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Evaluation of Fatty and Amino Acids Profile, Sensory and Microbial Loud of Chicken Luncheon Prepared with Lentil Powder, Turnip Plant and Cauliflower

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ABSTRACT

The aim of this study was to use some plants such as lentils (*Lens culinaris*), turnip plant (*Brassica rapa*) and cauliflower (*Brassica oleracea*) in processing of chicken luncheon to low cost of production and promote nutritional value. Treatments of chicken luncheon samples included: a) control luncheon (CL) Basal formula without any additional ingredients, b) Basal formula + lentils powder (T1), c) Basal formula + fresh turnip plant roots (T2), d) Basal formula + fresh cauliflower (T3) and f) (T4) Basal formula + lentils powder + fresh turnip plant roots + fresh cauliflower. Some parameter of chicken luncheon produced from different treatments included saturated and unsaturated fatty acids, amino acids, sensory attributes and microbial loud were evaluated. The total saturated fatty acids for oils extracted from CL, T1 and T2 treatments were 41.15, 40.15 and 40.18%, while the total unsaturated fatty acids amounted to 58.75, 59.83 and 59.80 %, respectively and the palmitic acid presented the predominant saturated fatty acids, while oleic acid was the highest unsaturated fatty acids. Leucine is the major essential amino acid in chicken luncheon treatments. It was 4.41 % for T2 sample and 4.49 % for T1 sample. Glutamic acid showed higher ratio of non-essential amino acid ranged between 8.97% (T2) and 9.75% (control sample). The results showed that additive lentils, turnip plant and cauliflower to chicken luncheon samples during its preparation decreased and retarded the growth of total molds & yeasts, total bacterial, psychrophilic bacteria and spore-forming bacteria of chicken luncheon samples during cold storage at 4 ± 1°C, hence T1 and T2 increase the shelf life of chicken luncheon samples to four months compared other samples (Three months).The applied additive from lentils and turnip plant also improved the appearance, color, texture, taste and odor of the chicken luncheon samples. It was concluded that the activity of lentils and turnip plant as natural antimicrobial assay to control microbial load of chicken luncheon samples, should be used as a food additive to improve the safety of chicken products.

Keywords: Chicken luncheon, Chemical composition, Fatty acids, amino acids, microbial loud; Lentils, Turnip plant Cauliflower.

