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SENSORY AND BACTERIOLOGICAL EVALUATION OF SOLD CHILLED DUCK AND QUAIL CARCASSES IN MARKETS

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ABSTRACT

Chilled poultry carcasses are usually subjected to the bacterial contamination during evisceration, preparation and handling. Some of these bacteria are harmful to consumers causing toxicity or infective agents. Hence, this study was done on some chilled duck and quail carcasses collected separately from different supermarkets at Mansoura city and sent to the laboratory for determination of the sensory characters and counts of aerobic plate count (APC), in addition to the prevalence rate of *E. coli*, *Staph. aureus*, Salmonella sp. and *Listeria monocytogenes*. The obtained results of counts for APC, *E. coli* and *Staph. aureus* were 4.9±3.2; 3.2±2.1 and 2.7±1.6 log_{10}cfu/g for chilled duck carcasses and 4.7±3.6; 3.0±2.3 and 2.8±1.4 log_{10}cfu/g for chilled quail carcasses respectively. While, the prevalence rate of *E. coli*, *Staph. aureus*, Salmonella sp. and *L. monocytogenes* were 20%; 22%; 6% and 18% in chilled duck carcasses and 24%; 18%; 0% and 16% for chilled quail carcasses respectively. Serologically the isolated *E. coli* serotypes were O6, O55, O44 and O127 in chilled duck carcasses and O6; O44 and O78 in chilled quail carcasses and the isolated strains of Salmonella were *Salmonella enteritidis* and *Salmonella anatum* in chilled duck carcasses. By PCR the examined isolates of *E.coli* contained *stx1 and stx2* in chilled duck and quail carcasses. While, the examined *Staph. aureus* by PCR contained the enterotoxigenic strains A, E, C, D enterotoxins in chilled duck carcasses and A, C, D enterotoxigenic strains in chilled quail carcasses. The hygienic importance of isolated bacteria and methods of minimizing its incidence were discussed.

Key words: Sensory character; Bacteria; duck; quail carcasses.

INTRODUCTION

Poultry meat constitutes a substantial portion of human diet. In fact, the world average annual consumption of poultry has increased steadily and now exceeds beef, Because of this high level of consumption, the microbiological quality of poultry purchased in retail markets is of concern for suppliers, consumers and public health officials worldwide so, the bacterial contamination of fresh poultry carcasses has important implications for food safety and product shelf life (FAO, 2011).

Duck and quail meat are an excellent sources of animal-derived high quality proteins. marketed through many supermarkets and its consumers have greatly increased.

Chilled duck and quail carcasses often contaminated with food spoilage and pathogenic microorganisms during slaughtering and processing that decreases its quality and constitutes a public health hazards. Quail meat is a sweet and delicate white game meat with extremely low skin fat and low cholesterol value. Also, it is rich in a wide range of vitamins and minerals including vitamin B6, niacin, thiamin, pantothenic acid and riboflavin, folate and vitamin E and K. It is therefore recommended for people with high cholesterol levels and those who want to maintain a low level of cholesterol, (Michael, 2014).

Darwish *et al.* (2015) stated that *E. coli* was one of the foodborne pathogens associated with several cases of human sickness. *E. coli* could be isolated from the examined duck meat. Despite the high value of poultry meat, there is no accurate control and inspection on poultry carcasses. Therefore, possibility for transmission of some bacteria such as *E. coli*, which is one of the main causes of food poisoning. Hence, carcass contamination during slaughtering and processing is a major risk for subsequent foodborne infections in human.

The most dominant pathogens involved were *E. coli O157*, *Staph. aureus* and *L. monocytogenes* (Chapman *et al.*, 1997 and Abbasi *et al.*, 2012) and

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Tamarapu *et al.* (2001) mentioned that *Staph. aureus* considered as one of the most important Staphylococci species and the third worldwide cause of foodborne illnesses in addition to Freitas *et al*. (2013) who stated that Salmonella spp. was present in the examined quail carcasses in three evaluated flocks and in the scalding water of one flock. Recently, Kanwal *et al.* (2015) detect the incidence of *E. coli* and Salmonella through conventional culture method by 82.5% and 66.6% and by multiplex PCR 90% and 82% respectively in quail meat.

