Prevalence of Different *Salmonella serovars* in Broiler Farms in Sharkia Governorate

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Abstract:
Bacteriological examination of 300 samples from broiler internal organs (liver, cecum, unabsorbed yolk sac) from one day old chicks suffering from omphalitis and respiratory disorders after hatching, revealed 37 Salmonella isolates 12.3%. Conventional methods for isolation and identification of Salmonella isolates from chicks showed that Salmonella appear as a colorless colony on Macconkeys agar medium. It gave the characteristics slightly transparent zone of reddish color with or without black center on XLD and colorless colonies with black center on SS agar medium. It appeared as Gram –negative straight rods , non-spore forming and arranged single in pairs and in groups .Moreover , Salmonella isolates were citrate test positive (blue color),urease test negative (yellow color)and they also gave acid but(yellow) and alkaline slant (red) with H25 production (black correlation on TSI agar medium. Serotyping of 37 Salmonella isolates by slide agglutination test using specific monovalent and polyvalent O and H Salmonella sera revealed eleven different Salmonella serotypes, with S. Enteritis as the most prevalent serotype (27.1%) followed by S. Tamale (16.2%)., S. Typhymurium and S. Kentucky (13.5%) for each one, S. Anatum (10.8%), S. Gallinarum 5.4%, while S. Infntis, S. Bargny ,S. Takorade ,S. Heldberg and S. Larochelle were the last detected serovars (2.7%) for each one. Anti-microbial sensitivity test revealed that most Salmonella isolates were sensitive to ciprofloxacin, sulfa methoxasole – trimethoprime , chlorumphenicol and gentamycin .while they were resistant to erythromycin,rifamycin ,amoxycillin /clavulinic acid ,colistin sulfate and cefotaxime .

Key words: Salmonella, serovars, Broiler.

Introduction

Salmonella serovars are one of the primary foodborne pathogens. Poultry consumption is responsible for the majority of disease cases worldwide. The prevalence of virulence determinants among Salmonella serovars appears to be lacking in Egypt. Therefore, this study investigated the occurrence, antibiotic resistance patterns, and virulence gene profiling of Salmonella serovars in broilers ***Ammar et al., (2016).***

Salmonella is an important pathogen for poultry production industry as well as for human due to zoonotic importance. It has more than 2600 identified serovars despite of this identification of Salmonella isolates into different serovars is critical for study of incidence and surveillance ***Sedeik et al., (2019).***

The aim of work prevalence of different Salmonella Serovars in broiler farms in Sharkia Governorate

Materials and Methods

1.sampling

A total of 300 samples (liver, cecum and unabsorbed yolk sac; 100 from each organ) were collected from diseased and freshly dead broiler chickens. Clinical tissue samples were collected aseptically to prevent cross contamination using sterile sampling materials (swabs, bags and syringes) and wearing disposable gloves. The samples were collected and transported in ice boxes with ice packs as early as possible to the laboratory for bacteriological examination.

2 Isolation of Salmonella and serotyping

The procedure for isolation and identification of Salmonellae were conducted according to ISO 6579 (2002) procedure. Suspected Salmonella colonies were confirmed serologically by Kauffman – White scheme (Kauffman, 1974) for the determination of Somatic (O) and flagellar (H) antigens using Salmonella antiserum (DENKA SEIKEN Co., Japan). and biochemically by (TSI), Urea hydrolysis test, Lysine decarboxylation test, Indole production test and Citrate utilization test. The isolates were then serotyped by the Animal health research institute in Dokki -Giza. Only confirmed Salmonella were tested for their susceptibility to antimicrobial agents and the presence of the antimicrobial resistant genes.

3 Resistance to the antimicrobial agents

The antibiotic susceptibility was determined according to the recommendations set by the Clinical and Laboratory Standards Institute (Clinical and

Laboratory Standards Institute, CLSI, 2007) for the disk diffusion technique. The antimicrobials and concentrations tested were ampicillin (10 µg), gentamicin (10 µg), tetracycline (30 µg) and sulfamethoxazole (25 µg) (Oxoid, United Kingdom). The inhibition zones were measured and scored as sensitive, intermediate susceptibility or resistant according to the CLSI recommendations

Results and Discussion

Isolation and identification of *Salmonella* isolates:

Colonial appearance:

Salmonella grown onto MacConkey′s agar medium gave pale colonies (non-lactose fermenter), subculturing from MaCconkey′s agar onto xylose lysine desoxy cholate agar medium yielding colonies with aslightly transparent zone of reddish colour with or without black center.

