Chemical and Microbial Profile of Some Chicken Products

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Abstract:

Hundred samples of chicken meat products, raw products (fillet, shiesh and wings), half cooked nugget and cooked luncheon were randomly collected from supermarkets and shops at EL-Sharkia Governorate, Egypt. The pH mean values was 5.94 ± 0.02, 6.11 ± 0.04, 5.96 ± 0.02, 6.67 ± 0.03 and 6.42 ± 0.05. The TVB-N mean values was 9.12 ± 0.23, 10.19 ± 0.34, 11.54 ± 0.36, 7.56 ± 0.28 and 7.66 ± 0.31mg/100g and TBA mean values was 0.52 ± 0.01, 0.58 ± 0.01, 0.73 ± 0.01, 0.42 ± 0.03 and 0.64 ± 0.02 mg malonaldehyde/kg for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon , respectively. The aerobic plate count (APC) was $2.3 \times 10^5 \pm 0.9 \times 10^5$, $5.2 \times 10^5 \pm 1.4 \times 10^5$, $11.8 \times 10^5 \pm 6.4 \times 10^5$, $8.3 \times 10^3 \pm 1.8 \times 10^3$ and $3.2 \times 10^3 \pm 0.9 \times 10^3$ CFU/g. the Psychotropic count was $2.8 \times 10^4 \pm 1.1 \times 10^4$, $6.3 \times 10^4 \pm 2.6 \times 10^4$, $14 \times 10^4 \pm 7.2 \times 10^4$, $1.9 \times 10^3 \pm 0.9 \times 10^3$ and $9.8 \times 10^2 \pm 2.3 \times 10^2$ CFU/g. the Pseudomonas counts was of $3.6 \times 10^3 \pm 1.4 \times 10^3$, $9.5 \times 10^3 \pm 1.82 \times 10^3$, $16.2 \times 10^3 \pm 4.7 \times 10^3$, $4.5 \times 10^2 \pm 1.2 \times 10^2$, and $2.3 \times 10^2 \pm 0.9 \times 10^2$ CFU/g and Enterobacteriaceae counts were of $9.6 \times 10^3 \pm 3.8 \times 10^3$, $13.2 \times 10^3 \pm 5.1 \times 10^3$, $9.58 \times 10^3 \pm 2.44 \times 10^3$, $9.6 \times 10^2 \pm 1.28 \times 10^2$, and $7.1 \times 10^2 \pm 1.08 \times 10^2$ CFU/g for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon, respectively**.** All examined samples located within the permissible limits of freshness parameters established by Egyptian standard, while contaminated with spoilage bacteria.

Key words: Nuggets- Luncheon- Shiesh – Aerobic plate count – Pseudomonas – Enterobacteriaceae.

1. Introduction:

Poultry meat products constitute an excellent source of high quality, easily prepared, cooked and digested animal protein, which contains all essential amino acids besides many vitamins and minerals which are required for human development, hence it represents an important food article in most countries and has a considerable share in Egyptian's diet for its competitive price with that of other meats. Chicken meat is characterized by a lower caloric value as it contains less fat, which is rich in unsaturated fatty acids, so it can be used for feeding young children and some patients. In addition, they are low in price with a comparison to beef and mutton.

The interactions and changes that exist between various microbial spoilage groups turn meat spoilage into a dynamic process. In fact, bacterial spoilage is the important factor that directly reduces the shelf life of chicken meat products and affects the health and safety of consumers in the supply chain **(Gil et al., 2006)**. The initial microbial level and storage conditions are major contributing factors which determine the level of metabolites and the specific spoilage organisms produced in chicken meat products **(Boziaris et al., 2011).** The metabolic activities of microorganisms responsible for spoilage constitute the main spoilage mechanism and produce off-odors. The main criterion of quality assessment of chicken meat products is freshness, which corresponds to the presentation of spoilage signs. The expiry point occurs when the acceptable maximum limit of existing bacteria exceeds 6 log CFU/g and metabolites resulting from microbial growth produce bad odors, viscosity and chemical modifications in the chicken meat product **(Raab et al., 2008)**.