Therefore the present study was designed to determine the sensory quality and the prevalence of some bacteria having hygienic importance that may found in sold chilled duck and quail carcasses**.**

MATERIALS AND METHODS

1- Collection of samples: One hundred random chilled duck and quail carcasses samples (50 samples each) were collected separately from different supermarkets at Mansoura city and sent to the laboratory in icebox for examination without delay then, subjected to the following:

2- Sensory examination: Experts in sensory evaluation to evaluate chilled duck and quail carcasses where changes in appearance, odor and texture were recorded and freshness quality scheme was developed according to Costell (2002) and Botta (1995) as follows six trained persons 30-60 years of age made assessments and the sum of points for each sample was transformed to a percentage of maximum demerit points and was expressed as the demerit score.

3- Determination of pH value: It was carried out according to Pearson (1984).

4- Preparation of the samples for Bacteriological examination according to (APHA 2001): Upon reciept to the laboratory 25 g from each of the examined carcass (skin and muscles) were homogenized with 225 ml 0.1% peptone water in a stomacher for 3 minutes at 3000 rpm and filtered through a sterile cheese cloth filter, followed by ten fold six serial dilutions in 0.1% peptone water to determine:

A- Aerobic plate count according to APHA (2001).

B- Total count of *E. coli***:** *E. coli* was detected by using sorbitol MacConkey agar medium (Oxoid, England). The isolated *E. coli* were analyzed biochemically and serologically according to Forbes *et al.* (2002).

C- Isolation of *Staph. aureus* according to FDA (2002) using Baird-Parker agar plates, incubated at 35ºC for 48 hr. and the suspected *Staph. aureu*s colonies were picked up, and confirmed by catalase, coagulase, thermostable nuclease and Voges-Proskauer tests.

D- Isolation of Salmonella according to the technique recommended by (FDA, 2007) on enrichment Rappaport vassiliades broth at 35^0C for 24h, platting onto XLD agar at 42^0C for 24h. The presumptive colonies were confirmed biochemically and serologically**.**

E- Isolation of *L. monocytogenes* according to the technique recommended by USDA; FSIS (1989) and FAO (1992).

F- Detection of virulence genes: the isolated *Staph. aureus* and *E. coli* were examined by using PCR for detection of *Staph. aureus* enterotoxins and *E. coli* (stx1 and stx2).

1- DNA extraction for isolated *Staph. aureus*:

a- DNA extraction from samples was performed using the QIA amp DNA Mini kit (Qiagen, Germany, GmbH) with modifications from the manufacturer's recommendations. Briefly, 200 µl of the sample suspension was incubated with 10 µl of proteinase K and 200 µl of lysis buffer at 56^OC for 10 min. After incubation, 200 µl of 100% ethanol was added to the lysate. The sample was then washed and centrifuged following the manufacturer's recommendations. Nucleic acid was eluted with 100 µl of elution buffer provided in the kit.

b- Oligonucleotide Primers used were supplied from Metabion (Germany) are listed in Table 1.

c- For multiplex PCR of enterotoxins, Primers were utilized in a 50- µl reaction containing 25 µl of Emerald Amp Max PCR Master Mix (Takara, Japan), 1 µl of each primer of 20 pmol concentration, 8 µl of water, and 7 µl of DNA template. The reaction was performed in an Applied biosystem 2720 thermal cycler.

d- Analysis of the PCR Products the products of PCR were separated by electrophoresis on 1.5% agarose gel (Applichem, Germany, GmbH) in 1x TBE buffer at room temperature using gradients of 5V/cm. For gel analysis, 30 µl of the multiplex PCR products were loaded in each gel slot. Gelpilot 100 bp DNA ladder (Qiagen, Germany, GmbH) was used to determine the fragment sizes. The gel was photographed by a gel documentation system (Alpha Innotech, Biometra) and the data was analyzed through computer software.