Biochemical identification:

All *Salmonella* isolates were urea negative (yellow color),citrate positive (blue color),*Salmonella* isolates gave acid butt(yellow)and alkaline slant(red)with H2S production(black coloration)on TSI agar medium.

Serotyping of *Salmonellae* isolates from chickens

Serotyping of 37 *Salmonella* isolates was applied by slide agglutination test using specific polyvalent "O" I, II, III and "H" *Salmonella* sera. Three different serotypes were identified among selected *Salmonella* isolates. The different serogroups were identified and *Salmonella* Enteritidis was the most prevalent onewith apercentage of (27.1%) followed by *S.* Tamale (16.2%), *S.* Typhymurium & *S.kentucky* (13.5%) for each one, *S. Gallinarum* (5.4%), *S. Apeyme* (10.8%), *S.Larochelle, S. Takorade, S. Bargny , S. Infantis* and *S. Heldberg* with percentage of 2.7% for each one.

Prevalence of *Salmonella* in different organs of chickens in El-Sharkia Governorate.

Thirty-seven *Salmonella* isolates were recovered from 300 examined samples collected from chickens (12.1%). *Salmonella* was previously isolated from chicken by ***(Alshawabkeh and Yamani, 1996; Mohammed et al., 1999; Taha, 2002; Ahmed, 2003; Orji et al., 2005; Pieskusetal., 2006; Moawd, 2009; Maripandiand Ali 2010; Ahmed et al., 2016 and Ammar et al., 2019).***

Nearly the same rates were obtained by ***Moawad (2009)*** who isolated *Salmonella* from chicken in Dakahlia Governorate with percentage 13.3% while higher rates were recorded by ***Al-Shawabkeh and Yamani (1996)***

who recovered *Salmonella* with percentage 20.5% ,19% and 17.9%, in layers, followed by broilers and breeders respectively.

Lower percentage rates than the previously mentioned were reported by ***Sadoma (1997)*** who isolated *Salmonella* from six out of 300(2%) cloal swabs collected from30 chicken farms at different localities in Garbia.

Moreover, ***Mohamed et al. (1999)*** isolated *S*. Typhymurium *S*. Anatum, and *S*.Pullarum from 2.5%of chickens and 4%of duck samples from fattening and laying farms in Kafr-Elshikh Governorate and ***Ahmed (2003)*** isolated *Salmonella* from chickens reared in rural village in Sharkia province with a percentage of 1.7%.

This differences in prevalence rate may reflect considerable disparity in the sampling scheme, sample type, *Salmonella* detection protocol and geographic location.

Beside, eleven different serotypes were identified among selected isolates by slide agglutination test using polyvalent "O" 1,11,111 and H antisera.

The results of serological identification in present study detected eleven different serovars from 37 *Salmonella* isolates, *S*. Entertides predominated with higher percentage (27.1%), while the remained isolates were serotyped as *S*. Tamale, *S*. Typhymurium, *S*. Kentucky, *S*. Apeyme, *S*. Gallinarum *S*. Infantis, *S*. Takorade, *S*. Heldberg, *S*. Bargany and *S*. Larochelle with percentages (16.2%), (13.5%), (13.5%), (10.8%), (5.4%), (2.7%), (2.7%), (2.7%), (2.7%), (2.7%) respectively as in table (7).

