Quality of battered and breaded chicken meat products

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ABSTRACT

Battered and breaded chicken meat products are one of the most popular consumer items that have traditionally been consumed in many countries and form an integral part of human foods because of the increased palatability provided by soft and moist interior with porous outer crispy crust. Total of 60 random Samples of battered and breaded chicken meat products including drumstick and wings (30 of each) were collected from different supermarkets in different localities in Qalubyia Governorate. The collected samples were transferred directly to the laboratory in an ice box under complete aseptic condition without undue delay and then subjected to following examinations. sensory analysis of battering and breading characteristics was applied. Chemical investigation for the samples for determination of pH, TVB-N, TBA indicated that the mean values were 6.10±0.01 ,10.35±0.41 ,0.3±0.01 in the examined chicken drumsticks respectively, while they were 6.00±0.02 ,8.12±0.38 ,0.17±0.01 in the examined chicken wings respectively, all examined samples were within the accepted levels as they contain TVB-N lower than 20 mg % and TBA lower than 0.9 mg Mal/kg. The obtained results indicated that the mean values of Aerobic plate count, total *Staphylococci count and coliforms* counts were $1.23x10^5 \pm 0.15x\ 10^5$, $7.4x\ 10^2 \pm 1.4x\ 10^2$ and $17.53x\ 10^3 \pm 2.3x\ 10^4$ in the examined chicken drumsticks respectively. While the counts were $1.6x\ 10^5 \pm 0.16x\ 10^5$,$12.5x\ 10^2 \pm 1.6x\ 10^2$,$36.30x\ 10^3 \pm 5.4x\ 10^3$ in the examined chicken wings, respectively. Also *Staph. aureus* in 15 samples of the examined chicken drumsticks and 20 samples of the examined chicken wings were detected with mean values $0.82x10^3 \pm 0.09x10^3$ for chicken drumsticks and $0.77x10^3 \pm 0.08x10^3$ for chicken wings. Concerning *Salmonella* and *E.coli* could not be detected in all examined samples.

Keywords: Battered and breaded chicken meat, Drumsticks, wings, *Staph aureus, E.coli*

1- INTRODUCTION

Battering and breading improves the overall quality attributes of coated products especially the sensory quality parameters e.g. appearance, color, texture, taste and flavor. Also improve the nutritional value, weight and volume of the food product, Battered and breaded products are coated products in which meat protein

components (as whole muscle or ground meat) is the core surrounded by cereal base coating (as wheat flour or corn starch).Batter and breading of deep- fat fried products is used to improve appearance, flavor, texture and color **(Rombauer, *et al.*, 2000).**Before chicken meat products quality is addressed, the term food quality should be clearly defined as it is the extent to which all requirements relating to characteristics of food are met.The pH value is an indicator of the keeping quality of meat where the pH measurement of meat is used to assess the shelf life ad quality of the products.The variation of TVN values of examined samples of chicken meat product could be attributed to the variation of protein content of different product sample, and storage life of each product.Thus, the TVN could be considered as reliable measure indicating the quality of various food articles especially chicken meat products. Generally, microorganisms either flora or those induced by handling of food items grow at different levels (**Warries, 2000).**The variation of TBA values of examined samples of chicken meat products could be attributed to the variation of fat content of different product sample and storage life of each product.Chicken meat and their products often get contaminated with different kinds of microorganisms from different sources during different stages of processing, preparation and packaging.The most important pathogens of public health hazard are Salmonella, *E.coli* and *Staph.aureus*which cause different diseases to man.Therefore, one of the main responsibilities of the food technologists and scientists are to find the best possible way to produce product free from pathogens of public health hazard or with minimal microbial content in order to improve its quality.Therefore, the present study was planned out to throw light on the sensory ,chemical and bacteriological criteria of some battered and breaded chicken meat products.

2- MATERIAL and METHODS

2-1. Collection of SAMPLES:

Total of 60 random Samples of battered and breaded chicken meat products including drumstick and wings (30 of each) were collected from different supermarkets in different localities in Qalubyia governorate.The collected samples were transferred directly to the laboratory in an ice box under complete aseptic condition without undue delay and then subjected to following examinations .