2- DNA extraction for isolated *E. coli*:

a- DNA extraction from samples was performed using the QIA amp DNA Mini kit (Qiagen, Germany, GmbH) with modifications from the manufacturer's recommendations. Briefly, 200 µl of the sample suspension was incubated with 10 µl of proteinase K and 200 µl of lysis buffer at 56ºC for 10 min. After

incubation, 200 µl of 100% ethanol was added to the lysate. The sample was then washed and centrifuged following the manufacturer's recommendations. Nucleic acid was eluted with 100 µl of elution buffer provided in the kit.

b- Oligonucleotide Primers used were supplied from Metabion (Germany) are listed in Table 1.

c- PCR amplification for stx1, stx2 duplex PCR, primers were utilized in a 50- µl reaction containing 25 µl of Emerald Amp Max PCR Master Mix (Takara, Japan), 1 µl of each primer of 20 pmol concentration, 13 µl of water, and 8 µl of DNA template. The reaction was performed in an Applied biosystem 2720 thermal cycler.

d- Analysis of the PCR Products The products of PCR were separated by electrophoresis on 1.5% agarose gel (Applichem, Germany, GmbH) in 1x TBE buffer at room temperature using gradients of 5V/cm. For gel analysis, 20 µl of the uniplex PCR products and 30 µl of the duplex PCR products were loaded in each gel slot. Generuler 100 bp DNA ladder (Fermentas, sigma) was used to determine the fragment sizes. The gel was photographed by a gel documentation system (Alpha Innotech, Biometra) and the data was analyzed through computer software.

Table 1: Primers sequences, target genes, amplicon sizes and cycling conditions for *Staph. aureus*, *E. coli* used in multiplex PCR.

organism	Target gene	Primers sequences	Amplified segment (bp)	Primary denaturation	Amplification (35 cycles)			Final extension	Reference
					Secondary denaturation	Annealing	Extension		
Staph. aureus	*Sea*	GGTTATCAA TGTGCGGGT GG	102	94˚C 5 min.	94˚C 30 sec.	50˚C 40 sec.	72˚C 40 sec.	72˚C 10 min.	Mehrotra *et al.*, 2000
		CGGCACTTT TTTCTCTTCG G							
	Seb	GTATGGTGG TGTAACTGA GC	164						
		CCAAATAGT GACGAGTTA GG							
	Sec	AGATGAAGT AGTTGATGT GTATGG	451						
		CACACTTTT AGAATCAAC CG							
	Sed	CCAATAATA GGAGAAAAT AAAAG	278						
		ATTGGTATT TTTTTTCGTT C							
	See	AGGTTTTTT CACAGGTCA TCC	209						
		CTTTTTTTTC TTCGGTCAA TC							
E. coli	stx1	ACACTGGAT GATCTCAGT GG	614	94˚C 5 min.	94˚C 30 sec.	58˚C 40 sec.	72˚C 45 sec.	72˚C 10 min	Dipineto *et al.*, 2006
		CTGAATCCC CCTCCATTA TG							
	stx2	CCATGACAA CGGACAGCA GTT	779						
		CCTGTCAACTG AG CAGCACTTTG							

Statistical analysis:
The results are expressed as log mean ± Standard Error (SE). Data were statistically analyzed using statistical analysis systems.