INTRODUCTION

Poultry meat has organoleptic, desirable nutritive properties, it is economic, quick, easy to prepare and low in fat compared to other meats, chicken have a significant decrease in total cholesterol (Gross *et al.*, 2002 and Mohamed, 2014). The main ingredients of luncheon formula including beef from flank and topside, starch or soya protein flour, salt, ice water, ascorbat and chicken, final product of luncheon characteristics are affected by raw materials formulation. The chemical composition of luncheon ranged from 61.0% to 63.5% for moisture, 13.8% to 19.5% for protein, 19.6% to 15.8% for fat and 3.7 % to 4.0 % for ash (Abdullah, 2007and Mohammed, 2013). Luncheon meat is a popular food item in many countries and used as fast food (Al-Bachir and Mehio, 2001).Quality of luncheon products influenced by the fat content of meat, temperature, and time of processing. Weatherill, (2009) reported that *Listeria monocytogenes* contaminated luncheon meat from a biofilm found during a slicer. So, sodium diacetate and sodium acetate used as antimicrobials for processed meat to microbial control on surfaces. Plant activities influence on their contamination (Lundén, *et al.*, 2003). *Listeria monocytogenes* responsible for 83% of foodborne illness in ready-to-eat foods involved luncheon (Islam *et al*., 2002 and Crandall *et al.*, 2015). Luncheon meat has demonstrated that luncheon meats sliced subjected to a significantly higher *L. monocytogenes* contamination (Gombas, *et al.*, 2003 and USDA, 2009). Many fruits and plants contain various amounts of phenolic compounds, including gallic and ellagic acids, which are represent antiviral activity and antimicrobial in vivo as well as in vitro (Leusink *et al*., 2010; Rozoy, *et al.*, 2013 and Saucier, 2016). The major amino acids of lentil were glutamic acid followed by aspartic acid, leucine acid, arginine acid and lysine acid (Bamdad, *et al*., 2006; Hefnawy, 2011; Jarpa-Parra *et al.*, 2014 and Sun, *et al.*, 2018), reported that interact of functional side chain groups with some starch hydroxyl groups, hence can utilize as a crosslinking agent. Amino acids of lentil can interact with carbonyl group of N-substituted glycosylamine and starch glucoses producing water (Su, *et al.*, 2012). Starch materials of lentil proteins used as antimicrobials and antioxidants to prolong the shelf life of some foods (López de Lacey, *et al.*, 2014; Medina-Jaramillo, *et al.*, 2017 and Ochoa-Yepes, 2019). The unsaturated essential fatty acids of lentils ranged from 77.5 % to 81.7%, total tocopherols was 37 - 64 l g/g on DW and carotenoid ranged from 64 % to 78% and the2,2-diphenyl-1- picrylhydrazyl (DPPH) activity of carotenoids and tocopherols were 0.4893 and 0.3259 g/g, respectively which contributed as a strong antioxidant activity Zhang, *et al.*, (2014). Peptides of lentils seeds have antimicrobial potential agenist *Lens culinaris* and antifungal activity against *Botrytis cinerea* and *Neurospora crassa* (Shenkarev *et al.*, 2014 ; Pina-Pérez and Ferrús Pérez, 2018). Turnip contain a high amount of glucosinolates especially gluconasturtiin which cause protection against pathogens, antimicrobial and anticancer activities in humans (Fahey *et al.*, 2001; Zhang *et al.*, 2008; Aires *et al.*, 2009 and Thiruvengadam *et al.*, 2016). Phenolics, flavonoids and carotenoids compounds represented as antioxidant, antimicrobial compounds and anticancer activity (Sams *et al*., 2011). Cauliflower assessed antimicrobial potential against *Listeria monocytogenes*. It has as sources of antioxidant and fibers. These bioactive properties is an important for the nutritious quality, healthy, so extensively reported currently (Stojceska, *et al.*, 2008; Volden, *et al.*, 2009 and Sanz-Puig *et al.*, 2015). The aims of this study use some plants (lentils, turnip plant and cauliflower) with their bioactive compounds to improve chicken luncheon quality and shelf life. This study aims to assess the quality of chicken luncheon which prepared with lentils, turnip plant and cauliflower additives by parameters used in quality control included chemical composition, fatty acids and amino acids profiles sensory and microbiological evaluation during cold storage at (4 ± 1°C).

MATERIALS AND METHODS

Materials

1. **Chemicals** : were purchased from Sigma-Aldrich Company. All ingredients of chicken luncheon were obtained from local markets in Cairo, Egypt.

2. Preparation of chicken luncheon

Fresh chicken luncheon was prepared according to formula described by Al-Bachir and Mehio (2001) prepared as follows ingredients in Table (1) with adding lentils (Seed powder), fresh turnip plant (roots) and fresh cauliflower (w/w) then chicken luncheon samples were packaged stored in cold refrigerator at 4 ± 1°C. Sensory, chemical and microbial evaluations of chicken luncheon samples under investigation were determined every one month during storage (Four months) at refrigerator temperature (4 ± 1°C). The treatments of chicken luncheon and their abbreviations showed in Table (2).

Table 1. Basal ingredients of chicken luncheon formula

Ingredients	Gram
Chicken meat	780
Eggs	70
Flour	40
Salt	20
Dried milk	30
Spices	10
Soybean powder	40
Ground garlic	10
Total	1000

Table 2. Ingredients and abbreviations of chicken luncheon treatments

Treatment	Ingredients	Abbreviation
1	Basal formula (1000 gm) Table(1)	Control luncheon (CL)
2	Basal formula(1000 gm) + 200gm of lentils seeds powder	Lentils luncheon (T1)
3	Basal formula(1000 gm) + 200 gm of fresh turnip plant roots	Turnip plant luncheon (T2)
4	Basal formula(1000 gm) + 200gm of fresh cauliflower	Cauliflower luncheon (T3)
5	Basal formula(1000 gm) +66.5 gm of lentils seeds powder +66.5 gm fresh turnip plant roots +66.5 gm of fresh cauliflower	Collected luncheon (T4)

Methods

1. Gross Chemical composition

Chemical composition of chicken luncheon and all treatments (Moisture, lipids, protein, crude fibers and ash) examined according to AOAC, (2016), and total carbohydrates were calculated according to the method published by Egan *et al*., (1981) as the following:

Percent of total carbohydrates = 100 – (percent of (moisture + crude protein + total lipids + ash+ crude fibers).