Quality assessment of chicken meat products and deciding about the end of shelf life, there are chemical, microbiological and sensory methods with some accuracy **(Olafsdottir et al., 1997)**. Mostly, all of these methods are put together and are used for assessment of quality changes of chicken meat products. The evaluation of meat quality by microbial methods and the plate count of specific microorganisms (indicators of spoilage or related changes) is a precise method that needs 2 days or more for incubation and results. On the other hand, the strong relationship between spoilage resulting from the growth of bacteria and chemical indices could be an auxiliary and a supplementary technique used to make a decision about or predict the end of chicken meat product shelf life and assessing its quality.

The two main parameters related to the microbial growth are total volatile base nitrogen (TVB-N) and thiobarbituric acid (TBA). The principal chemical parameter for microbial growth, including Pseudomonas spp. is TVB-N **(Zhang et al., 2012)**. Consequently, pH and TVB-N are two important indicators of microbial spoilage in meat and poultry **(Fraqueza et al., 2008)**. Furthermore, an important item in the distribution and consumption of poultry meat product is the effective monitoring of temperature conditions which affects safety and quality of chicken meat **(Zhang et al., 2012)**. If chicken meat products that is a perishable product is stored at improper and fluctuating temperature conditions, rapid microbiological growth happens and the product spoils **(Raab et al., 2008)**.

The objectives of the present study were to evaluate some chemical and microbial parameters in some poultry meat products.

2. Materials and methods:

Hundred samples of chicken meat products, raw products (fillet, shish and wings) heat treated (luncheon and nugget) 20 of each were randomly collected from supermarkets and shops at EL-Sharkia Governorate. The collected samples were transferred in an insulated ice box under complete aseptic conditions, without undue delay to the laboratory of Meat Hygiene, Food Control Department, Faculty of Veterinary Medicine, Zagazig University, Egypt. They were left to thaw at 4°C for 12 hours before being subjected to physicochemical and bacteriological examinations.

2.1.Chemical parameters: Measurement of pH value according to**(ISO, 1974)** briefly five grams of each examined chicken product were homogenized in 45 ml of distilled water using laboratory blender and pH was measured using a digital pH meter by inserting the electrodes into the homogenates. The pH meter was calibrated using pH 4 and 7 buffer. Measurement of total volatile basic nitrogen (TVB/N): according to Conway's micro diffusion technique recommended by **(ES, 63/9, 2006).**Measurement of thiobarbituric acid (TBA): according to **(ES, 63/10, 2006).**

2.2.Bacteriological parameters: Chicken meat product samples were firstly thawed by holding in a refrigerator at 3-4°C overnight. Then the samples were prepared according to the technique recommended by **APHA (2001)**.Aerobic plate count detected on standard plate count agar Oxiod (CM325) according to **ISO, (2002)**.Total psychotropic count detected with the same technique as in the aerobic plate count was carried out except that the incubation at 7^{o} C for 7-10 days according to **APHA, (2002)**. Enterobacteriaceae counted on violet red bile glucose agar (VRBG) agar. The agar was inoculated by spreading 0.1 ml of the decimal dilution onto the surface. Plates were inverted and incubated at 37°C for 24 hours under aerobic condition according to **ISO 21528-2, (2004)**.Enumeration of *Pseudomonas* species according to **Kreig and Holt, (1984)** on Pseudomonas isolation agar (BioMed). The inoculated plates and control plates were incubated at 25 ºC for 48 hours. The bluish-green colonies were recorded and the total count of pseudomonas species was determined.

Statistical analyses: The experimental data were evaluated using mixed model's procedure, *post hoc* comparisons were applied, whenever appropriate, using Duncan's test. All statistical procedures were performed using PASW statistics 18 (SPSS Inc., USA). Statistical significance was considered at $P \leq 0.05$.

3.Results and Discussion:

Production and consumption of poultry meat and poultry meat products show an upward trend. Adequate control and inspection was required not only during poultry rearing, but also, in slaughter houses, **(Kozaèinski *et al.*, 2006)**.In the last decades, Egypt food markets had an intensive expansion in chicken meat production, which developed in a response to consumer demand. So this study designed to protect the consumer by diminishing microbial growth and virulence of detected pathogen.