RESULTS

Table 2: Sensory quality evaluation of duck (group 1) and quail (group 2) carcasses according to Costell (2002) and Botta (1995).

parameter	characteristic	demerit points
Color	Characteristic meat color	0
	opaque	1
	yellowish	2
Odor (fresh)	Normal	0
	Neutral	1
	Trace off odor	2
Odor (boiled)	Normal	0
	Neutral	1
	Abnormal urine	2
Flesh texture	Firm	0
	Slightly soft	1
	Soft	2
Wetness	Normal	0
	Slightly dry or slightly wet	1
	Moderatly dry or moderatly wet	2
Contamination (feather, feces, blood patches)	None	0
	Slight	1
	Moderate	2
Fat appearance	White	0
	Opaque	1
	Yellowish	2
Rancidity (odor)	Absent	0
	Slight	1
	Moderate	2
Package	Normal	0
	Defective	1
	broken	2
Maximum demerit points for duck and quail carcasses (group1&2)		17 &19

Table 3: Sensory and pH evaluation of the examined duck and quail carcasses

Groups	Demerit score (%)	pH
Group (1) duck carcasses	9.7±2.8	5.8 ±0.2
Group (2) quail carcasses	15.4±2.05	5.9 ±0.2

Demerit score % =total Demerit points transformed to a mean ± SE percentage of maximum demerit points attainable.

Table 4: Microbial mean counts of the Examined Duck and Quail Carcasses expressed as log mean±SE (n=50 for each).

carcasses type / Isolated organisms	Duck carcasses			Quail carcasses		
	APC	*E. coli*	*Staph. aureus*	APC	*E. coli*	*Staph. aureus*
Bacterial count	4.9±3.2	3.2±2.1	2.7±1.6	4.7±3.6	3.0±2.3	2.8±1.4

Table 5: Prevalence of the Isolated Bacteria from Examined Duck and Quail Carcasses (n=50 for each).

carcasses type / Isolated organisms	Duck carcasses				Quail carcasses			
	E. coli	*Staph. aureus*	Salmonella	*L. mono cytogenes*	*E. coli*	*Staph. aureus*	Salmonella	*L. mono cytogenes*
Positive no	10	11	3	9	12	9	ND	8
Prevalence%	20	22	6	18	24	18	-	16

NB: n=50 means number of examined carcasses from duck or quail carcasses; ND=not detected
%=according to the No of examined carcass samples.

Table 6: Serological identification of isolated *E. coli* and Salmonella in the examined positive duck and quail carcasses.

Serotypes of *E. coli*	No	duck carcasses	quail carcasses	Identified strains of isolated Salmonella in Duck carcasses			
				isolated Salmonella	No	Antigenic structure	
						O	H
O44	3	2	1	*Salmonella enteritidis*	2	1,9 ,12	g,m: 1,7
O6	5	3	2	*Salmonella anatum*	1	3,10,15, 3,4	e,h: 1,6
O55	2	2	-				
O78	3	-	3				
O127	4	4	-				

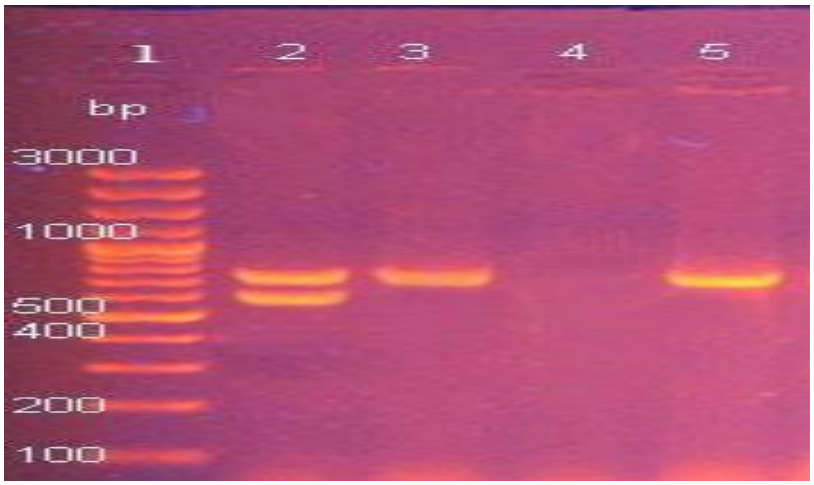

Fig. (1): Agarose gel electrophoresis of *E. coli* PCR products isolated from chilled duck carcass samples using *stx1 and stx2* primers.
Lane "1": 100 bp DNA ladder
Lane "2 ": positive amplification of\614 bp for stx1 gene and 779 bp for stx2.
Lane "3": positive amplification of 779 bp for stx2.
Lane "4": negative amplification for stx1 and stx2 genes.
Lane "5": positive amplification of 779 bp for stx2.