2 Fatty acids profile

Fatty acids profile was determined using gas chromatography technique (GC) according to the methods described by AOAC, (2016).

3. Amino acids profile

Amino acid profile was determined using amino acid Analyzer technique as reported by AOAC (2016).

4. Sensory evaluation

Sensory evaluation (appearance, color, texture, taste and odor,) of chicken luncheon samples were examined every one month during storage at 4 ± 1°C for five months according to Mohamed *et al*., (2014).

5. Microbial determination

Total bacterial count was counted according to methods described by APHA, (1992). Psychrophilic and spore-forming bacteria counts determined according to FDA, (2002). Total molds and yeasts were counted according to Oxoid (1998).

6. Statistical analysis

Data were subjected to statistical analysis using the general linear models procedure of the statistical Analysis System (SAS, 1998)

RESULTS AND DISCUSSION

Gross chemical composition of different chicken luncheon samples

Table 3 shows gross chemical composition of different chicken luncheon treatments on dry weight basis. The highest content of moisture content found in (T2) treatment (66. 5%), while the lowest one was in control sample (63.5 %). The moisture content of other treatments ranged between 65.1 % (T1) and 65.6 % (T4) and 66.1 % (T3). Total lipids of the T2 treatment was the lowest (2.8 %), while CL treatment had the highest (4.4 %). Ash content ranged between 8.2% and 9.3%, this is due to ingredients of chicken luncheon. Protein content of T2 treatment was higher (51.9%) while T4 treatment was the lowest ratio of protein (43.01%). Fiber content of T1 treatment was the first 1.74 % than the other treatments which ranged between 0.95 % and 1.38 %. Total carbohydrates of T4 treatment were the highest (43.01%). Meanwhile, the lowest observed in control sample (33.6) and T2, T3 and T1 treatments showed moderate content of carbohydrates 35.42%, 34.25%, and 38.56 %, respectively).These results are in consistent with the published data reported by Jelen *et al.,* (1982), Mohammed, (2013) and Hayes *et al.,* (2013) they reported that the chemical composition of luncheon ranged from 61.0% to 63.5% for moisture, 13.8% to 19.5% for protein, 19.6% to 15.8% for fat and 3.7 % to 4.0 % for ash.

Table 3. Chemical constituent of different chicken luncheon samples

Chemical composition(%)	Treatments				
	CL[a]	T1[b]	T2[c]	T3[d]	T4[f]
Moisture	63.5	65.1	66.5	66.1	65.6
Total lipids*	4.4	3.4	2.8	4.3	4.1
Ash*	9.3	8.2	8.5	8.9	8.6
Crud protein*	51.46	48.1	51.9	51.6	43.01
Fiber*	1.24	1.74	1.38	0.95	1.28
Total carbohydrates*	33.6	38.56	35.42	34.25	43.01

***% on dry weight basis**

CL[a]: Basal formula without any additional ingredients (Control luncheon)

T1[b]: Basal formula + lentils seeds powder

T2[c]: Basal formula+ fresh turnip plant roots

T3[d]: Basal formula+ fresh cauliflower

T4[f]: Basal formula + (Lentils seeds powder + fresh turnip plant roots + fresh cauliflower)

Sensory evaluation of different chicken luncheon samples

Evaluation of appearance, color, texture, taste and odor resulted in T2 treatment scoring highly, followed by T1 treatment during period's storage (4±1ºC) which rejected after four months, while control sample, T3 and T4 treatments received significantly (P>0.05) lower score for evaluated parameters and rejected after three months. Hence, chicken luncheon samples prepared with turnip plant and lentils were scored the best treatment, compared to the other samples (Table 4). This may be due to the effects of flavonoids and phenolic compounds as natural antioxidants. Moreover starch materials of lentil proteins used as antimicrobials and antioxidants to prolong the shelf life of same food (López de Lacey, *et al.,* 2014; Medina-Jaramillo, *et al*., 2017 and Ochoa-Yepes, 2019) Also, turnip contain a high amount of glucosinolates especially gluconasturtiin which cause protection against pathogens, antimicrobial, anticancer activities in humans and improve meat quality and shelf life (Fahey *et al.,* 2001; Zhang *et al.,* 2008; Aires *et al.,* 2009 and Thiruvengadam *et al.,* 2016), Hence improve the sensory attributes via inactivation microbial load and discoloration of surface (Sams *et al.,* 2011; Su *et al.,* 2012 and Sanz-Puig *et al.,* 2015).