3.1.Chemical parameters of chicken meat products

The pH value is an indicator of the meat quality of chicken meat where the pH measurement as pH values plays an important role in a microbiological growth affecting the shelf life of the products **(Hathout and Aly, 2010).**

The data in table (1) declared that pH values of chicken products ranged from 5.68 to 6.11, 5.71 to 6.28, 5.69 to 6.18, 6.17 to 6.98 and 6.15 to 6.76 with mean values of 5.94 ± 0.02, 6.11 ± 0.04, 5.96 ± 0.02,6.67 ± 0.03 and 6.42 ± 0.05, respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon. Comparing to the safe permissible limits of pH stipulated by **Egyptian standard (ES), (1090/2005)** (5.5 - 6.5), nearly all examined frozen chicken products were within the acceptable level.

Regarding to nuggets and luncheon nearly similar pH obtained 5.87 to 6.03 for nuggets **(Al-Dughaym and Altabari 2010)**,6.08 ± 0.046 and 6.15 ± 0.06 in nuggets and luncheon**(El-Kewaiey, 2012)**.

There were significant differences (p< 0.05) between frozen raw and cooked products which may be due to the initial pH of the meat which ranges from 5.6 to 6.4. The inclusion of polyphosphates may increase the pH by 0.3, and the final pH after processing may vary between 6.1 and 6.5 **(Ingram and Simonsen, 1980)**. The increase in pH might be due to the addition of phosphates in the formulation, the addition of whole egg liquid (pH 7.83) in nuggets. Also, an increase in pH was observed after frying,this is in agreement with other studies on poultry restructured meat products **(Jimenez-Colmenero*et al.*, 2003)** and breast poultry meat **(Allen *et al.*, 1998)** and it could be attributed to the formulation and/or the protonation of some basic amino acids residue side chains which became exposed due to the protein denaturation during cooking **(Xiong*et al.*, 1999)**.

Table (1) Chemical parameters of the examined poultry meat products pH, TVB-N mg/100g and TBA (mg/Kg) (n= 20 of each).

	Product		Minimum	Maximum	Mean± SE
pH	Raw	Frozen Pane	5.68	6.11	5.94 ± 0.02^{b}
		Frozen Shiesh	5.71	6.28	6.11 ± 0.04^{ab}
		Frozen Wings	5.69	6.18	5.96 ± 0.02^{b}
	Half cooked	Nuggets	6.17	6.98	6.67 ± 0.03^{a}
	Cooked	Luncheon	6.15	6.76	6.42 ± 0.05^{a}
TVB-N	Raw	Frozen Pane	6.8	11.2	9.12 ± 0.23^{b}
		Frozen Shiesh	7.4	12.6	10.19 ± 0.34^{ab}
		Frozen Wings	8.6	13.4	11.54 ± 0.36^{a}
	Half cooked	Nuggets	6.3	8.4	7.56 ± 0.28^{c}
	Cooked	Luncheon	5.46	12.6	7.66 ± 0.31^{c}
TBA	Raw	Frozen Pane	0.39	0.67	0.52 ± 0.01^{bc}
		Frozen Shiesh	0.43	0.75	0.58 ± 0.01^{b}
		Frozen Wings	0.46	0.84	0.73 ± 0.01^{a}
	Half cooked	Nuggets	0.12	0.66	0.42 ± 0.03^{c}
	Cooked	Luncheon	0.47	0.79	0.64 ± 0.02^{b}

$^{(a,b,c)}$Means carrying different superscript small letters are significantly different (P< 0.05) for the same parameter.

Protein and non-protein nitrogenous compounds of broiler chicken fillets are degraded by several enzymatic processes and microbial activity, which result in the production of volatile nitrogen. The amount of TVB/N is a very good chemical indicator to assess the quality and freshness of the broiler chicken fillets.The results achieved in table (1) revealed that TVB/N of chicken products ranged from 6.8 to 11.2, 7.4 to 12.6, 8.6 to 13.4, 6.3 to 8.4 and 5.46 to 12.6 with mean values of 9.12 ± 0.23, 10.19 ± 0.34, 11.54 ± 0.36, 7.56 ± 0.28 and 7.66 ± 0.31mg/100g., respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon. Comparing to the safe permissible limit stipulated by **ES, (1090/2005)**(TVB/N lower than 20mg/100gm), 100% of the examined chicken products were within the acceptable level.There were significant increases (p< 0.05) in frozen rawer than cooked products which may be due tobreakdown of protein as a result of proteolysis induced by enzymatic activities of psychotropic bacteria. Moreover, cooked products have a lower % in protein, which considered as the main precursor for TVB-N.