In current study *S*. Entertides is the predominant serotype that go hand in hand with ***Sedeik et al. (2019).***

Several authors isolate *Salmonella* Typhymurium from chickens at a higher rate than *S*. Enteritidis in India with a percentage of 18.10% and 9.87% respectively **(*verma and Gupta, 1995)*** and in Singapore with apercentage of 23.8% and 3.3%respectively ***(Toh et al., 1996).*** On the other hand, *S*. Entertidis was the predominated serotype in Saudi Arabia with percentage of (55.6%) followed by *S*. Typhymurium (22.2%) ***Moussa et al. (2010).***

Poultry farms are *Salmonella* enterica serovar Typhimurium and *Salmonella* enterica serovar Enteritides ***Abd El-Gany et al. (2012).***

Indicating the health hazard of poultry as a major source of *S*. Typhymurium and *S*. Entertidis as a food borne pathogens and the commonest serotype causing

disease in human ***(Baggesen et al., 2000 and Aktas et al., 2007).***

Antimicrobial resistance in *Salmonella* has received consider attention as the emergence of MDR *Salmonella* may result in treatment failure ***Yan et al. (2003).***

With the emergence of antibiotics resistance bacteria presenting a serious challenge in human and veterinary medicine globally, there is an abundant of evidence showing that the antimicrobial resistance of *Salmonella* in the chicken supply chain is more possibly attributed to the use of antibiotics in animal husbandry ***(Cui et al.,2016).***

Examination of samples collected from diseased and died saso chicks from different hacharies in Sharkia using SMT, 37 *Salmonella* isolates was isolated in an over prevalence of 12.3%(37/300), 21%was from liver, while 11%was from 2ceciand 5%from yolk sac. The results of serological identification in present study detected eleven different serovars from 37 *Salmonella* isolates, *S*.Entertides predominated with higher percentage (27.1%),while the remained isolates were serotyped as.

S. Tamale, *S*. Typhymurium, *S*. Kentucky, *S*. Apeyme, *S*. Gallinarum S. infantis, *S*. Takorade, *S*. Heldberg, *S*. Bargany and *S*. Larochelle with percentages (16.2%), (13.5%), (13.5%), (10.8%), (5.4%), (2.7%), (2.7%), (2.7%), (2.7%), (2.7%) respectively.

Results of antimicrobial susceptibility testing(antibiogram of *Salmonella* isolates) :

All *Salmonella* isolates were tested for their susceptibility to the following antimicrobial agents: gentamicin (CN), ciprofloxacin (CIP), amoxicillin- clavulanic acid (AMC), doxycycline (DO), chloramphenicol (C), erythromycin (E), sulfamethoxazole trimethoprim (SXT), cefotaxime(CTX), colitis sulfate (C.T), streptomycin (S), naiidixic acid (N.A) and rifamycin (R). High rate of susceptibility was the most common finding obtained against sulfamethoxazole trimethoprime (97.3%), streptomycin (83.8%) chloramphenicol and ciprofloxacin (75.7%) as shown in table (8). Also, absolute resistance was obtained among *Salmonella* isolates against erythromycin, cefotaxime, colistin sulfate and rifamycin (100%) for each one followed by amoxicillin clavulanic acid (75.7%).

In particular, there are many reports of increasing prevelance of fluroquinolone –resistant

Salmonella **Piddock, (2002) and Wasyl et al., (2013)** which might be a potential risk for human health.

The results of this study revealed the potential problem of widespread of multidrug resistant *Salmonella* species especially in chickens because of extensor use of antimicrobial agent, in human and veterinary medicine that was agree with **Briggs and Fratamsco (1999)** as we detect resistance to CIP was 24% that is nearly the same as **Ren et al. (2016) and Nhung et al. (2018) but Cui et al. (2019)** detect resistance to CIP with a higher percentage 37%.

In present study, it is noticed that there is a huge increase in quinolone resistance in *Salmonella* that is go hand in hand with **Mobalk et al. (2002).** Controversially, no resistance of *Salmonella* to ciprofloxacin in Egypt from broiler carcass **Mona (2014)** and in Brazil **(Cordoso et al. (2006).** The burden of food born disease is increasing due to antimicrobial resistance which represents a great risk of treatment failure, however, very little is known about the resistance profile of food born pathogen **Bantawak et al. (2019)**

Therefore, efforts are needed to reduce the prevalence of resistant *Salmonella* in broiler chickens, including the adoption of guide lines for the prudent use antimicrobial agents in animals used for food. There is a need for continued surveillance to determine a regular antimicrobial susceptibility data to detect any changing of resistance pattern **Kumar et al., (2012).**

Table (1): *Prevalence of Salmonella serotypes among different organs of chicks (each organ represent one chick)*