Table 4. Changes in the sensory evaluation of different chicken luncheon samples during cold storage (4±1ºC)

Sensory attributes	Storage (months)	Treatments				
		CL[a]	T1[b]	T2[c]	T3[d]	T4[f]
Appearance	1	8.5±2.2	8.9±2.1	9±1.8	7.3±1.2	7.1±0.90
	2	8.3±2.1	8.4±0.50	8.4±1.6	6.9±1.2	6.8±0.98
	3	7.1±1.9	7.2±1.7	7.3±1.4	5.8±0.88	5.7±1.2
	4	®	5.5±1.1	5.3±0.9	®	®
	5		®	®		
Color	1	8.4 ±2.2	8.2±1.9	8.7±1.8	7.6±1.4	7±0.93
	2	7.3±2.1	7.4±1.7	8.1±1.5	7.1±1.03	6.4±0.61
	3	7.1±1.9	6.5±1.6	7.1±1.5	6.1±0.99	5.5±0.78
	4	®	5.6±0.98	5.3±1.2	®	®
	5		®	®		
Texture	1	8.2±2.3	8.4±1.9	8.5±1.7	7.3 ±1.1	7.1±0.90
	2	7.5±1.9	7±1.7	7.7±1.4	6.4±0.83	6.4±0.86
	3	6.4±1.6	6.1±1.3	6.4±1.2	5.6±0.78	5.3±0.86
	4	®	5.1±1.2	5.8±0.98	®	®
	5		®	®		
Taste	1	8.1±2.3	8.3±1.8	8.5±1.7	7.7±1.2	7.1±0.90
	2	7.5±1.9	7.5±1.7	7.9±1.4	6.7±1.3	6.5±0.88
	3	6.5±1.7	6.6±1.4	6.8 ±1.3	6.1±1.1	5.4±0.88
	4	®	5.00±1.1	5.8±1.2	®	®
	5		®	®		
Oder	1	8.1±2.3	8.1±1.9	8.2±3.1	7.3±1.1	7.1±1.2
	2	7.3±1.9	7.4±1.6	7.5±1.4	6.7±0.89	6.5±0.88
	3	6.3±1.8	6.4±1.4	6.7±1.4	5.6±0.89	5±0.85
	4	®	5.9±1.1	5.3±1.5	®	®
	5		®	®		

®: At these points samples were rejected. Means ± SD with the same latter in the same row are not significantly different (P≤0.05)
CL[a]: Basal formula without any additional ingredients (Control luncheon) **T1[b]: Basal formula + lentils seeds powder**
T2[c]: Basal formula+ fresh turnip plant roots **T3[d]: Basal formula+ fresh cauliflower**
T4[f]: Basal formula + (Lentils seeds powder + fresh turnip plant roots + fresh cauliflower)

Fatty acids composition of different chicken luncheon samples

From data presented in Table (5) it can be noticeable that gas chromatographic analysis for oils extracted from different chicken luncheon samples. The total saturated fatty acids for oils extracted from different chicken luncheon samples recorded 41.15, 40.15and 40.18%, while the total unsaturated fatty acids amounted to 58.75, 59.83 and 59.80 % for oils extracted from CL, T1 and T2 treatments, respectively. The palmitic and stearic acids were predominant saturated fatty acids, while oleic acid came the first unsaturated fatty acids. These results confirmed by Romans *et al*. (1994) and Mohamed *et al.,* (2014) reported that meat lipids contain less than 50 saturated fatty acids and up to 70 chicken unsaturated fatty acids. Chicken luncheon treatments (T1 and T2) contained higher level of unsaturated fatty acids. This is due to the addition of lentils and turnip plant that contains higher level of unsaturated fatty acids. These results are agreement with those mentioned by Ansorena and Astiasarán (2013) who reported vegetable oils rich in linoleic acid.