***2-2. Sensory evaluation* (Hale and Goodwin ,1968)**

2-3 Chemical examinaion:

2-3.1. Determination of pH value (E.O.S 63/11 2006):

2-3.2. Determination of Total Volatile Nitrogen (TVN)(mg%)(E.O.S 2006):

2-3. 3.Determination of Thiobarbituric Acid number(TBA)(mg/kg)(E.O.S 63/9 2006):

2-4. Bacteriological examination:

2-4.1.Preparation of food homogenate (ISO6887/1, 2003)

2-4.2. Enumeration of Aeropic Plate Count(APC),(APHA,2001)

2-4.3. Enumeration of total Staphylococci count (FDA, 2001)

2-4.3.1. Isolation and identification of *Staphylococcus aureus* (APHA,2001):

2-4.4.1. Identification of *Escherichia coli*(FDA ,2002)::
2-4.5. Identification of coliforms (ISO,2004):
2-4.6. Isolation and identification of *Salmonellae* (ISO 6579, 2002)

3- RESULTS

Table (1) Frequency distribution of battering and breading sensory characteristics scores of examined chicken samples.

	samples	0-<1		1-<2		2-<3		3-<4		4-<5	
		No.	%	No.	%	No.	%	No.	%	No.	%
Color	Drumsicks	6	20	5	16.7	13	43.3	6	20	-	-
	Wings	6	20	8	26.7	10	33.3	5	16.7	1	3.3
Adhesion	Drumsicks	6	20	6	20	8	26.7	4	13.3	6	20
	Wings	3	10	9	30	9	30	5	16.6	4	13.4
Texture	Drumsicks	2	6.6	10	33.3	13	43.3	5	16.7	-	-
	Wings	5	16.7	6	20	9	30	7	23.3	3	10
Hardness	Drumsicks	3	10	9	30	10	33.3	4	13.3	4	13.3
	Wings	1	3.3	5	16.7	11	36.7	4	13.3	9	30

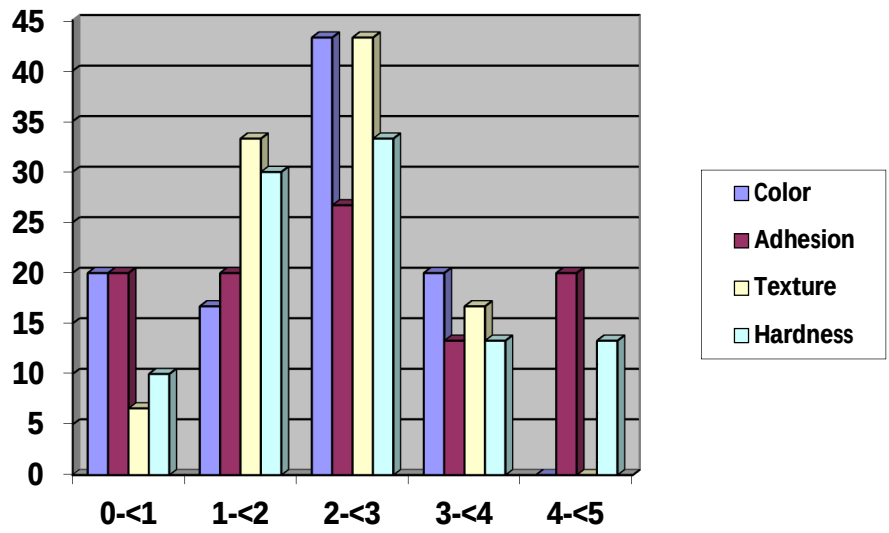

Fig.(1): Frequency distribution of battering and breading sensory characteristics scores of examined chicken drumsticks.

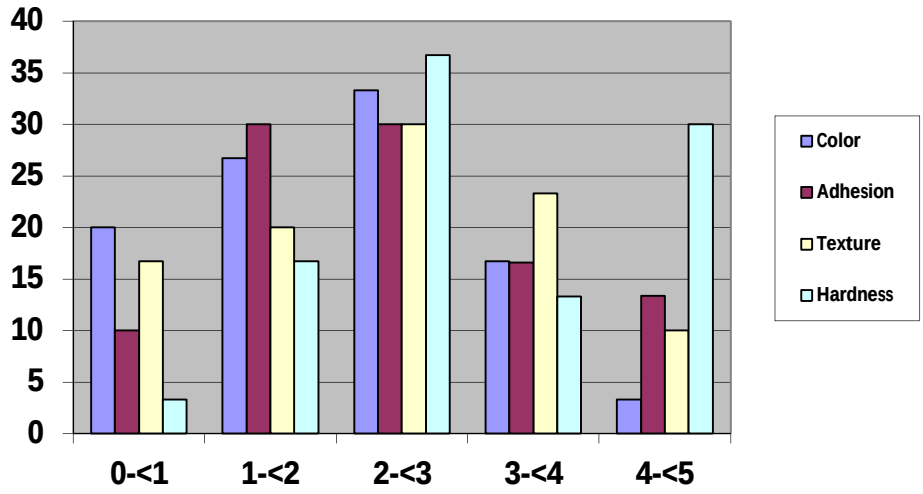

Fig.(2): Frequency distribution of battering and breading sensory characteristics scores of examined chicken Wings.