Organ (No)	No of *Salmonella* isolates	*Salmonella* serotypes(37)										
		S. Enteitides	**S.Tamale**	**S.Typhimurium**	**S. kentucky**	**S. Apeyme**	**S. Gallinarum**	**S.Infantis**	**S.Takorade**	**S. Heldberg**	**S Bargny**	**S. Larochelle**
Liver(100)	21%	6	4	3	2	3	-	1	1	-	1	-
2ceci(100)	11%	4	2	1	2	1	-	-	-	1	-	-
Yalk sac(100)	5%	-	-	1	-	-	2	-	-	-	-	1
Total (300)	37 12.3%	10 27.1%	6 16.2%	5 13.5%	5 13.5%	4 10.8%	2 5.4%	1 2.7%	1 2.7%	1 2.7%	1 2.7%	1 2.7%

Table (2): *Species susceptibility testing to different antimicrobial discs*

Code no		AMC	S	CN	NA	CIP	CTX	SXT	DG	E	C	CT	RF
22	*S*.Enteritides	-	I	I	-	-	-	S	I	-	I	-	-
23		-	I	I	-	-	-	S	I	-	I	-	-
27		-	S	I	-	I	-	I	I	-	I	-	-
36		-	S	I	I	S	-	S	-	-	I	-	-
38		-	S	I	I	S	-	I	-	-	-	-	-
42		-	I	I	-	-	-	S	I	-	I	-	-
44		-	I	I	-	-	-	S	I	-	I	-	-
92		-	-	-	I	S	-	I	-	-	S	-	-
105		-	-	I	-	I	-	-	I	-	-	-	-
108		-	i	-	-	I	-	I	-	-	-	-	-
13	*S*. Tamale	I	I	s	I	S	-	I	I	-	I	-	-
18		-	I	I	-	-	-	S	I	-	I	-	-
46		-	I	S	I	S	-	S	-	-	S	-	-
87		I	S	I	-	I	-	I	-	-	S	-	-
91		I	S	S	I	S	-	I	I	-	I	-	-
93		-	S	S	I	S	-	I	-	-	I	-	-
17	*S*.Ttyphymurium	I	-	-	-	I	-	I	-	-	-	-	-
20		-	I	I	-	-	-	S	I	-	I	-	-
21		-	I	I	-	-	-	S	I	-	I	-	-
26		-	-	-	-	I	-	I	-	-	-	-	-
31		-	I	-	-	S	-	I	I	-	-	-	-
5	*S*.Kentucky	-	I	-	-	I	-	I	-	-	-	-	-
10		-	I	I	-	-	-	S	I	-	I	-	-
11		-	I	I	-	S	-	I	-	-	S	-	-
33		-	I	I	-	I	-	S	-	-	-	-	-
34		-	I	-	I	I	-	I	-	-	-	-	-
51	*S*.Apeyme	I	S	I	I	S	-	I	I	-		-	-
52		-	I	I	-	-	-	S	I	-	S	-	-
55		-	S	I	I	I	-	I	I	-	I	-	-
57		-	S	-	I	S	-	I	I	-	S	-	-
77	*S*.Gallinarum	I	S	I	I	S	-	S	-	-	S	-	-
79		I	S	I	I	S	-	s	I	-	S	-	-
74	*S*.Infantis	I	S	-	I	S	-	S	I	-	S	-	-
86	*S*.Takorade	I	I	I	I	S	-	I	I	-	I	-	-
97	*S*.Heldberg	-	I	-	-	I	-	I	I	-	I	-	-
101	*S*.Bargny	-	I	I	I	S	-	I	I	-	I	-	-
106	*S*.Larochelle	-	I	i	I	S	-	I	I	-	I	-	-

