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QUALITY EVALUATION AND PUBLIC HEALTH IMPORTANCE OF PROCESSED CHICKEN MEAT PRODUCTS IN ASSIUT GOVERNORATE

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ABSTRACT

The present study was conducted to determine the sensory quality, nutritive value and public health importance of processed chicken meat products including 25 samples from each chicken burger, chicken luncheon, crispy chicken pane and chicken strips. Samples were randomly collected from supermarket shops with different generic names in Assiut City, Egypt, and were transferred to the laboratory under refrigerated conditions in an ice tank where they were left in the refrigerator for 24 hrs before being prepared for chemical analysis. The results revealed that processed chicken meat product samples contained low levels of protein and high levels of fat and carbohydrates. The results were compared with the Egyptian standards (E.O.S 2005) to evaluate their acceptability. The mean percentage of moisture content (%) in the inspected samples was 59.20±0.69, 66.8±0.86, 57.40±0.82 and 52.50±0.93 and the mean values of protein content (%) were 10.94±0.20, 10.42±0.17, 11.76±0.25 and 11.92±0.26 respectively. The mean percentage of fat content (%) were 11.90±0.31, 6.96±0.46, 10.48±0.35, and 15.76±0.80, respectively; mean values of ash content (%) were 5.08±0.25, 4.03±0.14, 3.64±0.19 and 6.60±0.27, respectively. and the mean values of carbohydrate content (%) were 12.86±0.37, 11.76±0.45, 16.71±0.66 and 12.85±0.85, respectively. It is obvious that all the examined processed chicken meat products were accepted organoleptically. To guarantee adherence to legal and compositional criteria, strict monitoring and routine inspection of meat products should be carried out.

Keywords: Quality evaluation, chicken meat products, chicken, luncheon, chicken burger.

INTRODUCTION

Modern technology in various areas gave chance to meat processors the opportunity to create new products in various shapes that are simple to handle, store, and use. Due to their high biological value, delectable flavor, and ease of serving of meat products are in high demand (Edris *et al.*, 2013). The food industry and customers have recently focused their attention on the serious meat safety and quality issues of adulteration (Ahmed *et al.*, 2016). Adulteration of meat products may occur in many different forms, such as the

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full or partial removal of beneficial components, and the full or partial replacement of components with an approved substitute in order to increase volume, weight, or value (Hargin, 1996). Adulteration may be used to increase product perception quality, reduce production costs, or for additional product reasons in order to increase profits (Ahmed *et al.,* 2016). Manufacturers are further encouraged to use other substitutes in the making of meat products due to the high cost of meat and the lack of customer safety assurance (Roostita *et al.,* 2014). Over the last few years, the production and consumption of poultry meat have grown significantly (American Meat Institute, 2023). Low production costs, fast growth costs, high nutritional values, and quantities of further processed products are all responsible for this increase in production (Barbut, 2002). People prefer poultry meat products over beef for a number of different factors. While compared with beef items, the cost of manufacturing such products is usually cheaper (Guerrero-Legarreta and Hui, 2010). The nutritional value of the raw materials and the additives used in the end product are essential for maintaining general health. As a result, low-quality meat items are produced while processing low-quality components. (Pearson and Gillette, 1996). A major risk factor for human cardiovascular diseases like coronary heart disease and stroke is high cholesterol levels in diet (Hongbao, 2004). So full details on the chemical and nutritional components are necessary for consumers when selecting meat products, (Erwanto *et al.,* 2012).

Poultry flesh contains 22 to 25% protein, while other food products such as frankfurters, bologna, and sausages may contain 17 to 20% protein, 20% fat, and 60 to 80% water (Smith, 2001).

The chemical analysis of chicken meat products such as sausage, burger, luncheon and frankfurter was 59.4, 63.8, 66.9 and 61.2 for water, 18.2, 18.2, 19.9 and 17.8 for protein and 20.3, 15.3, 10.0 and 17.1 for fat, respectively. The sensory evaluation estimates all of the properties of, like food products based on experience by the human senses. Food color, texture, flavor, and fragrance should all be described, not just the taste (Murano, 2003).

The goal of the present study was to evaluate the sensory quality, nutritive value and public health significance of some chicken meat products (chicken burger, chicken luncheon, crispy chicken pane and chicken strips) in Assiut City. Egypt.