Multiplex PCR for *Staph. aureus* enterotoxins genes:
Total number of 5 isolates from *Staph. aureus* tested by using multiplex PCR by using sets of primers for enterotoxins (A,B,C,D and E). The results obtained by multiplex PCR showed that the

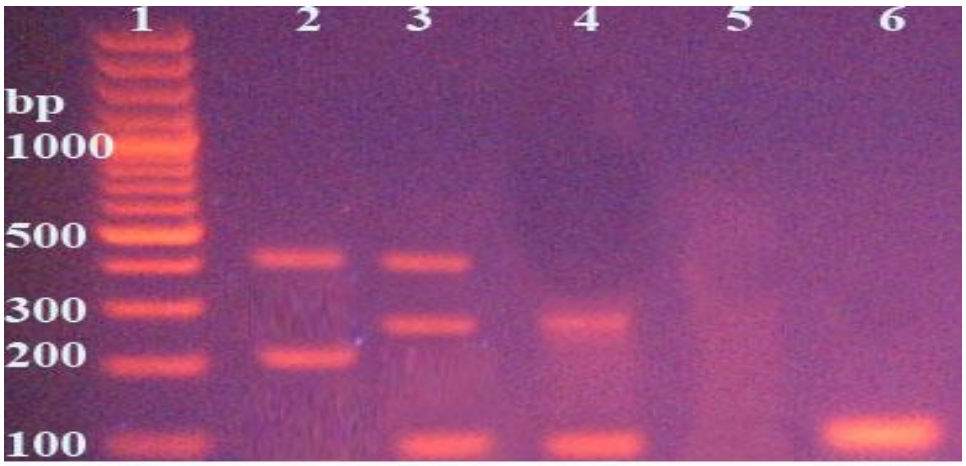

Fig (2): Agarose gel electrophoresis of *Staph. aureus* PCR products isolated from chilled duck carcass samples using *Staph. aureus* enterotoxins primers.
Lane "1": 100 bp DNA ladder
Lane "2 ": positive amplification 209 bp for enterotoxin E and 451 bp for enterotoxin C
Lane "3": positive amplification of 102 bp for enterotoxin A, 278 bp for enterotoxin D and 451 bp for enterotoxin C
Lane "4": positive amplification of 102 bp for enterotoxin A and 278 bp for enterotoxin D
Lane "5": negative amplification for *Staph. aureus* enterotoxins
Lane "6": positive amplification of 102 bp for enterotoxin A

DISCUSSION

Sensory examination of duck and quail carcasses
Although dressing of each meat species should be regarded as a unique process. Hence, Evaluation of freshness and potential consumer acceptance defined in terms of carcass characteristics such as appearance, color, odor and texture which were one of the principal aims of this study. Therefore, the sensory quality of duck and quail carcasses were determined on the basis of quality grading assessment Costell, (2002) to which demerit points ranging from 0 to 3 (table 2), the lower score the better quality. All the examined carcass samples for sensory quality inspected separately for each and they were within the acceptable limit.

