



CHEMICAL INDICES OF SOME CHICKEN MEAT PRODUCTS

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ABSTRACT

A total of 60 random samples of processed chicken meat products were collected from different supermarkets located in Kalyobia governorate. The examined samples of half-cooked Chicken Fingers, Chicken Pane, Cordon Bleu, and Chicken Fillet (15 of each product) were collected to evaluate their chemical indices. The result showed that the average values of PH, TVN% and TBA% in half cooked samples were 5.92 ± 0.01 , 8.17 ± 0.31 and 0.07 ± 0.01 for chicken fingers, 5.86 ± 0.01 , 7.06 ± 0.26 and 0.05 ± 0.01 for chicken pane, 5.95 ± 0.01 , 7.89 ± 0.28 and 0.03 ± 0.01 for chicken fillets, and 5.73 ± 0.01 , 5.93 ± 0.19 and 0.10 ± 0.01 for cordon blue samples, respectively. Thus, all samples were within the accepted limit. The present study achieved that the keeping quality of chicken meat product is good.

Keywords: Chemical indices, Chicken meat products, pH, TBA, TVN.

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1. INTRODUCTION

Poultry and poultry products are good sources of animal protein of high biological value, besides that they contain higher proportion of unsaturated fatty acids and less cholesterol especially when skin is removed [17]. pH value is an indicator of the keeping quality of meat. The pH measurement of meat is used to assess the shelf life and quality of the carcass [15]. Lipid and protein oxidation is a major phenomenon reducing meat quality during cooking and storage and leading to off-flavor formation and rancidity. The use of vegetable extracts to increase shelf life is a promising new frontier in the prevention of oxidation [6]. TVN value was increased to critical values indicating incipient spoilage of those chicken meat products after different periods of frozen storage reaching 30.76 ± 1.07 at 4 months of storage [8]. TBA value was related to the oxidation in meat products also, some

microorganisms can degrade the fat by either lipase hydrolysis enzyme or oxidation by oxidize enzyme which can yield rancidity [12]. The aim of the current study to evaluate chemical profile of chicken meat product.

2. Material and Methods

2.1. Samples

A total of 60 random samples of processed chicken meat products represented by precooked Chicken Fingers, Chicken Pane, Cordon Bleu and Chicken Fillet (15 of each product) were collected from different supermarkets in Kalyobia governorate to evaluate their chemical indices. Each sample was weighed 300g and transferred in an insulated icebox to the laboratory. All collected samples were subjected to the following examinations:

2.2. Determination of pH value [2]

Ten grams of samples homogenized with 25 ml of neutral distilled water, left to stand 10

min., filtered, PH were determined by using pH meter (Digital, Jenco 609).

2.3. Determination of total volatile nitrogen (TVN):

The technique recommended by FAO [5] as follow:

a. Preparation of meat extract

25 g minced sample placed in 250ml beaker , 75ml of distilled water were added, The PH adjusted at 5.2 by addition 2ml HCL (drop wise). The mixture slowly heated to 70°C, left to cool at room temperature, then filtered in Erlenmeyer flask.

b. Procedures:

Two ml of 0.01 HCL putted in the inner ring of Conway's dish, Two ml of extract putted in outer ring of dish, One ml of saturated KCO₃ added in outer ring, dish immediately covered with airtight glass, incubated at 36°C for 2hrs. HCL in central compartment titrated with 0.01 ml NaOH using 2-3 drops of methyl red indicator (t₁).

c. Calculation:

TVN-N mg/100 g = 26088(2-t₁).

Where: (t₁) volume of NaOH exhausted in titration.

2.4. Determination of Thiobarbituric acid number (TBA):

Technique recommended by Kirk and Sawyers [10], TBA number expressed as mg of malonaldehyde equivalents / kg of samples.

a. Procedure:

Ten grams samples blended with 48ml of distilled water; added 2ml of 4 ammonium chloride in warring blender 2 minutes, left at room temperature 10 minutes, Mixture put in Kjeldahl flasks by washing with additional 50ml distilled water, followed by an antifoaming preparation and few glass beads. Kjeldahl distillation apparatus assembled , the flask heated by electric mantle, 50 ml distillate collected in 10 minutes from time of boiling commences, distillate mixed, then 5ml pipette in glass-Stoppard tube, Five ml of

TBA reagent (0.2883 g/100 ml of 90% glacial acetic acid) added, tube stopper, shacked, immersed in boiling water bath 35 minutes. Blank similarly prepared using 5 ml distilled water , 5 ml TBA reagent, treated like the sample, After heating, tube cooled under tape water for 10 minutes. A portion transferred to curette, optical density (D) of sample read against the blank by spectrophotometer at wave length 538nm.

b. Calculation: TBA value (Mg malonaldehyde /kg of sample) = $D \times \frac{7.8}{D}$

D: the read of sample against blank.

2.5. Statistical Analysis:

Results statistically evaluated according to Feldman et al. [4].

3. RESULTS AND DISCUSSION

Hydrogen ion concentration (pH value):

From the results recorded in table (1), it is obvious that the mean value of pH in the examined half cooked Chicken Fingers , Chicken Pane , Chicken Fillets and Cordon Bleu were 5.92±0.01, 5.86±0.01, 5.95±0.01 and 5.73±0.01, respectively. Nearly similar results were obtained by Shedeed [17] 5.7 and 6.1, Afifi-Jehan [1] 5.9 to 6.4 and Fathy-Eman [3] 5.6 to 6.2 While, higher results were obtained by Hassan-Fatin and Hassan [8] 6.57±0.03 and 6.67±0.02. 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.