MATERIALS AND METHODS

1- Collection of Samples:

A total number of 100 randomly selected of four different types of chicken meat products represented by 25 samples of crispy chicken pane, 25 samples of chicken burger, 25 samples of chicken luncheon and 25 samples of chicken strips. The samples were randomly collected from markets in Assiut city in the first month of production date.

2- Organoleptic assessment:

The organoleptic assessment was done by three members of the Food Hygiene Department Faculty of Veterinary Medicine, Assiut University.

Seven sensory attributes were evaluated (appearance, color odor, taste, tenderness, juiciness, and overall acceptability) using 5 points hedonic scale for each trait where 1 = Very poor, 2 = poor, 3= fair, 4= Good, 5= excellent (Mansour and Khalil, 1999).

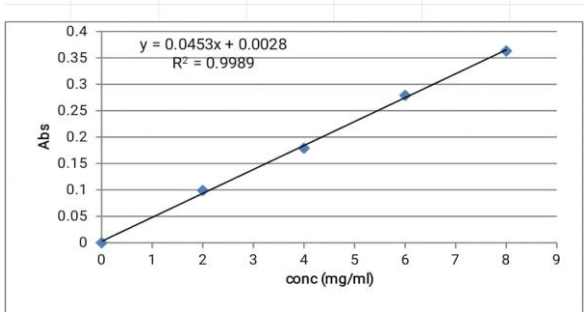
3- Chemical analysis:

The chicken meat product samples were analyzed chemically for moisture, protein, fat and ash. Also, total carbohydrate percentage, gross energy value and percentage of calories from protein, fat and carbohydrate were calculated. The results were averages of duplicate analysis on a wet basis following the methodologies of the Association of Official Analytical Chemists,

AOAC (2016). Moisture percent determinations was determined by drying samples in an oven at 65°C for 24 hrs and then at 105 °C for 6 hrs. until constant weight.

- Determination of crude protein percentage "Biuret method" (Reichardt and Eckert, 1991): Of the wet sample 0.5 gram was used. The sample absorbance was read against the blank at 540 nm on the spectrophotometer (Unico, 2100 UV, USA); and the sample protein concentration was determined from the prepared standard curve as follows: Sample protein concentration =

$$\frac{\textbf{Sample absorbance} - \mathbf{0.0028}}{\mathbf{0.0453}}$$



The protein percentage of the sample was calculated according to the following equation: Protein% =

$$\frac{\textbf{Sample protein concentration} \times \textbf{dilution volume (50 ml)} \times \mathbf{10}}{\textit{sample wight}\ (\mathbf{500}\textit{mg})} \times \mathbf{100}$$

-Crude lipid determination: was determined by Soxhlet extraction unit using Petroleum ether.

-Determination of ash: was done by dry ashing at 550-600°C for 6 hrs in a muffle furnace and the mass was incinerated after the furnace had reached the required temperature (white ash was formed).

-The total carbohydrate determination: was represented by the figure obtained when the sum of moisture, crude protein, fat and ash of the sample was subtracted from 100 on a wet weight basis.

- The gross energy value determination: of chicken meat products was calculated according to the equation given by Merrill and Watt (1973). Gross energy value (kcal/100g) = (Protein% x 4) + (Fat% x 9) + (Carbohydrate%x 4).

- Determination of cholesterol contents: firstly extraction of fat from chicken meat products according to the procedures of Bligh and Dyer (1959), then preparation of the lipid extract for cholesterol determination according to Naeemi *et al.* (1995). Finally determination of cholesterol: According to Pasin *et al.* (1998), enzymatic determination of cholesterol using procedures of diagnostic kits (CHOD-PAP, Ref: 230001, Spectrum, S.A.E.) was applied. The absorbance of specimens and standard were measured against reagent blank within 30 minutes using the spectrophotometer (Unico 2100UV, USA) at wavelength 546 nm. Cholesterol content "mg/100 g" =

$$\frac{A\ sample}{A\ standard} \times 200$$

A sample = absorbance of sample.
A standard = absorbance of standard.
Statistical analysis was performed using Excel and SPSS version 19.