Table (2): Statistical analytical results of pH value in examined battered and breaded chicken meat products (n = 30).

samples	Min	Max	Mean ± SE	Approved samples
Drumstick	5.95	6.31	6.10 ± 0.01	100%
Wings	5.87	6.18	6 .00± 0.02	100%

pH must be 5.5-6.5 according **'E.**O.S, 3493" (2005).

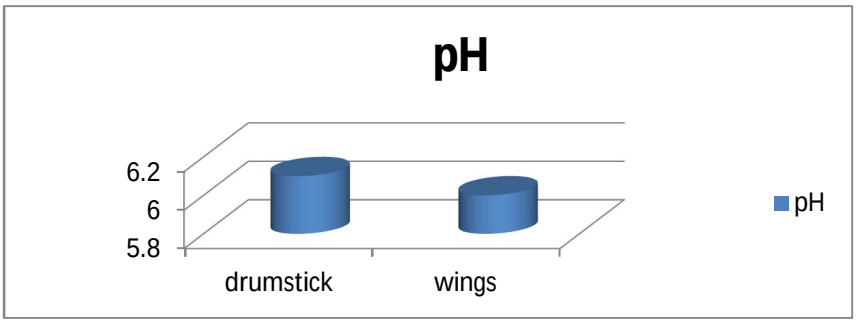

Fig. (3): Mean values of pH in examined battered and breaded chicken meat products (n = 30).

Table (3): Statistical analytical results of TVN (mg %) in examined battered and breaded chicken meat products (n = 30).

sample	Min	Max	Mean ± SE	Approved samples
Drumstick	7.05	17.36	10.35±0.41	100%
Wings	4.63	12.87	8.12±0.38	100%

TVN must be lower than 20 mg% according ***'E.***O.S, 3493" (2005).

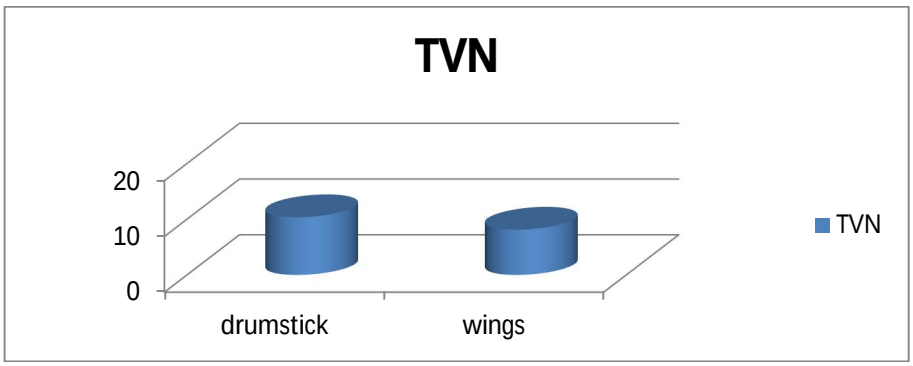

Fig. (4): Mean values of TVN (mg %) in examined battered and breaded chicken meat products (n = 30).

Table (4): Statistical analytical results of TBA value (mg /kg) in examined battered and breaded chicken meat products (n = 30).

sample	Min	Max	Mean ± SE	Approved samples
Drumstick	0.17	0.42	0.30 ± 0.01	100%
Wings	0.10	0.29	0.17 ± 0.01	100%

TBA must be lower than 0.9 mg/kg according ***'E.***O.S, 3493" (2005).

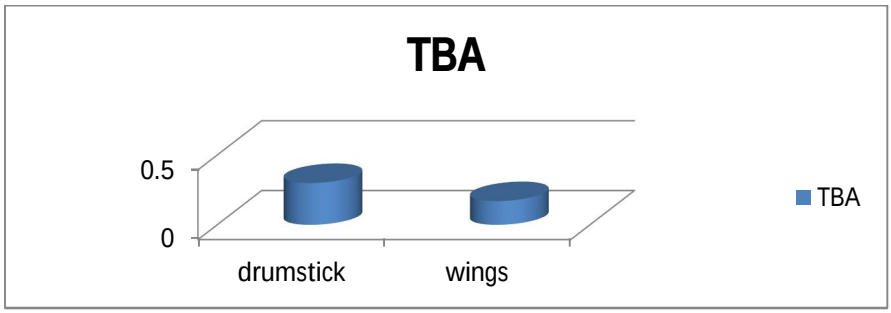

Fig. (5): Mean values of TBA (mg/kg) in examined battered and breaded chicken meat products (n = 30).

Table (5): Statistical analytical results of Aerobic Plate Counts/g (APC) in examined battered and breaded chicken meat products (n = 30).