Thiobarbituric acid (TBA) has proved to be a valuable indicator to assess the degree of lipid oxidation during the storage of poultry meat due to its speed and simplicity**(Borsoglou *et al*., 2003).**

It has been shown from table (1) that TBA of chicken products ranged from 0.39 to 0.67, 0.43 to 0.75, 0.46 to 0.84, 0.12 to 0.66 and 0.47 to 0.79 with mean values of 0.52 ± 0.01, 0.58 ± 0.01, 0.73 ± 0.01, 0.42 ± 0.03 and 0.64 ± 0.02mg malonaldehyde/kg, respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon. Comparing to the safe permissible limits of TBA stipulated by **ES, (1090/2005)**(lower than 0.9mg/kg), 100% of the examined chicken products were within the accepted level.

The increased values of TBA which occur as storage progress may be attributed to oxidation of fat by the help of heam iron as a prooxidant and fat hydrolysis. Lipid oxidation causes loss of nutritional and sensory values as well as the formation of potentially toxic compounds that compromise meat quality and reduce its shelf life.

3.2.Bacteriological parameters of chicken meat products:

Special attention in poultry meat production is paid to the fact that live birds are hosts to a large number of different microorganisms residing on their skin, feathers or in the alimentary tract. During slaughter most of these microorganisms are eliminated, but subsequent contamination is possible at any stage of the production process, from feather plucking, evisceration, and washing to storage by cooling or freezing. Microorganisms from the environment, equipment and operator's hands can contaminate meat.

Aerobic plate count is a commonly recommended microbiological method for estimating the food shelf-life, the microbiological quality and the overall degree of microbial contamination of frozen poultry meat.

The results showed in table (2) revealed that APC of chicken products ranged from 8 $\times 10^4$ to 3 $\times 10^6$, 13 $\times 10^4$ to 7 $\times 10^6$, 18 $\times 10^4$ to 16 $\times 10^6$, 2 $\times 10^3$ to 6×10^4 and 2 $\times 10^2$ to 2 $\times 10^4$ with mean values of 2.3 $\times 10^5 \pm$ 0.9 $\times 10^5$, 5.2 $\times 10^5 \pm$ 1.4 $\times 10^5$, 11.8 $\times 10^5 \pm$ 6.4 $\times 10^5$, 8.3 $\times 10^3 \pm$ 1.8 $\times 10^3$ and 3.2 $\times 10^3 \pm$ 0.9 $\times 10^3$ CFU/g , respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon.These results were compatible with **Hassanin and Hassan (2003)**. They reported that the mean value of APC in the thigh samples was 6.57 ± 0.03 $\log_{10}$ CFU/g.**Al-Groom and Abu Shaqra (2014)**examined about 100 lots of frozen broilers and found that total plate count ranging between 3 **-** 6 $\log_{10}$ CFU/g. **Hassan (2015)** revealed that APC ranged from 3.7 to 6.2 with a mean value 5.3 ± 4.5 $\log_{10}$ CFU/g in frozen chicken carcasses.**Hassanien*et al.* (2016)**.Theyrecorded that the mean values of APC were 6.3 and 6.4 in the examined breast and thigh samples, respectively.

There were significant differences ($p < 0.05$) between the raw frozen, half cooked and cooked products which reflect the effect of heat treatments on aerobic plate count. The achieved results in table (3) showed that the acceptability of raw frozen products was 75%, 65% and 60% of the examined frozen pane, frozen shiesh and frozen wings within permissible limits according to the safe permissible limits stipulated by **EOS, (1090/2005)** for APC (not exceed 10^6 CFU/g).Moreover 80% and 90% of nuggets and luncheon was within the permissible limits stipulated by **EOS, (3493/2005)** for APC (not exceed 10^4 CFU/g in poultry meat products treated with heat).Although, the APC of any food article are not sure indicative of their safety for consumption, yet it is of importance in judging the hygienic condition under which it has been produced, handled and stored **(Le Levine, 1987).** Accordingly, the high APC of examined samples may be attributed to neglected sanitary measures during slaughtering, scalding, dressing, evisceration and washing of carcasses.Psychrotrophic bacteria are the predominant spoilage bacteria in frozen poultry. The type and number of psychrotrophic bacteria in frozen chicken meat varied according to different factors, including storage temperature and storage time. Many of them capable of breaking down protein and / or fat.Table (2) illustrated that the total psychrotropic count of chicken products ranged from 5 $\times 10^3$ to 34 $\times 10^5$, 2 $\times 10^3$ to 11 $\times 10^5$, 9 $\times 10^3$ to 14 $\times 10^5$, 7