RESULTS

Table 1: Statistical differences between means values of sensory evaluation for chicken meat products

Chicken products	Appearance	Color	Odor	Taste	Tenderness	Juiciness	Overall acceptability
Chicken burger	3±0.57	3±0.57	3.66± 0.33	3±0.57	2.66± 0.66	2.66± 0.66	3±0.57
Chicken luncheon	3.33± 0.33	2.66± 0.33	3.33± 0.66	3.66± 0.33	3.33± 0.66	2.66± 0.33	3.33± 0.66
Crispy Chicken pane	2.66± 0.88	3±0.57	3±0.57	2.66± 0.88	2±0.57	2.33± 0.66	3±0.57
Chicken strips (commercial brands)	3.33± 0.33	3.33± 0.33	3.66± 0.33	3.66± 0.66	3.33± 0.33	3.33± 0.33	3.33± 0.33
P. Value*	0.91	0.74	0.74	0.68	0.34	0.57	0.92

Seven sensory attributes were evaluated (appearance, color odor, taste, tenderness, juiciness, and overall acceptability) using 5-point hedonic scales for each trait where 1 = Very poor, 2 = poor, 3= fair, 4= Good, and 5= excellent.

*No significant differences between samples ($p>0.05$) between any two means, within the same column. Values were expressed as a mean± standard error.

Table 2: Statistical differences between mean values of nutritive value evaluation for examined chicken meat products.

Chicken products (N=25 each)	Moisture (%)	Protein (%)	Fat (%)	Ash (%)	Carbo-hydrate (%)
Chicken burger	59.20 ± 0.69^{b}	10.94 ± 0.20^{bc}	11.90 ± 0.31^{b}	5.08 ± 0.25^{b}	12.86 ± 0.37^{b}
Chicken luncheon	66.8 ± 0.86^{a}	10.42 ± 0.17^{c}	6.96 ± 0.46^{c}	4.03 ± 0.14^{c}	11.76 ± 0.45^{b}
Crispy Chicken pane	57.40 ± 0.82^{b}	11.76 ± 0.25^{ab}	10.48 ± 0.35^{b}	3.64 ± 0.19^{c}	16.71 ± 0.66^{a}
Chicken strips	52.50 ± 0.93^{c}	11.92 ± 0.26^{a}	15.76 ± 0.80^{a}	6.60 ± 0.27^{a}	12.85 ± 0.85^{b}
P.Value	0.000*	0.000*	0.000*	0.000*	0.000*

"a, b & c": There is a significant difference ($P< 0.05$) between any two means, within the same column that has a different superscript letter, values are expressed as mean ± standard errors

Table 3: Acceptability of chicken burger samples according to the Egyptian standards for their nutritive value (n=25).

Nutritive value evaluation	EOS 2005	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Moisture%	Not more than 70%	25	100	0	0
Protein%	Not less than 12%	3	12	22*	88
fat%	Not more than 15%	24	96	1**	4
Ash%	Not more than 2.5%	0	0	25***	100
Carbohydrates%	----------	-------	-------	------	-------

* The % of protein content in unaccepted samples ranged from (8.9 to 11.2 g /kg).

** The % of fat content in the unaccepted sample was 18 g / kg.

*** The % of ash content in unaccepted samples ranged from (3 to 9 g /kg).

Table 4: Acceptability of chicken luncheon samples according to the Egyptian standards for their nutritive value (n=25):

Nutritive value evaluation	EOS 2005	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Moisture%	Not more than 60%	2	8	23*	92
Protein%	Not less than 12%	1	4	24**	96
fat%	Not more than 35%	25	100	0	0
Ash%	Not more than 3.5%	11	44	14***	56
Carbohydrates%	----------	-------	-------	------	-------

* The % of moisture content in unaccepted samples ranged from (61 to 71 g /kg).
** The % of protein content in unaccepted samples ranged from (8.7 to 11.5 g /kg).
*** The % of ash content in unaccepted samples ranged from (3.6 to 5.3 g /kg).

Table 5: Acceptability of crispy chicken pane samples according to the Egyptian standards for their nutritive value (n=25).

Nutritive value evaluation	EOS 2005	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Moisture%	Not more than 60%	23	92	2*	8
Protein%	Not less than 12%	1	4	24**	96
fat%	Not more than 15%	25	100	0	0
Ash%	Not more than 3.5%	9	36	16***	64
Carbohydrates%	Not more than 12%	1	4	24****	96

* The % of moisture content in the unaccepted sample was 65g/100g.
** The % of protein content in unaccepted samples ranged from (8 to 11 g /kg).
*** The % of ash content in unaccepted samples ranged from (4 to 5.5 g /kg).
**** The % of carbohydrate content in unaccepted samples ranged from (12.6 to 20 g /kg).