Item / Sample	Positive sample		Min	Max	Mean± SE	Unfit Samples	
	No.	%				No.	%
Drumstick	30	100	2×10^5	2.5×10^6	$1.23\times10^5\pm0.15\times10^5$	30	100
Wings	30	100	2×10^5	2.5×10^6	$1.6\times10^5\pm0.16\times10^5$	30	100

*SE=Standard Error of mean.
Permissible limit of aerobic plate count /g is not exceed10^4accordingto ***'E.***O.S, 3493" (2005).

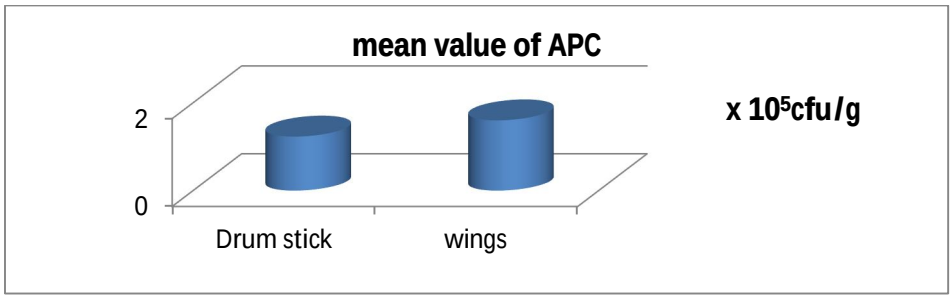

Fig. (6): Mean values of APC in examined battered and breaded chicken meat products (n=30).

Table (6): Statistical analytical results of coliforms Counts/g in examined battered and breaded chicken meat products (n = 30).

Sample / Counts	Positive sample		Min	Max	Mean ± SE
	No.	%			
Drumstick	6	20	$3x10^3$	$65x10^3$	$17.53\times10^3\pm2.3\times10^3$
Wings	17	56	$6x10^3$	11.3×10^4	$36.30\times10^3\pm5.4\times10^3$

E.coli and *Salmonella* could not be detected from any examined samples.

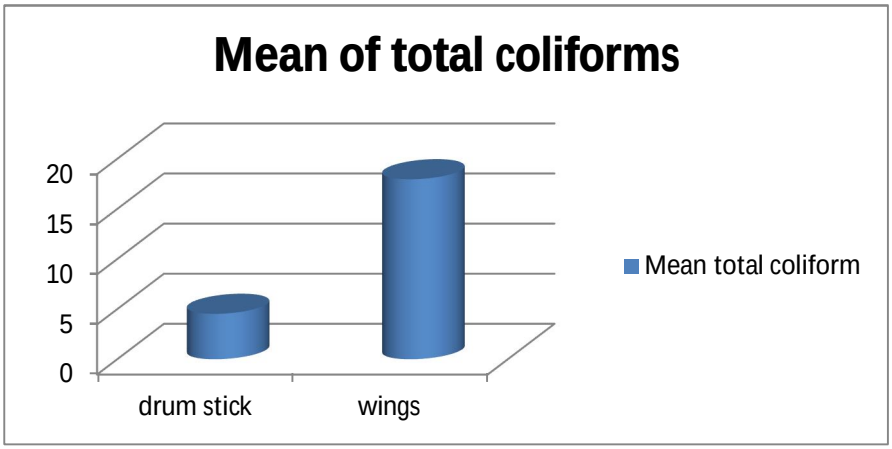

Fig. (7): Mean values of total coliforms count in examined battered and breaded chicken meat products (n = 30).

Table (7): Prevalence of coliforms count in examined battered and breaded chicken meat products (n = 30).

Sample	Approved Sample		unapproved Sample	
(n = 30)	No.	%	No.	%
Drumstick	24	80	6	20
Wings	13	44	17	56

Permissible Limits for Coliforms /g 10^2 according to ***'E.***O.S, 3493" (2005).

Table (8): Statistical analytical results of total Staphylococci Counts /g in examined battered and breaded chicken meat products (n = 30).

Item / Sample	Positive sample		Min	Max	Mean ± SE
	No.	%			
Drumstick	20	66	3×10^2	2.5×10^4	$7.4\times10^2\pm1.4\times10^2$
Wings	30	100	5×10^2	2.5×10^4	$12.5\times10^2\pm1.6\times10^2$

