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*Website: http://www.aun.edu.eg/faculty_agriculture* *E-mail: ajas@aun.edu.eg*

# Nutritional Value of Farmed and Wild Quail Meats

**Khalifa, A. H.[1]; M.B. Omar [1]; S.M. Hussein[2] and H.E. Abdel- mbdy[2]**

[1] Food Scince & Technology Department, Faculty of Agriculture, Assiut University, Assiut, Egypt.

[2] Food Scince & Technology Department, Faculty of Agriculture, Al-AZhar University, Assiut, Egypt.

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## Abstract

The aim of this study was to determine the proximate chemical composition, mineral content, amino acid composition and fatty acids profile in the breast meat of farmed young (6weeks) and spent (8months) Japanese quails as well as wild quail to compare the nutritional value of the meat. The results indicated an increment in protein, fat and caloric value by increasing the age of farmed birds. The wild quails meat was higher in protein, Fe, Zn levels compared to the farmed quail meats. The essential amino acids content recorded 37.09,36.05and39.30 g/100g protein for young, spent and wild quail breast meat; respectively. The predominant fatty acids in farmed Japanese quail meat were oleic, linoleic, palmitic and stearic whereas, it were oleic, vaccinic, palmitic and stearic in wild quail meat. Oleic acid, constituted more than one-third of fatty acids content of breast meat of all studied quail meat types. Quail meat should be taken into consideration due to the high oleic acid content which, associated with lowering the risk of cardiovascular disease.

***Keywords:*** *Farmed quails, wild quails, chemical composition, minerals, amino acids, fatty acids.*

## 1.Introduction

The poultry industry has high potential for increasing protein output for human consumption since the consumption of poultry meat and its product is growing all over the world (Mielnic *et.al.,* 2002). Raising quails for meat production is a genuine alternative to other animals raised as sources of animal protein (Faitarone *et.al*., 2005). Today, Japanese quails are reared in many countries in Asia, Europe, the Middle East and America for both eggs and meat production (Ribarski and Genchev, 2013). However, quail provides more advantages than the chicken such as its resistance to many poultry diseases that afflict chickens, its greater capacity to benefit from food, high reproduction proportions, and also low feed intake (Santos *et.al*., 2001). Quailmeat is recommended for the low fat diet because it contains low amount of fat and cholesterol especially thanks to its thin skin and low fat accumulation between its tissues (Alarslan,2006). Lately, quail meat has gained much popularity among consumers (Ikhlas *et.al.,* 2011). It is an ideal food for all ages due to its high meat yield, less shrinkage during cooking, being more effortless to cook, and being more easy to serve (Mountney, 1981). The valuable taste and dietary properties of quail meat are pivotal in determining the growing interest of consumers to this product (Genchev *et.al.,* 2008). The quality and composition of meat are influenced by numerous factors

namely, the genotype of birds (Genchev *et.al*., 2005**)**. and slaughter-ingage (Genchev *et.al.* ,2004). Recent years have seen growing interest in highly nutritious safe food products, which include game bird meat (kokoszynski *et.al.,* 2013**)**. Broiler quails are slaughtered at about six weeks of age and the older breeding birds (8weeks) are also slaughtered and sold on the commercial market without any distinction being made on age (shanaway,1994). However during the period from September to December each year, wild quails were found in a lot of number on north beaches of Egypt and part of those birds were hunted and sold in the local markets (El-dengawy and nassar, 2001). Data from the scientific and technical literature on age-related change in chemical composition of quail meat are scanty and sometimes contradictory (Lisunova *et.al.,* 2014). However, there is an increasing interest of consumer to quality of foods and that meat in particular (Genchev *et.al.,* 2008). There fore, the aim of this study was to compare the nutritive value of young (6weeks), spent (8months) as well as wild quail meats.