Amino acids composition of different chicken luncheon samples

From data presented in Table (6), it can be seen that the essential and non-essential amino acids of chicken luncheon treatments. Leucine is the major essential amino acid and it ranged between 4.41 % (T2 sample) and 4.49 % (T1 treatment), followed by lysine which ranged between 3.70 % (control sample) and 3.84 % (T1 treatment).

Valine came in the third order with value ranged between 2.89% (T2) and 3.17% (control sample). Glutamic acid was the highest it recorded 8.97% for T2 treatment and 9.75% for control sample. Aspartic acid was the second order of non-essential amino acids with the percentage ranged between 4.65% for T2 treatment and 5.05% for control sample followed by arginine and alanine.

Table 5. Fatty acids composition of different chicken luncheon samples

Fatty acid (%)		Treatments CL[a]	T1[b]	T2[c]
Capric acid	(C10:0)	0.52	0.59	0.61
Lauric acid	(C12:0)	1.06	1.19	1.26
Myristic acid	(C14:0)	3.15	3.35	3.31
Tetradecenoic acid	(C14:0 ω5)	0.38	0.41	0.45
Pentadecanoic acid	(C15:0)	0.54	0.53	0.54
Palmitic acid	(C16:0)	24.88	25.07	25.08
Palmitioleic acid	(C16:1 ω7)	2.93	3.02	3.00
Heptadecanoic acid	(C17:0)	0.94	0.83	0.82
Decatrienoic acid	(C16:0 ω4)	0.18	0.17	0.18
Stearic acid	(C18:0)	9.39	7.90	7.82
Oleic acid	(C18:1 ω9)	35.99	36.53	36.39
Linoleic acid	(C18:2 ω6)	17.65	18.04	18.01
Decadienoic acid	(C18:2 ω4)	0.13	0.24	0.20
Gamma linolenic acid	(C18:3 ω6)	0.19	0.20	0.17
Linolenic acid	(C18:3 ω3)	0.76	0.85	0.79
Octadecatetraenoic acid	(C18:4 ω3)	0.27	0.27	0.26
Arachidic acid	(C20:0)	0.11	0.11	0.11
Eicosaenoic acid	(C20:1 ω11)	0.11	0.00	0.12
Gadoleic acid	(C20:1 ω9)	0.20	0.20	0.21
9-Eicosaenoic acid	(C20:1 ω7)	0.11	0.00	0.12
Arachidonic acid	(C20:4 ω6)	0.41	0.48	0.53
Non identified fatty acids		0.10	0.02	0.02
Total saturated fatty acids		41.15	40.15	40.18
Total unsaturated fatty acids		58.75	59.83	59.80
Total fatty acids		99.90	99.98	99.98

CL[a]: Basal formula without any additional ingredients (Control luncheon)
T1[b]: Basal formula + lentils seeds powder
T2[c]: Basal formula+ fresh turnip plant roots

Table 6. Amino acids composition of different chicken luncheon samples

Amino acids (%)		Treatments CL[a]	T1[b]	T2[c]
Therionine	(Thr)	2.45	2.43	2.41
Valine	(Val)	3.17	2.92	2.89
Methionine	(Met)	1.22	1.29	1.30
Isoleucine	(Ile)	2.80	2.77	2.73
Leucine	(Leu)	4.47	4.49	4.41
Tyrosine	(Tyr)	1.36	1.22	0.92
Phenyalanine	(Phe)	2.25	2.21	2.25
Lysine	(Lys)	3.70	3.84	3.74
Histidine	(His)	1.81	1.77	1.75
Aspartic	(Asp)	5.05	4.81	4.65
Serine	(Ser)	2.22	2.26	2.15
Glutamic	(Glu)	9.75	9.18	8.97
Prolin	(Pro)	2.42	2.09	2.18
Glycine	(Gly)	2.79	2.73	2.52
Alanine	(Ala)	3.94	3.94	3.82
Cystine	(Cys)	0.74	0.59	0.72
Arginine	(Arg)	3.48	3.29	3.24

CL[a]: Basal formula without any additional ingredients (Control luncheon)
T1[b]: Basal formula + lentils seeds powder
T2[c]: Basal formula+ fresh turnip plant roots

Microbial examination of different chicken luncheon samples during cold storage (4±1ºC)

Results in Table (7) indicated that total bacterial count, psychrophilic bacteria, spore forming bacteria, total molds and yeasts of different chicken luncheon samples during cold storage at 4±1ºC. The best treatment to inactivation of microbial loud was T2 followed by T1 in chicken luncheon samples compared with other samples.