Table (3): *antimicrobial resistance paterrn of Salmonella isolates*

Resistant to / Serotype	S.Entritides(10)	S.Tamale(6)	S.Typhymurium(5)	S.Kentacky(5)	S.Apyme(4)	S.Gallinarum(2)	S.Infanty()	S.Takorade(1)	S.Heldborg(1)	S.Bargny(1)	S.Larochelle(1)	Total(37)%
Four antibiotics	0	2	0	0	1	1	0	1	0	0	0	5 (13.5%)
Five antibiotics	0	0	0	0	1	1	1	0	0	1	1	5 (13.5%)
Six antibiotics	2	3	0	0	1	0	0	0	0	0	0	6 (16.2%)
Seven antibiotics	6	1	2	2	1	0	0	0	1	0	0	13 (3501%)
More than 7 antibiotics	2	0	3	3	0	0	0	0	0	0	0	8 (21.6%)
No resistance to any	0	0	0	0	0	0	0	0	0	0	0	0 (0%)

Table (4): Sensitivity percentage of different *Salmonella* species to each microbial agent:

Isolates / AMA	S.Entritidis (10)	S.Tamale (6)	S.Typhymurium(5)	S.Kentacky(5)	S.Apyme(4)	S.Gallinarum(2)	S.Infanty(1)	S.Takorade(1)	S.Heldborg(1)	S.Bargny(1)	S.Larochelle(1)	Total (37)
CIP	6	5	3	4	3	2	1	1	1	1	1	28(7507%)
C	7	6	2	2	4	2	1	1	1	1	1	28(75.7%)
CN	8	6	2	3	3	2	0	1	0	1	1	27(72.9%)
SXT	9	6	5	5	4	2	1	1	1	1	1	36(97.3%)
CT	0	0	0	0	0	0	0	0	0	0	0	0(0%)
CTX	0	0	0	0	0	0	0	0	0	0	0	0(%)
DO	6	3	3	1	4	2	1	1	1	1	1	24(64.9%)
S	8	6	3	5	4	2	1	1	1	1	1	31(83.2%)
NA	2	4	0	1	3	2	1	1	0	1	1	16(43.2%)
RF	0	0	0	0	0	0	0	0	0	0	0	0(0%)
AMC	0	3	1	0	1	2	1	1	0	0	0	9(24.3%)
E	0	0	0	0	0	0	0	0	0	0	0	0(0%)

References

Abd El-Ghany W, El-shafii S, Hatem M. A (2012): Asurvay on *Salmonella species* isolated from chicken flocks in Egypt.Asian J Anim vet Adv.489-501.

Ahmed H. A. (2003): Tracing some sources of infection of some zoontic bacteria among family Enterobacteriaceae. M.V.Sc.Thesis, Fac. Vet. Med. Zoonoses Department, Zagazig Univerisity.

Akbarmehr J (2010): Isolation of *Salmonella* spp. From poultry (ostrich pigeon, and chicken) and detection of their *hil*A gene by PCR method. African journal of Microbiology.,4 (24): 2678-2681.

Aktas Z, Martin D, Kayacan C B, Diren S and Threlfall E J (2007): Molecular characterization of *Salmonella* Typhimurium and *Salmonella* Enteritidis by plasmid analysis and pulsed-field gel electrophoresis. Inter. J. Antimicrob. Agent, 30: 541-545.

Al – Shawabkeh K and Yamani, M I. (1996): Prevalence of *Salmonella* in poultry farms in Jordan. Pure Appl. Sci., B, 23 (1): 67 -72**.**

Ammar AM1, Mohamed AA, Abd El-Hamid MI, El-Azzouny MM ,(2016): Virulence genotypes of clinical *Salmonella*Serovars from broilers in Egypt. J Infect Dev Ctries. 28;10(4):337-46. doi: 10.3855/jidc.7437.

Ammar AM, Abdeen EE, Abo-Shama UH, Fekry E, Kotb Elmahallawy E(2019): Molecular characterization of virulence and antibiotic resistance genes among *Salmonella* serovars isolated from broilers in Egypt. Lett Appl Microbiol. 2019 Feb;68(2):188-195. doi: 10.1111/lam.13106. Epub 2019 Jan 6.

Baggesen L S, Sandvang D and Aarestrup F M (2000): Characterization of *Salmonella enterica* serovar typhimurium DT104 Isolated from Denmark and Comparison with Isolates from Europe and the United States. J. Clin. Microbiol.,38 (4):1581-1586.