Chicken meat products were marginally spoiled at pH value of 6.6 after which they are markedly spoiled [14]. Thus, all examined samples were within the accepted limit.

The decrease of pH value in meat may be attributed to the breakdown of glycogen with formation of lactic acid and the increase pH may be due to the partial proteolysis leading to the increase of free alkaline groups

Table 1. pH values in the examined samples of chicken meat products (n=15).

Products	Min	Max	Mean \pm S.E
Chicken fingers	5.7	6.1	5.92 \pm 0.01
Chicken pane	5.7	6.0	5.86 \pm 0.01
Chicken fillets	5.8	6.1	5.95 \pm 0.01
Cordon bleu	5.6	5.9	5.73 \pm 0.01

Table 2. TVN values (mg %) in the examined samples of chicken meat products (n=15).

Products	Min	Max	Mean \pm S.E
Chicken fingers	4.83	11.46	8.17 \pm 0.31
Chicken pane	3.94	10.29	7.06 \pm 0.26
Chicken fillets	4.42	11.19	7.89 \pm 0.28
Cordon bleu	3.18	8.72	5.93 \pm 0.19

Table 3. TBA values (mg %) in the examined samples of chicken meat products (n=15).

Products	Min	Max	Mean \pm S.E
Chicken fingers	0.03	0.10	0.07 \pm 0.01
Chicken pane	0.02	0.08	0.05 \pm 0.01
Chicken fillets	0.01	0.06	0.03 \pm 0.01
Cordon bleu	0.06	0.14	0.10 \pm 0.01

depending on the condition of such changes [9].

Total volatile nitrogen (TVN mg %):
The Total Volatile Nitrogen (TVN) value was increased to critical values indicating incipient spoilage of those chicken meat products after different periods of frozen storage [8]. Results achieved in table (2) declared that the mean values of TVN mg % in the examined samples of half cooked were 8.17 \pm 0.31 mg % for chicken fingers, 7.06 \pm 0.26 mg % for chicken pane, 7.89 \pm 0.28 mg% for chicken fillets and 5.93 \pm 0.19 mg % for cordon bleu. Nearly results were obtained by Fathy-Eman [3] 6.57 \pm 0.19 mg %. Higher

results were obtained by Afifi-Jehan [1] 12.57 \pm 0.222 mg %, Hassanin-Fatin and Hassan [8] 30.76 \pm 1.07 mg % and Fathy-Eman [8] 11.29 \pm 0.32 mg %. It is important to emphasize that the meat and chicken meat products at the beginning of deterioration contain 30 mg TVN per 100 grams [13]. Thus, all samples were within the accepted limit.

Ammonia is one of the most spoilage end product in spoiled meat and meat products which is directly responsible for spoilage odors and flavors, it is considered as indicator for amino acid degradation by bacteria and it

can be measured as total volatile basic nitrogen [7].

Thiobarbituric acid number (TBA mg %): The data recorded in table (3) indicated that the mean values of TBA in the examined half cooked Chicken Fingers, Chicken Pane, Chicken Fillets and Cordon Bleu were 0.07 ± 0.01 mg %, 0.05 ± 0.01 mg %, 0.03 ± 0.01 mg % and 0.10 ± 0.01 mg %, respectively. Nearly similar result obtained by Afifi-Jehan [1] 0.051% to 0.223 % and Fathy-Eman [3] 0.02 to 0.19 mg %. While, higher results were obtained by Shedeed [17] 1.69 to 0.28%, Hassan-Fatin and Hassan [8] 0.352 ± 0.015 and Koreleski and Dwiatkiewicz [11] 0.454 mg/kg. Accurately, TBA value tends to decrease during frozen storage [12]. Oxidative rancidity was occurred at TBA more than 0.9 mg % according to [13]. Thus, all samples were within the accepted limit. TBA value is closely related with the sensory characteristics of food article as rancidity [16]. The present study achieved that the keeping quality of chicken meat product is good.

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الدلائل الكيميائية لبعض منتجات لحوم الدواجن

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أجريت الدراسة لتقييم منتجات الدواجن من ناحية الجودة ولتحديد مدى صلاحية وفساد هذه المنتجات لذا قامت الدراسة على فحص عدد (60) عينة في كلا من التشكن فنجرز، البانية، الفيلية والكوردون بلو النصف مطهية بواقع (15) عينة من كل صنف والتي تم جمعها من محلات الاغذية المختلفة بمحافظة القليوبية وذلك لدراسة الدلائل الكيميائية للمنتجات، وقد أسفرت هذه الدراسة على النتائج التالية. كان متوسط تركيز ايون الهيدروجين، النيتروجين القلوي المتصاعد (مج/100جم) و حمض الثيو بارينثورك مجم/ كجم في منتجات الدواجن النصف مطهية هي 0.1 ± 5.92 ، 0.31 ± 8.17 و 0.01 ± 0.07 في التشكن فنجرز على التوالي، 0.01 ± 5.86 ، 0.26 ± 7.06 ، و 0.01 ± 0.05 في بانية الدجاج على التوالي، 0.01 ± 5.95 ، 0.28 ± 7.89 ، و 0.01 ± 0.03 في فلية الدجاج على التوالي، 0.01 ± 5.73 ، 0.19 ± 5.93 ، و 0.01 ± 0.10 في الكوردون بلو على التوالي، وقد أسفرت الدراسة عن أن الدلائل الكيميائية لهذه المنتجات الغذائية لا تتعدى القيم المسموح بها والتي تدل على عدم فساد هذه المنتجات.

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