Table 6: Acceptability of chicken strips samples according to the Egyptian standards for their nutritive value (n=25):

Nutritive value evaluation	EOS 2005	Acceptable samples		Unacceptable samples	
		No.	%	No.	%
Moisture%	Not more than 60%	24	96	1*	4
Protein%	Not less than 15%	0	0	25**	100
fat%	Not more than 13%	9	36	16***	64
Ash%	----------	-----	-----	-----	-----
Carbohydrates%	About 12%	9	36	16****	64

* The % of moisture content in the unaccepted sample was 65.3 g/100g.
** The % of protein content in unaccepted samples ranged from (8 to 14 g /kg).
*** The % of fat content in unaccepted samples ranged from (14 to 25 g /kg).
**** The % of carbohydrate content in unaccepted samples ranged from (12.6 to 18.9 g /kg).

Table 7: Statistical analytical results of gross energy content (Kcal/100 g); percentage of energy from protein, fat or carbohydrate of the examined chicken meat products (n=100).

Chicken meat products	Gross energy (Kcal/100g)	Protein-energy %	fat energy %	Carbohydrate energy %
Chicken burger	207.49±9.95^{a}	21.72±0.50^{b}	53.75±0.74^{ab}	24.63±1.06^{ab}
Chicken luncheon	155.11±8.45^{b}	27.86±2.28^{a}	42.08±1.95^{c}	30.04±0.89^{a}
Crispy chicken pane	217.92±10.88^{a}	22.15±1.84^{ab}	46.28±1.14^{bc}	31.52±1.24^{a}
Chicken strips	233.09±9.56^{a}	20.54±1.18^{b}	61.10±4.32^{a}	20.63±3.18^{b}

"a, b & c": There is a significant difference (P< 0.05) between any two means, within the same column that have different superscript letters, values are expressed as mean ± standard errors

Table 8: Statistical values of cholesterol (mg/100g) content of the examined processed chicken meat products samples (n= 25 each).

Chicken meat products	Minimum	Maximum	Mean ± SE
Chicken burger	80.20	115.35	100.68±4.82^{a}
Chicken luncheon	58.5	96.3	73.80±4.39^{b}
Crispy chicken pane	80.05	124.1	105.86±5.26^{a}
Chicken strips	89.3	139.55	112.64±4.74^{a}

"a, b & c": There is a significant difference (P< 0.05) between any two means, within the same column that has a different superscript letter, values are expressed as mean ± standard errors

DISCUSSION

1- Organoleptic examination:

Data in (Table 1) summarizes the results of sensory evaluation of chicken meat products collected from different meat processing plants. The general acceptability of all examined samples was poor, due to a significant decline in all of the studied sensory characteristics. There are no statistically significant variations between the groups (p>0.05). The results agreed with Sitz *et al.* (2005), who declared that the general approval of chicken meat products is determined by flavor, which is mainly determined by taste and odor components. Unacceptable flavor predominated in the majority of the samples tested, which could be explained by the inclusion of a large quantity of non-meat tissue, such as mechanically deboned meat. This non-meat tissue is susceptible to the quick start of oxidative rancidity, resulting in off-flavors and off-odors that eventually decrease customer satisfaction. (Field, 1988).

2-Chemical analysis of examined samples:

The chemical investigation reveals the nutritive characteristics of the meat products which are essential for customer health and attract attention.

2.1 Moisture Content

Because of the characteristics of water, how it interacts with other components in the product, and its input to the chemical, biological, and physical properties of foods, the moisture level of a chicken product is essential. (Cornejo and Chinachoti, 2003).

Data in Table (2) showed that the mean values of moisture were 59.20±0.69, 66.8±0.86, 57.40±0.82 and 52.50±0.93 for chicken burger, chicken luncheon, crispy chicken pane and chicken strips, respectively. There were significant differences between all examined chicken meat products. These results matched with Lukman *et al.,* (2009) on crispy chicken pane, Paulina *et al.* (2018), Ragab *et al.* (2018), Heikal *et al.* (2019) on chicken burger, Aly and Morsy (2019) on chicken

luncheon, Abd-El-Aziz *et al.* (2021) and were lower than that obtained by Awad *et al.*, 2019) and Shaltout (2022) in chicken strips. The obtained values were compared to Egyptian standards (EOS, 2005) for chicken meat products to determine acceptability. For, chicken burger, chicken luncheon, crispy chicken pane and chicken strips the percentage of accepted samples for moisture were 100, 8, 96, and 96; respectively (Tables 3,4,5 and 6) Fat relationship (inverse connection), the inclusion of water and non-meat components, and degree and type of processing and cooking are all variables that can influence moisture content.