## 2.Materials and Methods

### 2.1.Raw materials

Twenty of farmed young (6 weeks) and spent (8months) Japanese quail *(coturnixcoturix japonica)*as well twenty wild quails were used in this study. The farmed quails were produced from local farm at Assuit city while, the wild quails were procured from AL- Aresh city market in Egypt in October of 2015

### 2.2. Methods

#### 2. 2. 1. Proximate composition

The proximate composition of quail meat was determined according to the AOAC method (2000). The crude protein content was determined by the Kjeldahl method and the crude lipid content was determined by the Soxhlet method. The ash content was determined by ashing the samples overnight at 550°C. Moisture content was determined by drying the samples overnight at 105°C.

#### 2.2.2. Determination of Minerals Content

Minerals content of quail meat sample were determined by a flam photometer 410 for sodium, spekoll1spectrophotometer for phosphorus and a perki- Elmer Atomic Absorption spectrophotometer 2380 for calcium, manganese, iron, zinc and cadmium were used. The determination was carried out in Central Laboratory, Faculty of Agriculture, Assiut University, as described in AOAC (1995).

#### 2.2.3. Amino acids content

Amino acid were determined according to the method described by Pellett and Young (1980). With some modifications, which could be summarized as follows: A known weight of the dry, fat free samples, was hydrolyzed with 5 ml of 6 N HCl, in closed test tube at 110°C for 24h. The hydrolysate was filtered. The residue was washed with distilled water and the volume of the filtrate was completedto 50ml with distilled water. Then 5 ml of the filtrate were evaporated on water bath at 50°C. The residue was dissolved in 5 mlloading buffer (0.2 N sodium citrate buffer of pH 2.2). Amino acids were determined chromatography using Beck-

man Amino Acid Analyzer Model119CL, at National Research Center Giza- Cairo.

**2.2.3.1. Determination of tryptophan:**

Tryptophan was determined using spectrophotometric method as described by Sastry and Tummuru (1985).

**2.2.3.2. Computation of chemical Score**

The chemical score was estimated by the two methods of calculating chemical score recommend by (Bhau *et.al*., 1991) as follows:

$$\textbf{Chemical Score} = \frac{\text{mg of essential amino acid in 1 gm test protein}}{\text{mg of essential amino acid in 1 gm reference protein}} \times 100$$

**2.2.3.3. Computation of A/E ratio**

The relationship between the content of an individual essential amino acid in the food protein (A) and the total essential amino acid content (E) was calculated according to FAO (1965) as follows:

$$\textbf{A/E ratio} = \frac{\text{mg of the individual essential amino acid}}{\text{g of total essential amino acid}}$$

**2.2.4. Fatty acid composition**

**2.2.4.1. Preparation of methyl esters of fatty acids**

The methyl esters for fatty acids were separated from total lipids using 5ml 3% $H_2SO_4$ in absolute methanol and 2 ml benzene as mentioned by Rossell *et.al*., (1983). The contents were heated with methanol at 90°C for 90min. After cooling phase separation was performed by addition of 2 ml water and the methyl esters were extracted with aliquots of 5 ml hexane each. The organic phase was removed, filtered through anhydrous sodium sulfate and concentrated by using rotary evaporator.

**2.2.4.2. Gas liquid chromatography of methyl esters for fatty acids**

The methyl esters of fatty acids were separated using Perkin-Elmar gas chromatography (model F22) with a flame ionization detector in presence of nitrogen as a carrier gas. The separation was carried out on a (2 m 60.25 in) glass column, packed with diethylenglyco succinate (DEGS) on chromosorb W, 80– 100 mesh. The injector and detector temperature was 220ºC. The nitrogen, hydrogen and air flow rate were 30, 30and 300 ml/min, respectively. The chart speed was 1 cm/min. Peaks identification were established by comparing the retention times obtained with standard methyl esters of fatty acids The relative percentages of various fatty acids were determined by rotary evaporator. angulation method (Kates, 1972).

**2.2.5. Statistical analysis**

The statistical data analysis was performed by Analysis of Variance (ANOVA) and the results were submitted to Duncan's test.