Bantawa K, Sah SN, Subba Limbu D, Subba P, Ghimire A (2019): Antibiotic resistance patterns of Staphylococcus aureus, Escherichia coli, *Salmonella*, Shigella and Vibrio isolated from chicken, pork, buffalo and goat meat in eastern Nepal. BMC Res Notes. 12(1):766. doi: 10.1186/s13104-019-4798-7.

Briggs C E, and Fratamsco P M. (1999): Molecular characterization of an antibiotic

resistance gene cluster of *Salmonella* typhimurium DT 104- antimicrob. Agents chemother., 43: 846-849.

Cardoso M O, Ribeiro A R, Santos L R, Pilotto F, Moraes H L S, Salle CTP, Rocha SLS and NascimentoV P (2006): Antibiotic resistance in *Salmonella* enteritidis isolated from broiler carcasses. Brazil.J. Microbiol., 37: 368-371

Clinical and Laboratory Standards Institute (CLSI) (2011): Performance Standards for Antimicrobial Susceptibility Testing; Twenty-first Informational Supplement, CLSI document M100-S21, Wayne, Pennsylvania, USA, 30 (15): 42-46.

Cui M.,Xie M.,Gu Z.,Zhao S.,Wang J., and Wang Y.,(2016):prevalence and antimicrobial resistance of *Salmonella* isolated from integrated broiler chicken supply chain in quingdo, China.Food control .62 270-276.

ISO 6579 (2002): Microbiology of food and animal feeding stuffs. Horizontal methods for the detection of Salmonella species. (4th ed.) international Organization for standardization.

Kauffman F. (1973): Serological diagnosis of Salmonella spp. Kaufmann White Scheme, Copenhagen, Denmark.

Kumar T, Mahajan N K and Rakha N K (2012): Isolation and prevalence of *Salmonella* serovars from poultry in different parts of Haryana, India. Indian J. Anim. Sci., 82(6): 557-560.

Maripandi A and Al-Salamah A A (2010): Multiple-antibiotic resistance and plasmid profiles of *Salmonella* enteritidis isolated from retail chickens' meats. American Journal of Food Technology., 5 (4): 260-268.

Mohammed L N, Smaha H A, Draz A A and Haggage Y N (1999): *Salmonella* among birds and human beings. Alex. J. Vet. Sic., (1): 147-154.

Moawad AAI (2009): Bacteriological studies on *Salmonella* Enteritidis isolated from different sources in Dakhlia Governorate. M. V. Sc. Thesis, Fac. Vet. Med., Zoonoses: Dept., Zag. University.

Molback M, Gerrner-Smidt P and Wegener HC (2002) : Increasing quinolone resistance in *Salmonella* enterica serotype Enteritidis. Emerg. Infect. Dis., 8 (5): 514-515.

Mona M.El-Azzouny (2014): Occurrence of Virulence Genes among Multidrug

Resistant Salmonellae Isolated from Broilers. thesis (Bacteriology), Fac. Vet. Med., Zagazig University

Moussa I M, Gassem M A, Al-Doss A A, Mahmoud W A, Sadik and Abdel M A L (2010): Using molecular techniques for rapid detection of *Salmonella* serovars in frozen chicken and chicken products collected from Riyadh, Saudi Arabia. African Journal of Biotechnology., 9 (5): 612-619.

Nhung N. T., Van N. T. B., Cuong N. V, Duong T. T., and Hang T. (2018): Antimicrobial residues and resistance against critically important antimicrobials in non typhoidal *Salmonella* from meat sold in Vietnam.Int.J.Food Microbe(266)301-309.

Orji M U, Onuigbo H C and Mbata T I (2005): Isolation of *Salmonella* from poultry dropping and other environmental sources in Awka, Nigeria. Int. J. Inf. Dis., 9 (2): 86-89.

Piddock L.J. (2002): Flouroquinolone resistance in *Salmonella* serovars isolated from human and food animals.FEMS.Microbiol.Rev.2 6 3-16.

Pieskus J, Milius J, Michalskiene I and Zagrebneviene G (2006): The distribution of *Salmonella* serovars in chickens and human in Lithuania. Journal of Veterinary Medicine., 53 (1): 12-16.

Ren C, Zhao Y and Shen Y. (2013): Analysis of the effect of integrons on drug-resistant *Staphylococcus aureus* by multiplex PCR detection.Molecular Med. Reports; 7(3): 719-724.