Hydrogen ion concentration (pH):
The variation in pH could be a factor in declaring the types of microorganisms growing on poultry carcasses (Hulot and Ouhayoun, 1999). Our results recorded in (table 3) revealed that pH values of examined duck and quail carcass samples were 5.8 ±0.2 and 5.9 ±0.2 respectively. These results nearly agree with (El-Shehry, 2012) who stated that pH of chicken meat were 5.91 and (Youssef, 2013) found poultry meat pH mean value were 5.64±0.02. Higher results were recorded by Afifi, (2000) in poultry meat with value of (6.15). The decrease in pH value may be attributed to the breakdown of glycogen with the formation of lactic acid and the increase of pH may be due to the partial proteolysis. Poultry meat with a pH below 5.8 had a pale color, while meat with higher pH had dark color and has a great risk on human health. However, the ideal pH for meat is between 5.8 and 6.3 (Pearson and Gillette, 1996).

The bacterial count of any food article is not indicative about its safety for consumption, yet it was of more importance in judging the hygienic conditions under which it had been produced, handled and stored (Jay, 1997).

The recorded results in (table 4) showed that the mean APC for duck and quail carcasses were 4.9±3.2 and 4.7±3.6 $\log_{10}$cfu/g respectively with prevalence rate of 100% in duck and quail carcasses. These results were nearly similar to that reported by (Nyo *et al.*, 2010) where the APC were 4.8 $\log_{10}$cfu/g of the examined slaughtered duck carcass samples and (Edris *et al.*, 2011) where they found $9x10^4 \pm 1.43x10^4$ cfu/g in Quail meat meanwhile, slightly higher than (Alvarez-Fernandez *et al.*, 2009) who found that the mean aerobic count were 4.01±0.48 $\log_{10}$cfu/g in duck carcasses. The higher bacterial counts of examined carcasses may be due to unsatisfactory sanitation during handling, processing and distribution as well as inadequate chilling which increase the existing organisms as reported by (Thatcher and Clark, 1973). These results were in accordance with the Egyptian Organization for Standardization and Quality Control (EOS) No. 1651 (2005) for APC in chilled poultry meat ($<10^5$cfu/g).

There is no accurate control and inspection on poultry carcasses in the slaughter houses. Therefore, the possibility of some bacterial transmission such as *E. coli*, which is one of the main causes of foodborne

pathogens associated with several cases of human sickness.

People with low immunity are the prime target of the pathogenic strains of *E. coli*. The main habitat of *E.coli* is the intestinal tract of human and animal. So its presence indicates fecal contamination. Moreover, many strains of the organism are enteropathogenic and give rise to acute diarrheal hemorrhagic enteritis in adults (Law 2000 & Akbar and Anal, 2011).

The obtained results in (tables 4&5) showed that the mean value of *E. coli* counts in chilled duck and quail carcasses were 3.2±2.1 and 3.0±2.3 $\log_{10}$cfu/g with prevalence rate 20% and 24% respectively. Serologically (table 6) the isolated *E. coli* serotypes were O6, O55, O44 and O127 in chilled duck carcasses and O6; O44 and O78 in chilled quail carcasses while, O157:H7 could not be isolated either from duck or quail carcasses. The examined isolates of *E. coli* by PCR (Fig1) contained *stx1 and stx2* in chilled duck and quail carcass samples.

These results were nearly similar to that recorded by (Edris *et al*., 2011) who found *E. coli* count $1.18x10^4 \pm 4.55x10^4$cfu/g in 40% of the examined quail carcasses and (Fodor, 2007) detect *E.coli* in 25.3% of broiler carcass samples, but none was serotype O157:H7 also, (Hamad *et al*., 2012) could isolate *E. coli* from 18.2% of the examined quail carcasses in addition to (Kanwal *et al.*, 2015) found 25.6% of the examined quail carcasses contaminated with *E. coli* while, (Darwish *et al*., 2015) could isolate *E. coli* O86, O127, O114, O26 and O78 from the examined duck meat and (Hemmatinezhad *et al.,* 2015) reviewed that *E. coli* in duck and quail meat samples were 32.5% and 27.77% and the isolated serotypes were positive for stx1. Also, (Nyo *et al.,* 2010) added that the *E. coli* count were 2.9±0.16 $\log_{10}$cfu/g with presence of *E. coli* O72, O44, O124, and O82 in the examined slaughtered duck samples and (Fernandes, *et al*., 2009) found *E. coli* count 3.7±0.8 $\log_{10}$cfu/g in 19% of the examined duck carcasses.