Table 7. Microbial examination of different chicken luncheon samples during cold storage (4±1ºC)

Microbiological parameters	Storage (months)	Treatments CL[a]	T1[b]	T2[c]	T3[d]	T4[f]
Total bacterial count	1	3.6×10^2	3.6×10^2	3.5×10^2	3.7×10^2	4×10^2
	2	5.9×10^2	5.0×10^2	4.9×10^2	5.4×10^2	5.0×10^2
	3	7.5×10^2	5.5×10^2	6.0×10^2	7.3×10^2	7.0×10^2
	4	®	7.1×10^2	7.0×10^2	®	®
	5		®	®		
Psychrophilic bacteria	1	1.0×10^2	1.1×10^2	1.2×10^2	1.1×10^2	1.2×10^2
	2	2.5×10^2	1.9×10^2	1.8×10^2	2.5×10^2	2.4×10^2
	3	3.6×10^2	2.7×10^2	2.6×10^2	3.3×10^2	3.2×10^2
	4	®	3.1×10^2	3.2×10^2	®	®
	5		®	®		
Spore-forming bacteria	1	2.4×10^2	2.0×10^2	2.0×10^2	2.2×10^2	2.1×10^2
	2	3.1×10^2	2.7×10^2	2.6×10^2	2.9×10^2	2.8×10^2
	3	3.5×10^2	2.9×10^2	3.0×10^2	3.2×10^2	3.1×10^2
	4	®	3.3×10^2	3.2×10^2	®	®
	5		®	®		
Total molds& yeasts	1	3.2×10^2	3.0×10^2	2.9×10^2	3.0×10^2	3.0×10^2
	2	7.2×10^2	4.0×10^2	3.9×10^2	5.1×10^2	5.0×10^2
	3	8.2×10^2	6.0×10^2	5.9×10^2	6.3×10^2	6.2×10^2
	4	®	7.2×10^2	7.0×10^2	®	®
	5		®	®		

®: At these points samples were rejected.
CL[a]: Basal formula without any additional ingredients (Control luncheon) **T1[b]: Basal formula + lentils seeds powder**
T2[c]: Basal formula+ fresh turnip plant roots **T3[d]: Basal formula+ fresh cauliflower**
T4[f]: Basal formula + (Lentils seeds powder + fresh turnip plant roots + fresh cauliflower)

These reduction in microbial loud of T2 and T1 treatments and its effectiveness to extend shelf-life of chicken luncheon might be due to the presence of phenolic, flavonoids and carotenoids represented antioxidant, antimicrobial compounds and anticancer activity, these results are in agreement with those mentioned by Fahey *et al.*, (2001); Zhang *et al.*, (2008); Aires *et al.*, (2009) and Thiruvengadam *et al.*, (2016). They mentioned that turnip contain a high amount of glucosinolates especially gluconasturtiin which cause protection against pathogens, antimicrobial and anticancer activities in humans. Also Peptides of lentils seeds have antimicrobial potential agenist

Lens culinaris and antifungal activity against *Botrytis cinerea* and *Neurospora crassa* (Shenkarev *et al*. 2014; Pina-Pérez and Ferrús Pérez, 2018).

CONCLUSION

This work was carried out to use lentils seeds powder, fresh turnip plant roots and fresh cauliflower in processing of chicken luncheon to improve their quality and lower cost of chicken luncheon. The results revealed that the sensory attributes (appearance, color, texture, taste and odor) of different chicken luncheon samples during cold storage at 4±1ºC for five months. T2 treatment scoring a significant (P>0.05) highly, followed by T1 treatment during period's storage at 4±1ºC which rejected after four months, while control sample, T3 and T4 treatments received significantly lower score for evaluated parameters and rejected after three months. Hence, chicken luncheon samples prepared with turnip plant and lentils were scored the best treatment, compared to the other samples. The palmitic acid was the predominant saturated fatty acid, while oleic acid was the highest unsaturated fatty acids. The total unsaturated fatty acids for oils extracted from chicken luncheon samples recorded 58.75, 59.83 and 59.8%, while the total saturated fatty acids amounted to 41.15, 40.15and 40.18%for oils extracted from CL, T1 and T2 treatments respectively. Leucine is the major essential amino acid in all treatments. It reached between 4.41 % (T2 sample) and 4.49 % (T1 sample). Glutamic acid showed higher ratio of non-essential amino acid ranged between 8.97% (T2) and 9.75% (control sample). The results also, showed that a reduction in microbial loud (total molds and yeasts, total bacterial, psychrophilic bacteria and spore-forming bacteria) of T2 and T1 treatments and its effectiveness to extend shelf-life of chicken luncheon, this reduction might be due to the presence of bioactive compounds (flavonoids and phenolic compounds) hence improving its quality.