2.2 Protein content:

Data in (Table 2) relieved that the mean values of protein content (%) in the examined products were 10.94±0.20, 10.42±0.17, 11.76±0.25 and 11.92±0.26 receptively; for examined chicken meat products. There are significant differences between examined chicken meat products. These results were lower than that obtained by AL-Dughaym *et al.* (2010), El-Kordy *et al.* (2019), Chandler and Mcsweeny (2022) for chicken burger, Ragab *et al.* (2018), Abdelrahman *et al.* (2020) and Malak *et al.* (2020) for chicken luncheon and Chmie *et al.* (2019), Awad (2019) and Shaltout (2022) for chicken strips and the obtained results weren't matched with that obtained by (E.O.S 2005), AL-Dughaym *et al.* (2009), Abd-El-Aziz *et al.* (2021) for crispy chicken pane. The percentage of the accepted samples for protein % according to the Egyptian standards (EOS, 2005) were 12, 4, 4, and 0 for chicken burgers, chicken luncheon, crispy chicken pane and chicken strips, respectively (Tables 3,4,5 and 6) The low protein content of some meat products may be due to the inclusion of inappropriate meat cuts or the use of meat trimmings in preparation or replacement with non-meat components since meat proteins are comparatively more costly than non-meat components (Lawrie, 1998). Many of the protein sources currently used in the preparation of commercial products are partly supplanted by non-meat protein sources. Non-meat protein sources, such as egg, whey protein, and soy protein, can enhance the flavor and texture of the product by improving the lipid and moisture-binding ability (Kassem and Emara, 2010). Definitely, these components reduce manufacturing costs and improve sensory quality, but they also reduce the protein limit (Turhan *et al.*, 2007).

2.3 Fat content:

The mean values of fat % in the examined chicken meat product samples were 11.90±0.31, 6.96±0.46, 10.48±0.35 and 15.76±0.80 for chicken burger, chicken luncheon, crispy chicken pane and chicken strips respectively; there was a significant difference between all examined chicken meat products (Table 2). These results were relatively matched with that found by Khan *et al.* (2017), Eldemery (2017) for chicken burger and higher than that obtained by Mohammed (2013), Ragab *et al.* (2018), Aly and Morsy (2019) for chicken luncheon and higher than that obtained by AL-Dughaym *et al.* (2010), Agamy and Hegazy (2011), Abo-Zaid and Saleh (2020) for chicken pane and lower than that obtained by Latif and Abdel-Aal (2011), Awad *et al.* (2019) and Shaltout (2022) for chicken strips. By comparing the results with the Egyptian Standards (EOS, 2005) the accepted sampled % were 96, 100, 100 and 36 for chicken burgers, chicken luncheons, crispy chicken pane and chicken strips, respectively; (Tables 3,4,5 and 6) The role of fat is mainly to impact the sensory quality of burgers, especially its flavor (Suman and Sharma, 2003). Fat, as a primary dietary component, is used for its sensory and physiological advantages, which add to the end product's flavor, taste, and aroma/odor (Moghazy, 1999). Based on the current finding, it was obvious that the products under examination contained a low-cost fat replacement that enabled the creation of low-fat products. Increased carbohydrate and water content, which do not alter the traditional full-fat flavour, taste, or texture, can be used to produce low-fat meat products while also lowering the cost

of formulation. The industry's attempts to save costs through adulteration and cost-cutting measures, which cause their goods to deviate from the standard, may be responsible for this tendency towards the creation of low-fat meat products.