Presence of *E. coli* may be attributed to poor carcass sanitation caused by direct or indirect fecal contamination either from human or animal sources and mishandling ICMSF, (1978). The positive results were unacceptable according to the EOS No. 1651 (2005) for *E. coli* in chilled poultry meat.

Staph. aureus commonly causes gastroenteritis resulting from consumption of contaminated food in which enterotoxigenic staphylococci have grown and produced toxins. As these toxins are excreted from the organism, they are referred to as exotoxins. Staphylococcal enterotoxins are considered a potential biological threat because of their stability at 100°C for 1 hour (Rabello *et al.,* 2007) and (Weronika and Jacek 2014) found that 11.9% of the isolated *Staph. aureus* strains were positive for one or more classical SE markers. Also, (Evenson *et al.,* 1988) showed that growth of enterotoxigenic *Staph. aureus* up to10^6or more/g of food enables them to produce a sufficient amount of enterotoxins to cause intoxication. As little as 20ng of SE can induce nausea, violent vomiting, abdominal cramps, and diarrhea between 1 to 8 h after food consumption. Presence of *Staph. aureus* in a food indicates contamination due to food handlers and inadequately cleaned equipments. *Staph. aureus* recorded in cases of severe diarrhea and vomiting as well as cases of food poisoning enteritis among consumers (Davis and Board, 1998).

The data found in (tables 4&5) showed that the count of *Staph. aureus* present in chilled duck and quail carcasses were 2.7±1.6 and 2.8±1.4 $\log_{10}$cfu/g with prevalence rate 22% and 18% respectively in the examined samples. The examined *Staph. aureus* by PCR (Fig 2) contained the enterotoxigenic strains A, E, C, D enterotoxins in the examined chilled duck carcass samples and A, C, D enterotoxigenic strains were found in the examined chilled quail carcass samples. These results lower than that recorded by (Edris *et al.,* 2011) who isolated *Staph. aureus* from 40% of the examined quail carcass samples and nearly similar to (El-Dengawy and Nassar, 2001) where they found that the mean values of *Staph. aureus* were $1x10^3$ cfu/g in quails meat and (Hamad *et al.*, 2012) who examined quail carcasses and could isolate *Staph. aureus* from 16.3% of the examined samples. While, (Khalifa and Nassar, 2001) found the mean values of *Staph. aureus* count were 3.1 $\log_{10}$ cfu/g of pintail breast and thigh duck muscles. Also, (Fodor, 2007) isolate *Staph. aureus* from 20% of broiler carcass samples and (Nyo, *et al.,* 2010) found *Staph. aureus* count were 2.4±1.2 $\log_{10}$cfu/g in the examined slaughtered duck carcass samples, (Fernandes *et al.*, 2009) could isolate *Staph. aureus* from 24% of the examined duck carcasses with count of 3.1±1.4 $\log_{10}$cfu/g. The positive results were not in accordance with the EOS No. 1651 (2005) for *Staph. aureus* in chilled poultry meat.

The recorded results of Salmonella (table 5) declared that Salmonella could not be detected in the examined quail carcasses and isolated from 6% of the examined duck carcass samples. Serologically (table 6) the isolated strains were *Salmonella enteritidis* and *Salmonella anatum*. These results were in accordance with Mousa *et al.* (2016) who failed to isolate Salmonella from the examined frozen quail samples. Moreover, El-Dengawy and Nassar (2001) could not isolate Salmonella from the examined quail carcasses on the other hand Khalifa and Nassar (2001) declared that No Salmonella could be isolated from the examined game duck carcasses while, Fernandes *et al.* (2009) found Salmonella spp. in 7.69% of the examined frozen quail carcass samples and Nyo *et al.* (2010) found Salmonella in 10% of examined slaughtered duck samples in addition to Reusse *et al.*