$\times10^2$ to 9×10^3 and 3×10^2 to 7×10^3 with mean values of $2.8\times10^4\pm 1.1\times10^4$, $6.3\times10^4\pm 2.6\times10^4$, $14\times10^4 \pm 7.2\times10^4$, $1.9\times10^3 \pm 0.9\times10^3$ and $9.8\times10^2\pm 2.3\times10^2$ CFU/g , respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon.There were significant differences ($p< 0.05$) between the raw frozen, half cooked and cooked products which reflect the effect of heat treatments on Psychrotrophic count.The variation in counts may be attributed to different hygienic levels during broiler chicken slaughtering and other processing steps. The initial bacterial count at zero day of refrigeration and the sampling techniques used play an important role in this variation.In general, the contamination of chicken meat products with great number of psychrotrophic bacteria could be attributed to the neglected sanitary measures adapted during intensive preparation, processing, handling and packaging as well as cold storage. **(Cenci et al.,1990).**

Table (2) Bacteriological parameters CFU/g of the examined poultry meat products (n= 20 of each).

	Product		Minimum	Maximum	Mean± SE
APC	Raw	Frozen Pane	8×10^4	3×10^6	$2.3\times10^5\pm 0.9\times10^{5a}$
		Frozen Shiesh	13×10^4	7×10^6	$5.2\times10^5\pm 1.4\times10^{5a}$
		Frozen Wings	18×10^4	16×10^6	$11.8\times10^5\pm 6.4\times10^{5a}$
	Half cooked	Nuggets	2×10^3	6×10^4	$8.3\times10^3\pm 1.8\times10^{3b}$
	Cooked	Luncheon	2×10^2	2×10^4	$3.2\times10^3\pm 0.9\times10^{3b}$
Psychrotrophic count	Raw	Frozen Pane	5×10^3	4×10^5	$2.8\times10^4\pm 1.1\times10^{4a}$
		Frozen Shiesh	2×10^3	11×10^5	$6.3\times10^4\pm 2.6\times10^{4a}$
		Frozen Wings	9×10^3	14×10^5	$14\times10^4\pm 7.2\times10^{4a}$
	Half cooked	Nuggets	7×10^2	9×10^3	$1.9\times10^3\pm 0.9\times10^{3b}$
	Cooked	Luncheon	3×10^2	7×10^3	$9.8\times10^2\pm 2.3\times10^{2c}$
Pseudomonas count	Raw	Frozen Pane	4×10^2	11×10^3	$3.6\times10^3\pm 1.4\times10^{3a}$
		Frozen Shiesh	8×10^2	15×10^3	$9.5\times10^3\pm 1.82\times10^{3a}$
		Frozen Wings	3×10^3	8×10^4	$16.2\times10^3\pm 4.7\times10^{3a}$
	Half cooked	Nuggets	2×10^2	7×10^2	$4.5\times10^2\pm 1.2\times10^{2b}$
	Cooked	Luncheon	1×10^2	5×10^2	$2.3\times10^2\pm 0.9\times10^{2b}$
Enterobacteriaceae count	Raw	Frozen Pane	8×10^2	27×10^3	$9.6\times10^3\pm 3.8\times10^{3a}$
		Frozen Shiesh	6×10^2	23×10^3	$13.2\times10^3\pm 5.1\times10^{3a}$
		Frozen Wings	11×10^2	17×10^3	$9.58\times10^3\pm 2.4\times10^{3a}$
	Half cooked	Nuggets	1×10^2	3×10^3	$9.6\times10^2\pm 1.28\times10^{2b}$
	Cooked	Luncheon	4×10^2	11×10^2	$7.1\times10^2\pm 1.08\times10^{2b}$

$^{(a,b,c)}$Means carrying different superscript small letters are significantly different (P< 0.05) for the same microorganism.