2.4. Ash content:

The mean values of ash content (%) were 5.08±0.25, 4.03±0.14, 3.64±0.19, and 6.60±0.27, for chicken burger, chicken luncheon, crispy chicken pane and chicken strips, respectively. There were significant differences between all examined chicken meat products. The current results were matched with those obtained by Ibrahim *et al.* (2016), Heikal *et al.* (2019) for chicken burger, Abdelrahman *et al.* (2020), Malak *et al.* (2020) for chicken luncheon and higher than that obtained by Hafid *et al.* (2018), EL-Anany *et al.* (2020), Abd-El-Aziz *et al.* (2021) for chicken pane and higher than that obtained by Hussain *et al.* 2016) and Shaltout (2022) for chicken strips. The percentages of the accepted samples for ash% according to the Egyptian standards (EOS, 2005) were 0, 44 and 36 (Tables 3, 4 and 5) for chicken burger, chicken luncheon and crispy chicken pane, receptively; Ashes reflect the total elements found in food, such as sodium, phosphorus, and iron, which can be provided by raw flesh, salt, and spices (Fernández-López *et al.,* 2006). The ash level of beef products is determined not only by muscle minerals but also by the curing salt used (Kirk and Sawyer, 1991). Spices for flavoring, high-fiber carbohydrates, starches, cereals, soya-protein, and sodium could all be used to produce a high ash level. Another cause for the increased ash level could be the use of mechanically deboned poultry meat (Babji *et al.,* 2000).

2.5 carbohydrates content:

The obtained results in Table (2) indicated that the mean values of carbohydrate content (%) were 12.86±0.37, 11.76±0.45, 16.71±0.66 and 12.85±0.85 for chicken burger, chicken luncheon, crispy chicken pane, and chicken strips, respectively; There was significant difference between all examined chicken meat products. These results matched those of Heikal *et al.* (2019) and were lower than those obtained by Paulina *et al.* (2018) and Othman *et al.* (2022) for chicken burger. Our results matched with Ragab *et al.* (2018) and were lower than those obtained by Aly and Morsy (2019). For chicken luncheon, These results agreed with those obtained by Abd-El-Aziz *et al.* (2021) and higher than those obtained by El-Anany *et al.* (2020) for crispy chicken pane and were higher than those obtained by Awad *et al.* (2019) and Shaltout (2022) for chicken strips, The Egyptian Standards (EOS, 2005) stated that carbohydrate should not exceed 12% for chicken pane and chicken strips**.** The percentages of the accepted samples for carbohydrates % were 4 and 36 for chicken pane and chicken strips receptively; (Tables 5 and 6) carbohydrates in chicken meat products are primarily derived from the inclusion of starches as components. Starches such as corn, tapioca, rice, potato, and wheat have been used as meat fillers and water adhesives, which could be due to the use of low-cost components such as rusk and bread crumbs (Joly and Anderstein, 2009).

2.6 Total calories (Gross energy):

The intake of meat provides energy and nutrients that are essential to the health and well-being of an individual (Williams, 2007).

Regarding the caloric value of the examined chicken meat products samples, the data presented in Table 7 declared that the mean values (Kcal/100g) were 233.09±9.56, 155.11±8.45, 217.92±10.88 and 207.49±9.95 for chicken burger, chicken luncheon, crispy chicken pane and chicken strips, receptively.

Statistically, the mean values of the examined chicken burger, crispy chicken pane and commercial chicken strips samples were significantly ($P<0.05$) higher than chicken luncheon.

The obtained gross energy value was nearly

similar to that obtained by Musaiger (2008) and lower than that achieved by Heikal *et al.* (2019) for chicken burgers.

2.6.1 Calories percentage from protein

It is evident from the summarized results in Table 7 that the mean values of the percentage of calories from the protein content of the examined samples were 21.72±0.50, 27.86±2.28, 22.15±1.84 and 20.54±1.18, receptively. There were significant differences ($p<0.05$) in the percentage of calories from the protein content.

2.6.2 Calories percentage from fat

The data presented in Table 7 revealed that the mean values of the percentage of calories from the fat were 53.75±0.74, 42.08±1.95, 46.28±1.14 and 61.10±4.32[a] respectively; there were significant ($P<0.05$) differences were found between the examined chicken meat products samples.

2.6.3 Calories percentage from carbohydrate

Table 7 summarizes the data of the percentage of calories from the carbohydrate content of the examined chicken burger, chicken luncheon, Crispy chicken pane and chicken strips meat samples the mean values were 24.63±1.06, 30.04±0.89, 31.52±1.24 and 20.63±3.18 respectively.

The statistical analysis of the examined samples revealed significant ($P<0.05$) differences between examined chicken meat products where the highest value was in crispy chicken pane and the lowest value was in chicken strips.

