16	4	25	A
Total	150	36	24	

* = Serogroup E= 4 + Serogroup A= 2

Table 2: Prevalence of *Salmonella* in the Skin of Broiler Carcasses in Northern Jordan. 1995.

Slaughter Shop*	No. Birds	Salmonella , Positive	
		No.	%
1	40	25	62.5
2	40	31	77.5
3	40	14	35
4	40	10	25
5	40	18	45
Total	200	98	49

* Local broiler slaughter shops.

Table. 3: Distribution of *Salmonella* Serogroups of 98 Isolates from Broiler skin Carcasses in N. Jordan.

Slaughter shop	No. Isolates	Serogroup			
		E	A	B	D
1	25	16	6	0	3
2	31	19	12	0	0
3	14	9	0	4	1
4	10	6	0	4	0
5	18	16	2	0	0
Total	98	66	20	8	4
(%)	100	(67.3)	(20.4)	(8.2)	(4.1)

DISCUSSION

According to the world Health Organization (WHO), three major elements to be considered in order to control *Salmonella* food poisoning: (1) Reduction in the incidence of flock infection. (2) Improving slaughterhouse hygiene and (3) Health education *(BARROW, 1993)*. The results showed that 6 of 10 broiler flocks examined in Jordan were carriers of *Salmonella* with an overall prevalence rate of 24% at the time of slaughtering. This prevalence rate in broilers is high and reflects higher incidence rate of *salmonella,* in broilers. Actually, for broilers it is more valid to estimate prevalence of *samonella* at slaughtering time than the incidence rate among the living broilers, because prevalence rate of *Salmonella,* at slaughtering time, would reflect the potential risk of contaminating the carcasses, thus increasing the risk of *salmonella* food poisoning.

However, the result of examining the skin sample of broiler carcasses revealed high prevalence rate of *salmonella* 49%, ranging from 25% to 77.5%. The ratio of broiler carcass *salmonella* to cecal *salmonella* was 2.04: 1. The attributable risk of slaughter shop for contaminating broiler meat with *salmoella* equals $\frac{49\% - 24\%}{49\%} = 51\%$.

This meas, 51% of *salmoella* prevalent in the broiler carcasses was due to environmental contamination in the slaughter shops, assuming that the carcass of *salmonella* carrier bird, would be contaminated from its intestine. This finding about the significant role of the poultry slaughter houses in contaminating broiler meat with *Salmonella* is in agreement with *ASHTON, 1990 and MOCHIZUKI et al., 1992.* Several outbreaks of *Salmonella* food poisoning occurred in Jordan but the exact incidence of human *Salmonella* food poisoning is not known. The risk from cooked broiler meat is very low because Jordanians prefer well cooked meat. However the risk from cross contaminaton and poultry Shawermah is very high. This study showed that the prevalence of *Salmonella* in broiler carcasses is high in Jordan. Local broiler slaughter shops play a significant role in contaminating broiler carcasses with *Salmonella*. Serogroup E was the predomnant *Salmonella* in broilers in Jordan. Further investigaton is needed to identify the source and mode of transmission of Salmonella in broilers.

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