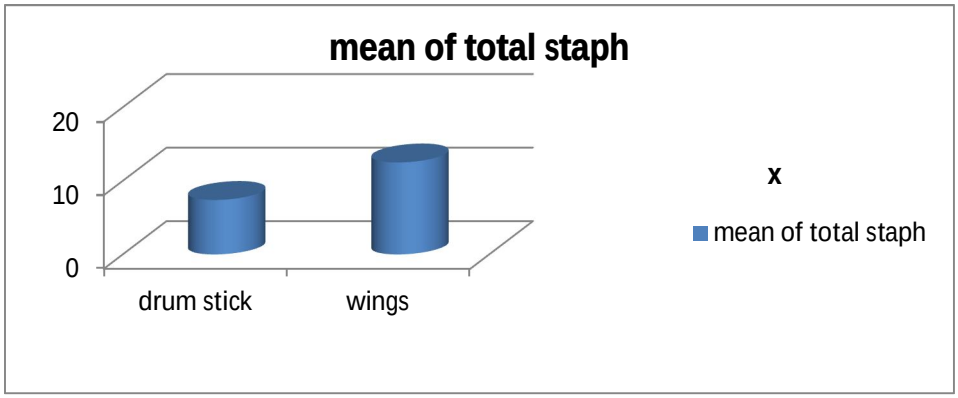

Fig (8): Mean values of total staphylococci count in examined battered and breaded chicken products (n=30).

Table (9): Prevalence of *Staph.aureus* count in examined battered and breaded chicken meat products (n = 30).

Sample	Approved Sample		unfit Sample	
(n = 30)	No.	%	No.	%
Drumstick	15	50	15	50
Wings	10	33	20	66

Staph. aureus must not be present (Zero/g) according to***'E.***O.S, 3493" (2005).

4- DISCUSSION

4-1. Sensory evaluation of examined battered and breaded chicken meat samples:

Data in table(1) ,fig.(1)and fig.(2) of sensory analysis of battering and breading characteristics indicated that 43.3, 26.7, 43.3 and 33.3% of battered and breaded chicken drumsticks and 33.3 , 30,30 and36.7% of battered and breaded chicken wings showed correct color ,adhesion, texture and hardness scores respectively.While 36.7,40,39.9 and 40%of battered and breaded chicken drumsticks and 46.7,40,36.7 and 20 %of battered and breaded chicken wings showed lighter color,looslyadhesion,flaky texture and less hardness scores respectively.While 20,33.3,16.7 and 26.6% of battered and breaded chicken drumsticks and 20,30,33.3 and 43.3% of battered and breaded chicken wings showed darker color, more tightly adhesion, too smooth texture and more hardness scores respectively.

Breading improved the flavour, appearance and texture of meat products, It also retained moisture, prevented lipid-absorption and preserved the nutritive value of the final product. **Gerdes (2001)**Sensory attributes of

a food are very important in determining its overall acceptance ***(***texture, appearance and flavor are the most significant factors for consumer acceptability ***(Dunford; 2004).***Consumers usually evaluate the coated fried product as acceptable or not first by its color…**Krokida et al (2001)** stated that oil temperature and sample thickness are the process parameters that affect the color parameters significantly during frying.The difference in texture scores could be due to differences in frying time ***(Altunakar et al, 2004%,*** where frying in oil with higher degree of hydrogenation resulted in products of lighter color and harder texture ***(Li, 2005).***.Appearance, colour, texture, adhesion and flavour are important factors in consumer perceptions of coated foods and crispiness is the most critical property that determines consumer acceptance, as the crisp outer layer contrasts with the soft interior.**Maskat and Kerr (2002)**

4-2.Chemical profile of examined battered and breaded chicken meat samples:

4-2.1-pH

It is obvious from the results recorded in Table(2) and Fig(3) that pH values ranged from 5.95 to 6.31with a mean value of 6.1± 0.01 for examined drumsticks, 5.87 to 6.18with a mean value of 6± 0.02 for examined wings. The obtained values from the examined drumsticks and wings were nearly similar to that reported by **Ali-Eans(2011**) 5.8±0.01 in Chicken pattie and ***Ghanem-Shereen(2013) 5.92***±0.01 for half-cooked chicken fingers and 5.86±0.01 for half-cooked chicken pane. The pH value is an indicator of the keeping quality of meat where the PH measurement of meat is used to assess the shelf life and quality of the products. The decrease in pH value in poultry meat 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 . The meat and chicken meat products were marginally spoiled at pH values of 6.6 after which they are markedly spoiled **(Potter, 2001).**According to Egyptian Organization for Standardization ***E.O.S, 3493(2005)*** for poultry meatproducts, all the examined samples were within the accepted level .

4-2.2-Total Volatile Nitrogen(TVN)

The results recorded in Table(3) and Fig(4) indicated that TVN values ranged from *7.05 to17.36 with amean value 10.36*±0.41/(mg%)for examined drumsticks*and 4.63 to12.87* with amean value 8.12±0.38/(mg%) for examined wings.The obtained values from the examined drumsticks and wings *are similar to that obtained by* ***Ali-Enas(2011)*** *10.22*±0.34/(mg%) in *chicken pattie* and ***Ghanem-Shereen(2013)*** 8.17±0.31 for half-cooked chicken fingers , ,7.06±0.26 for half-cooked chicken pane. While lower results obtained by **Fathy-Eman(2012)** 6.57±0.19/(mg%) in drumsticks**.**TVN can be considered as a reliable indicative measure for the quality of various food articles specially poultry and its products. Generally, microorganisms either flora or those induced by handling of food items grow at different levels (**Warries, 2000).** Thus, the TVN can be considered as reliable measure indicating the quality of various food articles especially poultry products.According to Egyptian Organization for Standardization ***E.O.S, 3493(2005)*** for poultry meatproducs, all the examined samples were

within the accepted level as T.V.N were lower than 20 mg%.