2.7 Cholesterol content

Cholesterol is necessary for healthy body function, but too much can cause serious health problems. Eating chicken as part of a balanced diet can help control cholesterol levels, but it depends on the part of the chicken a person consumes and how they prepare it (Tinsley 2022).

Meat is a source of saturated fatty acids and cholesterol in the human diet and its consumption could be related to cardiovascular disease, hypertension, obesity and diabetes (Valsta *et al.,* 2005).

From the reported results in Table (8) it is evident that the cholesterol content of examined processed chicken meat products varied from 80.20 mg to 115.35 in chicken burgers, 58.5 mg to 96.3 mg in chicken luncheon, 80.05 mg to 124.1 mg in the crispy chicken pane and from 89.3 mg to 139.55 mg in chicken strips with mean values of 100.68±4.82 in chicken burger, 73.80±4.39 in chicken luncheon, 105.86±5.26 in the crispy chicken pane and 112.64±4.74 in chicken strips.

Significant ($P<0.05$) differences were recorded between the examined processed chicken meat samples. The value for chicken strips was the highest followed by crispy chicken pane and chicken burger while the chicken luncheon was the lowest in cholesterol content (Table 8).

The obtained result for the cholesterol content of processed chicken meat products was nearly similar to that obtained by Prusa and Lonergan (1986), Dinh *et al.* (2011), El-Anany *et al.* (2020) and higher than that obtained by USDA (2019).

CONCLUSION AND RECOMMENDATIONS

The present study demonstrated a considerable variation in the quality characteristics of the meat products under investigation. The majority of them were higher in carbohydrate and moisture content compared to Egyptian Standards, but lower in fat, protein, and meat content. Our research clearly demonstrates that the food business does not comply with the legal criteria for meat quality standards.

From previous results, and to produce highly nutritional, healthy, safe and suitable meat products for consumers.

Meat product's contents and nutritive value should be periodically checked in factories'

lines of production during storage and marketing, and the law should be strictly enforced for adulterated products. High-quality raw materials should be used for meat product manufacturing. The amount of non-meat ingredients added should be controlled. The amount of added fat in the meat product formula should be closely observed to avoid high reduction during cooking. The amount of chemical additives should be correctly calculated and strictly controlled. The true contents of meat products should be fairly and obviously declared on the label, including the cholesterol content.

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تقييم الجودة والاهمية الصحية لمصنعات لحوم الدواجن في محافظة اسيوط

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أجريت هذه الدراسة الحالية بهدف التقييم الحسي وتحديد القيمة الغذائية والأهمية الصحية للدجاج المقرمش وشرائح الدجاج. إجمالي ١٠٠ عينة شملت ٢٥ من كل من برجر دجاج، لانشون دجاج، بانيه دجاج مقرمش، شرائح دجاج تم جمعها عشوائيًا من السوبر ماركت المختلفة بأسماء تجارية مختلفة في مدينة أسيوط ، مصر.

حيث وجد ان المنتجات تحتوي علي نسب متفاوتة من البروتين حيث كانت أعلي قيمة للبروتين في شرائح صدور الدجاج بنسبة ٢١,٦٠ % وأقل قيمة للبروتين في لانشون الدجاج بنسبة ١٠,٤٢ %. وكانت اعلي نسبة للرطوبة في لانشون الدجاج بنسبة ٦٦,٨% واقل نسبة في شرائح الدجاج بنسبة ٥٢,٥٠ %. وتراوحت قيمة الدهون بين ١٥,٧٦ في شرائح الدجاج و١١,٩٠ فى برجر الدجاج و٦,٩٦ فى لانشون الدجاج و١٠,٤٨ فى بانيه الدجاج بينما تراوحت قيمة الرماد بين ٦,٦٠ و ٣,٦٤ في العينات التي تم فحصها وتراوحت القيمة لمحتوي الكوليسترول بين أعلي قيمة هي ١٠٠,٦ ملجم في برجر الدجاج و أقل قيمة هي ٧٣,٨٠ ملجم في لانشون الدجاج وتم الكشف عن المحتوي الكلي الطاقة لجميع عينات مصنعات لحوم الداوجن وقد خلصت الدراسة بعد العمل علي أسماء تجارية مختلفة ان معظم العينات غير مطابقة للمواصفات القياسية المصرية ويجب عدم الإفراط في تناولها لتجنب المشاكل الصحية المصاحبة لمحتواه العالي من الكولستيرول .