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تقييم الأحماض الدهنية والأمينية والخواص الحسية والحمولة الميكروبية للانشون الدجاج المجهز بإضافة مسحوق العدس اللفت والقرنبيط

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الهدف من هذه الدراسة هو استخدام بعض النباتات مثل العدس ونبات اللفت والقرنبيط في تصنيع لانشون الفراخ لخفض تكلفة الإنتاج وتعزيز القيمة الغذائية له. شملت معاملات لانشون الدجاج : أ- لانشون الكنترول دون أي مكونات إضافية (CL)، ب- لانشون مع إضافة مسحوق العدس (T1) ، ج- لانشون مع إضافة جزور نبات اللفت الطازج (T2) ، د- لانشون مع إضافة القرنبيط الطازج (T3) و لانشون مع إضافة مسحوق العدس إضافة جزور نبات اللفت الطازج والقرنبيط الطازج (T4) ، تم تقييم بعض القياسات للانشون الدجاج الناتج من تلك المعاملات المختلفة اشتملت على تقييم الاحماض الدهنية المشبعة والغير مشبعة والاحماض الامينية والخواص الحسية والحمولة الميكروبية . وكانت النسبة المئوية للأحماض الدهنية المشبعة للعينة الكنترول (41.15%)، T1 (40.15%) ، T2 (40.18%) و النسبة المئوية للاحماض الدهنية الغير مشبعة للعينة الكنترول (58.75%)، T1 (59.83%) ، T2 (59.80%) وكان حامض البالماتيك أكثر الاحماض الدهنية المشبعة وحامض الاوليك أكثر الاحماض الدهنية الغير مشبعة. ويعتبر حامض اللليوسين أكثر الاحماض الامينية شيوعاً فى كل المعاملات . يعتبر حمض اللليوسين هو الحمض الأميني الأساسي السائد في جميع المعاملات حيث تراوحت نسبته ما بين 4.41 ٪ (للمعاملة T2) إلى 4.49 ٪ (للمعاملة T1). أظهر النتائج ان حمض الجلوتاميك يمثل أعلى نسبة للأحماض الأمينية غير الأساسية تراوحت النسبة بين 8.97 ٪ (T2) و 9.75 ٪ (للعينة الكنترول). أظهرت النتائج أن إضافة العدس ونبات اللفت والقرنبيط إلى عينات لانشون الدجاج أثناء تحضيرها إدى إلى خفض العد الكلى للفطريات والخمائر ، والعد الكلى للبكتريا والبكتريا المحبة للبرودة والبكتريا المتجرثمة لعينات لانشون الدجاج أثناء التخزين البارد على درجة حرارة (4 ± 1 ° مئوية) ، وبالتالي حدث زيادة فى فترة الصلاحية لعينات لانشون الدجاج T1 و T2 إلى أربعة أشهر مقارنة مع العينات الأخرى (ثلاثة أشهر). كما أدت إضافة العدس ونبات اللفت أيضا الى تحسين الصفات الحسية من المظهر واللون والقوام والطعم والرائحة لعينات لانشون الدجاج. خلصت النتائج إلى أهمية استخدام العدس ونبات اللفت كمضادات ميكروبية طبيعية للتحكم في الحمل الميكروبى لعينات لانشون الدجاج وكمادة مضافة للغذاء لتحسين سلامة منتجات الدجاج.

الكلمات المساعدة:لانشون الدجاج – القيمة الغذائية – الأمان الميكروبيولوجى - العدس - اللفت – القرنبيط – بدائل لحوم الدجاج النباتية.