The strong positive correlation between the growth of Pseudomonas spp. and the spoilage chemical indicators of poultry products was explained **(Ghollasi-Mood et al., 2017 andHussein et al., (2018)**. The data intable (2) showed that the Pseudomonas countranged from 4 $\times10^2$ to 11 $\times10^3$, 8 $\times10^2$ to 15 $\times10^3$, 3 $\times10^3$ to 14 $\times10^4$, 2 $\times10^2$ to 7$\times10^2$ and 1 $\times10^2$ to 5 $\times10^2$ with mean values of 3.6 $\times10^3$± 1.4 $\times10^3$, 9.5 $\times10^3$± 1.82 $\times10^3$, 16.2 $\times10^3$± 4.7 $\times10^3$, 4.5 $\times10^2$ ± 1.2 $\times10^2$, and 2.3 $\times10^2$ ± 0.9 $\times10^2$ CFU/g , respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon.The findings coincide with other studies report the same levels of Pseudomonas spp. for chicken, which is 2.7-3.8 **(Bruckner et al., 2012; Mead et al., 1993)** and 3.6 log CFU/g **(Abu-Ruwaida et al., 1994)**.There were significant differences (p< 0.05) between the raw frozen, half cooked and cooked products which reflect the effect of heat treatments on Pseudomonas species.

Table (3) Acceptability of the examined poultry meat products according to aerobic plate count (n= 20 of each).

Product		N (%) of samples within permissible limits	N (%) of samples exceeds permissible limits
Raw	Frozen Pane	15 (75%)	5 (25%)
	Frozen Shiesh	13 (65%)	7 (35%)
	Frozen Wings	12 (60%)	8 (40%)
Half cooked	Nuggets	16 (80%)	4 (20%)
Cooked	Luncheon	18 (90%)	2(10%)

- The maximum permissible limit (10^4 CFU/g) for Aerobic plate count (APC) according to Egyptian Standard Specifications (ES) (3493 – 2005) for poultry meat products treated with heat and (10^6 CFU/g) according to ES, (1090/2005) for APC in frozen poultry.

The data intable (2) showed that the Enterobacteriaceae countranged from 8 $\times10^2$ to 27 $\times10^3$, 6 $\times10^2$ to 23$\times10^3$, 11 $\times10^2$ to 17 $\times10^3$, 1 $\times10^2$ to 3$\times10^3$ and 4 $\times10^2$ to 11 $\times10^2$ with mean values of 9.6 $\times10^3$± 3.8 $\times10^3$, 13.2 $\times10^3$± 5.1 $\times10^3$, 9.58 $\times10^3$± 2.44 $\times10^3$, 9.6 $\times10^2$ ± 1.28 $\times10^2$, and 7.1 $\times10^2$ ± 1.08 $\times10^2$ CFU/g , respectively for examined frozen pane, frozen sheish, frozen wings, nuggets and luncheon.Nearly similar results were reported by **Zeitoun and Al-Eid (2003)**. They revealed that the mean value ofEnterobacteriaceae count was ranged from 1 - 3 $\log_{10}$cfu/g in examined frozen chicken samples. **Kozacinski*et al.*(2006).** They found that the average number of *Enterobacteria*ceae was 2.28 ± 0.52 $\log_{10}$cfu/g in chicken breast samples.Higher Enterobacteriaceae count obtained by**Vural*et al.* (2006)** they reported that the mean value of Enterobacteriaceae count in examined chicken meat samples was 5.6 log_{10}CFU/g and **Hassan (2015)** mentioned that the total Enterobacteriaceae count ranged from 3.1 to 5.9 with a mean value of 4.2 ± 3.9 log_{10}CFU/g in the examined frozen chicken carcasses.The presence of Enterobacteriaceae in a large number in food indicates inadequate processing and contamination from dirty equipment or poor hygienic measures **(Ikeme, 1990).**There were significant differences ($p< 0.05$) between the raw frozen, half cooked and cooked products which reflect the effect of heat treatments on Enterobacteriaceae population.