(1976) declared that Salmonella was present in 10.2% of frozen duck carcasses when only the skin of the cloaca region was sampled. Also, Hoszowski and Wasyl (2005) found Salmonella in 5.54% of poultry carcasses. Meanwhile, higher results reported by Fodor, (2007) who isolate Salmonella from 18% of broiler carcass samples. Recently Szosland-Faltyn *et al*. (2014) found 40% of examined duck meat contained Salmonella sp. which may be due to bad sanitation during evisceration, processing and storage.

The positive results of Salmonella sp. were not in agreement with the EOS No. 1651 (2005) for chilled poultry meat.

Listeria monocytogenes was one of the major pathogenic species in both man and animal. These pathogens decrease meat quality and constitutes a public health hazards. Mclauchlin and Jones (1999). The achieved results in (table 5) declared that the prevalence rate of *L. monocytogenes* were detected in 18% and 16% of the examined chilled duck and quail carcass samples respectively. These results were nearly achieved by Szosland-Faltyn *et al.* (2014) where they found *L. monocytogenes* in 24% of the examined duck meat samples in addition to Kevenk and Gulel (2016) mentioned that *L. monocytogenes* were found in 15.6% of the examined duck carcasses and Vannetten *et al.* (1998) could isolate *L. monocytogenes* from 19% of the examined poultry carcasses. Also, Wijendra *et al.* (2014) found 21% of the examined quail meat contaminated with *L. monocytogene*s.

The positive results of *L. monocytogene*s were not in agreement with the EOS No. 1651 (2005) for chilled poultry meat.

CONCLUSION

Hygienic measures should be applied specially ante-mortem inspection before slaughtering. Instruments used for slaughtering should be periodically cleaned and disinfected. Bleeding of slaughtered carcasses should be through channels in order to minimize aerial contamination. Periodical sanitation of duck and quail slaughter halls, utensils, equipments, chilling rooms and freezing cold stores. All these precautions must be followed to improve the hygienic quality of the retailed carcasses.

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التقييم الحسى والبكتريولوجي لذبائح البط والسمان والمباعة مبردة فى الاسواق

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اجريت هذه الدراسة على عدد٥٠ عينة من كل من ذبائح البط والسمان المبردة والمباعة بالاسواق فى مدينة المنصورة لمعرفة الصفات الحسية لهذه االذبائح والعد الكلى للبكتيريا الهوائية وبكتيريا الايشيريشيا كولاى والاستافيلوكوكس اوريس حيث كانت كالتالى ٩, ٣,٢±٤ ، ٣,٢ ±١, ٢ و٢,٧±٦, ١ لوج ١٠/ جم على الترتيب فى ذبائح البط المبردة وكانت كالتالى ٧, ٣,٦±٤ ، ٣,٠ ±٣, ٢ و٢,٨±٤, ١ لوج ١٠/ جم على الترتيب فى ذبائح السمان المبردة بالاضافة الى معرفة مدى تواجد كل من بكتيريا الايشيريشيا كولاى والاستافيلوكوكس اوريس والسالمونيلا وكذلك اللستيريا مونوسيتوجين والتى كانت ٢٠، ٢٢، ٦ و١٨% على الترتيب فى ذبائح البط المبردة و ٢٤، ١٨، ٠ و ١٦%على الترتيب فى ذبائح السمان المبردة وتم احراء الاختبارات السيرولوجية لكل من بكتيريا الايشيريشيا كولاى والسالمونيلا واجراءاختبار البلمرة المتسلسل لكل من بكتيريا الايشيريشيا كولاى والاستافيلوكوكس اوريس للكشف عن مدى تواجد جينات الضراوة ومناقشة الاهمية الصحية لهذه المعزولات وطرق الحد من تواجدها بهذه الذبائح٠