4-2.3Thiobarbituric acid (TBA)

The results recorded in Table (4) ad Fig (5) showed that the TBA values (mg/kg) in the examined samples were from 0.17 to 0.42 with meanvalue 0.3±0.01/(mg/kg)in the examined drumsticks and 0.10 to 0.29 with mean value 0.17±0.01/(mg/kg)in the examined wings.The obtained values from the examined drumsticks and wings are similar to that obtained by ***Ali-Enas(2011) 0.14***±0.01/(mg/kg) in chicken pattie while lower results obtained by ***Ghanem-Shereen(2013)*** 0.07±0.01(mg/kg) for half-cooked chicken fingers , 0.05±0.01(mg/kg) for half-cooked chicken pane. TBA value is routinely used as an index of lipid oxidation in meat product in store ***(Raharjo and Sofos1993).***Development of off–flavors known as rancidity is due to lipid oxidation **Owens (2001).**The quality of meat and chicken meat products during the chilling or frozen storage depends greatly on TBA value as recommended by ***Hassan and Shaltout (2004).***According to Egyptian Organization for Standardization ***E.O.S, 34393(2005)*** for poultry meat products, all the examined samples were within the accepted level as TBA were lower than***0.9*** mg/kg.

4-3. Bacteriological profile of examined battered and breaded chicken meat samples It is evident from the results recorded in Table(5),Fig(6) that the APC/g of the examined samples of battered and breaded chicken meat products ranged from $2x10^5$ to $2.5x10^6$ with an average of $1.23xl0^5$±$0.15xl0^5$/(cfu/g)for drumsticks and $2x10^5$ to $2.5x10^6$ with an average of $1.6x10^5$±$0.16x10^5$/(cfu/g) for wings. Permissible limit of aerobic plate count /g is not exceed10^4accordingto ***'E.***O.S, 3493" (2005). Accordingly the battered and breaded chicken drumsticks and wings were highly contaminated .This could be attributed to the fact that these products may receive more handling during preparation as well as addition of spices which may be contaminated with large numbers of microorganisms. The obtained results were similar to those reported by **Ali -Aisha(2007)** $2.7x10^6$,$1.85x10^6$,$1.2x10^6$/(cfu/g) in half –cooked chicken products(drumstick ,wings, fillet).while lower reults were recorded by **Shaltout (2002)** $4.16xl0^4$ and $6.22xl0^5$/(cfu/g) respectively in examined half – cooked chicken products(drumstick ,wings). However higher results were recorded by **Ahmed(2004)** $6.51xl0^6$±$1.12xl0^6$and$3.72x10^6$±0.93 $xl0^6$/(cfu/g) respectively in examined half –cooked chicken products (nuggets and hotwings). **Osman (2001)** was $4.1xl0^5$±$2.8xl0^5$/(cfu/g) in chicken nuggets. Results achieved in Table (6) declared that 100% unfit examined samples for human consumption. Although, the aerobic plate counts of any food articles are not sure indicative of their safety for consumption, yet it is of supreme importance in judging the hygienic condition under which food has been produced, handled and stored **(Levine, 1987)**.Accordingly the high bacterial count of examined samples may be attributed to neglected sanitary measures during their processing, handling, serving of such products. The three main routes by which microorganisms enter food, the food stuff, food handlers and the environments **(Roberts, 1990)**.Early preparation of larger quantities of meat products and hold for hours without control can facilitate the growth of microorganisms which

contaminated such products from numerous sources during handling, transport, processing, storage ad serving **(Dawson, 1992).**

From the results given in Table (6),Fig(7) it is obvious that the mean values of total coliforms counts /(cfu/g) in the examined samples were $17.53x10^3 \pm 2.3x10^3$/(cfu/g)for drumsticks and $36.30x10^3 \pm 5.4x10^3$/(cfu/g)for wings. Further more, the coliforms were detected in 20% of examined drumsticks and 56% in the examined wings. The current results are higher , while lower results were recorded by **Ahmed(2004)** $9.02x10^2 \pm 2.43x10^2$ and $6.51x10^2 \pm 1.86x10^2$/(cfu/g) respectively in examined half-cooked chicken products(nuggets,hotwings).Also lower results were recorded by **Ali- Enas (2011)** $2.3x10^4 \pm 0.53x10^4$/(cfu/g) in examied half-cooked chicken pattie.