Sadoma A M (1997): *Salmonella* in chickens in connection with human infection. M. V. Sc. Thesis, Fac. Vet. Med., Tanta Univerisity

Sedeik ME, El-Shall NA, Awad AM, Elfeky SM, Abd El-Hack ME, Hussein EOS, Alowaimer AN, Swelum AA (2019): Isolation, conventional and molecular characterization of *Salmonella* spp. from newly hatched broiler chicks**.** AMB Express. 30;9(1):136. doi: 10.1186/s13568-019-0821-6**.**

Shah A H and Korejo N A (2012): Antimicrobial resistance profile of *Salmonella* serovars isolated from chicken meat. J. Vet. Anim . Sci., (2): 40-46

Taha, N A A (2002): Zoonotic importance of enter pathogenic *E. coli* (EPEC). PhD Thesis, Fac.Vet. Med. Zagazig University.

Toh S L, Teo T P and Tay Y H (1996): ***Salmonella*** **serotypes isolated in Central Veterinary Laboratory between 1990 and 1994, Singapore. Journal of Primary Industries, 24: 67-80.**

Verma J C and Gupta B R (1995): Occurrence of *Salmonella* serotypes in animals in India. Ind. Journal Comp. Microbiol. Immmnol. Infec. Dis., 16 (3-4): 104 – 108.

Wasyl D, Hoszowski A, Zając M, Szulowski K. (2013): Antimicrobial resistance in commensal Escherichia coli isolated from animals at slaughter. Front Microbiol Aug 5; 4:221. doi: 10.3389/fmicb.2013.00221.

Yan S S, Pendrak M L, Abela-Ridder B, Punderson J W, Fedorko DP and Foley S L (2003): An overview of *Salmonella* typing Public health perspectives. Clinical and Applied Immunology Reviews, 4: 189-204.

الملخص العربى

تم تجميع 300 عينه من دجاج تسمين عمر يوم يعاني من مشاكل تنفسية والتهابات في الصره بعد الفقس وتم فحصها بكتريولوجيا واسفرت نتائج الفحص عن وجود 73 معزوله من السالمونيلا بنسبه 12.3%.

أظهرت الطرق التقليدية لعزل وتحديد معزولات السالمونيلا من الكتاكيت أن السالمونيلا مظهر مستعمرات عديمة اللون على وسط أجار Macconkeys. أعطت خصائص منطقة شفافة قليلاً من اللون المحمر مع أو بدون مركز أسود على XLD ومستعمرات عديمة اللون مع وسط أجار أسود المركز. ظهرت كقضبان مستقيمة سالبة الجرام ، ومرتبة مفردة في أزواج وفي مجموعات. عزلات السالمونيلا كانت نتيجة اختبار السترات إيجابية (اللون الأزرق) ، واختبار اليورياز سلبي (اللون الأصفر) ، كما أعطت الحمض ولكن (أصفر) وميل قلوي (أحمر) مع انتاج H2sالارتباط الأسود على وسط أجار TSI. عن طريق اختبار تراص الشرائح باستخدام مصل السالمونيلا أحادي التكافؤ ومتعدد التكافؤ ، أظهر 11 نمطًا مصليًا مختلفًا من السالمونيلا ، مع S. Enteritidis باعتباره النمط المصلي الأكثر انتشارًا (27.1٪) يليه S. تامالي (16.2٪ (، Sسالمونيلا كنتاكي (13.5٪) لكل منها ، S.Anatum (10.8٪ (، S.Gallinarum 5.4٪ ، بينما S.Infntis ، S.Bargny ، S.Takorade، S.Heldbergو S.Larochelle كانت آخر مصل تم اكتشافها (2.7٪) لكل واحد مضاد للميكروبات أظهر الاختبار أن معظم عزلات السالمونيلا كانت حساسة للسيبروفلوكساسين ، السلفا ميثوكساسول - تريميثوبريم ، الكلورومفينيكول والجنتامايسين ، بينما كانت مقاومة للإريثروميسين ، الريفاميسين ، الأموكسيسيلين / حمض الكلافولينيك ، كبريتات الكوليستين والسيفوتاكسيم.