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الملخص العربى

السمات الميكروبية والكيميائية لبعض منتجات الدجاج

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قسم مراقبة الأغذية كليةالطب البيطري جامعة الزقازيق مصر

تم تجميع مئة عينة من مصنعات الدجاج المجمدة والنيئة (الفيلية و الشيش و الأجنحة) و النصف مطهية الناجتس و لانشون الدجاج عشرون عينة لكل نوع. جمعت العينات من محلات بيع الدجاج والسوبر ماركت بمدينة الزقازيق محافظة الشرقية ونقلها إلى معمل الرقابة الصحية على اللحوم ومنتجاتها كلية الطب البيطرى جامعة الزقازيق لفحصها كيميائيا وبكتيريولوجيا. كانت متوسط قيم درجة الحموضة هي ٥.٩٤ ± ٠.٠٢ و ٦.١١ ± ٠.٠٤ و ٥.٩٦ ± ٠.٠٢ و ٦.٦٧ ± ٠.٠٣ و ٦.٤٢ ± ٠.٠٥. كانت متوسط قيم المواد النيتروجينية المتطايرة هي ٩.١٢ ± ٠.٢٣ و ١٠.١٩ ± ٠.٣٤ و ١١.٥٤ ± ٠.٣٦ و ٧.٥٦ ± ٠.٢٨ و ٧.٦٦ ± ٠.٣١مجم /١٠٠جم وكانت متوسط قيم حمضالثيوباربتيرك ٠.٥٢ ±٠.٠١ و ٠.٥٨ ± ٠.٠١ و ٠.٧٣ ± ٠.٠١ و ٠.٤٢ ± ٠.٠٣ و ٠.٦٤ ± ٠.٠٢ مجم مالون ألدهايد / كجم فى الفيلية و الشيش و الأجنحة والناجتس و لانشون الدجاج على التوالي. كان متوسط العدد الكلى للميكروبات الهوائية ٢.٣ × $١٠^{٥}$ ± ٠.٩ × $١٠^{٥}$، ٥.٢ × $١٠^{٥}$ ± ١.٤ × $١٠^{٥}$، ١١.٨ × $١٠^{٥}$ ± ٦.٤ × $١٠^{٥}$، ٨.٣ × $١٠^{٣}$ ± ١.٨ × $١٠^{٣}$ و ٣.٢ × $١٠^{٣}$ ± ٠.٩ × $١٠^{٣}$ خلية بكتيرية /جم ووجد أن متوسط عدد الميكروبات المحبة للبرودة ٢.٨ × $١٠^{٤}$ ± ١.١ × $١٠^{٤}$، ٦.٣ × $١٠^{٤}$ ± ٢.٦ × $١٠^{٤}$، ١٤ × $١٠^{٤}$ ± ٧.٢ × $١٠^{٤}$، ١.٩ × $١٠^{٣}$ ± ٠.٩ × $١٠^{٣}$ و ٩.٨ × $١٠^{٢}$ ± ٢.٣ × $١٠^{٢}$ خلية بكتيرية /جم ووجد أن ميكروب السيدوموناس ٣.٦ × $١٠^{٣}$ ± ١.٤ × $١٠^{٣}$، ٩.٥ × $١٠^{٣}$ ± ١.٨٢ × $١٠^{٣}$، ١٦.٢ × $١٠^{٣}$ ± ٤.٧ × $١٠^{٣}$، ٤.٥ × $١٠^{٢}$ ± ١.٢ × $١٠^{٢}$، و ٢.٣ × $١٠^{٢}$ ± ٠.٩ × $١٠^{٢}$ خلية بكتيرية /جم.ووجد أن متوسط الأمعئيات ٩.٦ × $١٠^{٣}$ ± ٣.٨ × $١٠^{٣}$، ١٣.٢ × $١٠^{٣}$ ± ٥.١ × $١٠^{٣}$، ٩.٥٨ × $١٠^{٣}$ ± ٢.٤٤ × $١٠^{٣}$، ٩.٦ × $١٠^{٢}$ ± ١.٢٨ × $١٠^{٢}$ و ٧.١ × $١٠^{٢}$ ± ١.٠٨ × $١٠^{٢}$ خلية بكتيرية /جم في الفيلية و الشيش و الأجنحة والناجتس و لانشون الدجاج على التوالي. ومن النتائج وجد أن جميع العينات المفحوصة لم تتعدى حدود المواصفات الكيميائية إلا أن معظم العينات ملوثة بالبكتريا المفسدة.