Coliforms well significant organisms in meat as an indicator of fecal contamination and had ability to grow well over wide range of temperature below 10C up to 46C **(Gill *et al*.,1996),.**The high incidence of coliforms in the examined battered and breaded chicken samples (drumsticks ,wings) indicate processing or post processing contamination(most probably from workers, dirty instruments, machinery and other contact surfaces),or from raw ingredients before processing which drive their contamination from various sources as human contact, polluted water, soil and manure, The presence of coliforms indicates aprobable faecal sources of contamination **(Thatcher and Clarck, 1975:ICMSF,1978 and NAS,1985) .***Salmonella and E.coli* could not be detected in all examined samples .These results were similar to those recorded by **Ehab(2003)**and**Abou-Hussein-Reham(2007)** who failed to isolate *salmonella***…**But disagree with **Ali- Enas (2011)**who isolate *Salmonella* and *E.coli* from chicken pattie with percentage 25% and 40% respectively, **Hanan *et al* (2007)** who isolate *Salmonella* and *E.coli* from chicken pattie with percentage 4% and 12% respectively, **Shaltout (2002)** who isolate *E.coli* from10%of examined hot wings samples and 20%of examined drumsticks samples , **Ahmed(2004)** who found *E.coli* in 20% of examined nuggets and 12%of examined hot wings and**, Ali - Aisha*(2007)***who found *E.coli* in 20%of examined half cooked chicken samples (wings, drum sticks and fillet). Results achieved in Table (8) declared that unfit examined samples for human consumption were 20% from drumstick and 56% from wings because they exceed the permissible limit of **E.O.S ,3493(2005).**

Table(8),fig(8)indicated that the total Staphylococcal count in the examined samples ranged from $3x10^2$ to $2.5x10^4$ with an average $7.4x10^2 \pm 1.4x10^2$ /(cfu/g) for examined drumsticks and from $5x10^2$ to $2.5x10^4$ with average of $12.5x10^2 \pm 1.6x10^2$ for examined wings. Furthermore the staphylococci were detected in 66% of examined drumsticks and 100% of examined wings, these results may be due to contamination from food handlers, inadequate cleaned equipment or post processing contamination. The obtained results were similar to those reported by **Ali- Enas (2011)** $2x10^2$ to $5x10^4$ with the mean value $9.92x10^3 \pm 2.82x10^3$/(cfu/g) in chicken pattie and **Ali-Aisha *(2007)*** $1x10^2$ to $8.9x10^4$,, $1x10^2$ to$1.5x10^4$ and $1x10^2$ to $1.55x10^4$ /(cfu/g) respectively in examined chicken products (wings, drumsticks,

fillet).However higher results recorded by **Hanan et al (2007)** $1.13x10^4 \pm 0.24x10^4$/(cfu/g) in chicken pattie.

Table (9) showed high incidence of *Staph. aureus* 50% for examined drumsticks and 66% for examined wings. According to **E.O.S,3493 (2005)** of chicken meat products for *Staph. aureus* count the permissible limit should be free from *Staph. aureus*, so about on 50% for examined drumsticks and 66% for examined wings were unfit for human consumption as showed in table(9). The obtained results of battered and breaded chicken meat products were similar to that obtained by **Ahmed(2004)** $5x10^2$ to $9x10^4$ /(cfu/g) in examined nuggets and $2x10^2$ to $4.5x10^4$/(cfu/g) in examined hot wings.While lower results obtained by **Ali-Aisha*(2007)*** $5x10^2$/(cfu/g) with incidience 5% in battered and breaded chicken fillet. But **Hanan et al (2007)** failed to isolate *Staph.aureus* from battered and breaded chicken products (fillet). Presence of *Staph.aureus*, in heat treated food may be due to its contamination from food handlers, inadequate cleaned equipment or post- processing contamination **Duffy*et al*. (2000)** *Staph.aureus* intoxication is a worldwide problem where several food poisoning outbreaks were reported due to consumption of meat and meat products contaminated with these organisms. Accordingly, the total *Staph.aureus* count can be taken as index of sanitary conditions under which the meat and its products are manufactured and handled ***Potter (2001)*** Most food borne illness outbreaks are a result of contamination from food handlers and production of heat stable toxins in the food. Sanitary food handling and proper cooking and refrigerating could prevent Staphylococcus food borne illness. ***FSIS (2003)*** Staphylococcal food poisoning is the result of performed enterotoxins that are produced by certain strains of *Staph.aureus* resulting in symptoms of intoxication, not an infection. The most common symptoms appear approximately 3-8 hrs after ingestion and include nausea, vomiting, abdominal' cramps and diarrhea. Generally, symptoms are short in duration (approximately 24 - 48 hrs) ***Sandle and Mckillip (2004)***.

5- CONCLUSION

Chicken meat products are considered as one of the most exposed meat products to microbial contaminations causing food poisoning. Examined chicken wings were higher in APC , coliform count and total Staph. count than examined chicken drumstick. Examined chicken drumsticks were higher in *Staph. aureus* than examined chicken wings. Examined chicken drumsticks were higher in pH, TVN and TBA than examined chicken wings.

RECOMMENDATIONS

Application of strict hygienic measures during production, processing, handling and storage of raw materials and the final products. Application of different procedures to prevent or inhibit growth of microbial growth contaminating poultry meat products. Application of HACCP principles

during processing, packaging and handling. Employee should have medical certificate and well trained about hygienic practice and safe hygiene. Poultry product should be cooked to safe minimum internal temperature (74^0 C) determined by food thermometer.

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جودة منتجات لحوم الدجاج المغطاة

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تعتبر منتجات لحوم الدجاج المغطاة مصدر هام للبروتين بالنسبة للانسان ولها دور أساسي فى سد الفجوة ا لغذائية.حيث انتشرت هذه المنتجات بمعدل كبير فى العالم ويرجع انتشارها لزيادة تقبلها من الانسان من حيث اللون والقرمشة والطعم والتماسك وأيضا لسهولة الطهى.

أجريت هذه الدراسة لتقييم جودة مصنعات لحوم الدجاج النصف مطهية بمحافظة القليوبية وقد جمعت 60 عينة من أجنحة الدجاج النصف مطهية ودبوس الدجاج نصف مطهية .

كما تم فحص العينات من حيث اللون , التماسك , القرمشة , الصلابة وكانت كالتالى43.3,26.7,43.3و33.3%,من عينات الدبوس نصف المطهية و33.3,30,30 و36.7% من عينات الجناح نصف المطهية كانت الافضل من حيث اللون , التماسك , القرمشة , الصلابة.بينما 36.7,40,39.9 و40% من عينات الدبوس نصف المطهية و46.7,40,36.7 و20%من عينات الجناح نصف المطهية كانت اللون فاتح أكثر ,تماسك أقل,قرمشة مثل القشور وغير مقبولة وأقل صلابة.بينما 20,33.3,16.7و 26.6% من عينات الدبوس نصف المطهية و20,30,33.3 و43.30% من عينات الجناح نصف المطهية كانت اللون غامق ,تماسك عالى جدا,قرمشة ضعيفة جداو الصلابة علية جدا.وقد تم فحص العينات كيميائيا وكانت النتائج كالتالى متوسط تركيز ايون الهيدروجين المتصاعد 6.10 ± 0.01 بالنسبة لدبوس الدجاج نصف مطهية 00.6 ± 0.02 بالنسبة لجناح الدجاج نصف المطهية.وكان متوسط تركيز النيتروجين القلوى المتصاعد 10.35 ± 0.41 بالنسبة لدبوس الدجاج نصف المطهية , و 8.12 ± 0.38 بالنسبة لجناح الدجاج نصف المطهية.وكان متوسط حمض الثيوباربيتوريك (مجم/كجم مالونالدهيد) 0.3 ± 0.01 بالنسبة لدبوس الدجاج نصف المطهية , و0.17 ± 0.01 بالنسبة لأجنحة الدجاج نصف المطهية وبالتحليل الكيميائى كانت كل العينات مطابقة للمواصفة القياسية المصرية رقم 3493 لسنة 2005وقد أفادت النتائج أن متوسط العد الكلى للبكتيريا الهوائية فى الجرام $1.23 \times 10^{5} \pm 0.15 \times 10^{5}$ بالنسبة لدبوس الدجاج نصف المطهية و $1.6 \times 10^{5} \pm 0.16 \times 10^{5}$ بالنسبة لأجنحة الدجاج نصف المطهية .كما تم اكتشاف البكتريا العنقودية فى العينات وكان متوسط البكتريا العنقودية $7.4 \times 10^{2} \pm 1.4 \times 10^{2}$ بالنسبة لدبوس الدجاج نصف المطهية و $12.5 \times 10^{2} \pm 1.6 \times 10^{2}$ بالنسبة لأجنحة الدجاج نصف المطهية ..كما تم اكتشاف البكتريا القولونية فى العينات وكان متوسط العد الكلى للبكتريا القولونية فى الجرام $17.53 \times 10^{3} \pm 2.3 \times 10^{3}$ بالنسبة لدبوس الدجاج نصف المطهية و $36.30 \times 10^{3} \pm 5.4 \times 10^{3}$ بالنسبة لأجنحة الدجاج نصف المطهية العينات كانت خالية من ميكروب السالمونيلا وميكروب الايشريشيا كولاي .