## 3. Results and Discussion

### 3.1. Gross chemical composition

Proximate chemical composition and caloric value of farmed and wild quail breast meat, are presented in Table (1) In farmed quail meat, the spent quail meat had significantly lower moisture content ($P<0.05$) and higher protein and fat content when compared with young quail meat (6weeks old). However the moisture content of breast farmed quail meat was ranged from 69.87 to 72.35% for spent and young quail meat; respectively. On other hand , the moisture content of wild quail breast meat was 71.45 % with no significant differences with the meat of 6 weeks old birds but significant higher than the meat of 8 months old birds.

**Table 1. Proximate chemical composition of 6 week, 8 months and wild breast quail meats (WWB).**

| Traits | | Breast quail meats | |
|---|---|---|---|
| | (6 week) | (8 month) | Wild |
| **Moisture** | 72.35±0.4[a] | 69.87±0.[b] | 71.45±0.40[a] |
| **Protein** | 21.65± 0.71[b] | 24.20±0.71[a] | 25.05±0.71[a] |
| **Fat** | 3.57±0.07[b] | 3.85±0.0[a] | 3.80±0.07[a] |
| **Ash** | 2.47±0.11[a] | 2.61±0.1[a] | 1.22±0.1[b] |
| **Caloric value (kcal/100g)** | 118.73 ±0.08[b] | 131.45±0.11[a] | 134.28±0.11[a] |

Different superscript letters indicates significance within the same row ($p<0.05$).

The moisture content was 73.01 and 70.28% for young (6weeks) and spent (8months) quail meat; respectively. as reported by Boni *et.al*. (2010), while it was ranged from 60.1 to 69.2% for wild quail meat as reported by El-Dengawy and Nassar (2001). The protein content increased significantly from 21.65% in young quail meat to 24.20% in spent quail meat. As the same trend, the fat content significantly increased from 3.57% in 6 weeks old quail meat to 3.85% in spent quail meat. However the decrease in moisture and increase of protein and fat with age was also reported by Boni *et.al.,*(2010), lisanova *et.al.,* (2014) and Raji *et.al*., (2015). The protein content of wild quail meat recorded 25.05% which was relatively higher than that of spent quail meat and significantly higher that the protein content of young quail meat. The protein content in the wild quail meat in this study was higher than that found by El-Dengawy and Nassar (2001) which was 55.0 to 68.8% (on dray weight bases). The fat content of wild quail meat recorded 3.80% with no significant the fat content of the spent quail 3.85% but it was significantly higher than that young quails 3.57%. On other hand, the fat content as reported by El-Dengawy and Nassar (2001). For wild quail meat was ranged from 28.8 to 42.1% on dray bases. Data in Table (1) revealed that, the ash content of quail breast meat was ranged from 1.22 to 2.61% with no significant differences between the farmed quail meat, but was significantly lower in wild quail meat.The calculated caloric value of the studied quail breast meat was ranged from 118.73 to 134.28 kcal /100 g. The caloric value of spent quail meat was higher than that of young quail meat as a result of increment of protein and fat content. The wild quail meat recorded 134.28 kcal /100 g of breast meat. Lonita *et.al*., (2011). Reported that, the energy value of quail meat was 192 kcal/100g. and they indicated also that, quail meat has a more reduced calories level than the chicken meat (215 kcal/100g) and duck meat (404kcal/100g).

### 3.2. Mineral content

Data in Table (2) shown the mineral content of the breast farmed and wild quail meat .in the farmed quail breast meat, the calcium content ranged from 42.61 to 55.47 ; sodium ranged from 14.93 to 31.30;

phosphorus from 48.72 to 75.75; magnesium from 10.62 to 13.10; iron from 5.31 to 5.93; manganese from 0.07 to 0.09; zinc from 0.49 to 061 and cadmium from 0.003 to 0.005 mg/100g (on dray basis) In general, all studied minerals were higher in the breast meat of 6 weeks old birds and that, may be due to the increased need of this elements during the period of maturation or the need of its during period of eggs laying. However, Lisunove *et.al.,* (2014). Reported that the contents of sodium, calcium and zinc diminished with age from 1 to 60 days in quail breast meat. The breast meat of wild quails recorded higher levels of iron, magnesium and zinc compared to the farmed meat and nearly, the same levels of Ca,Cd and Mg compared with 8 month old quail meat and intermediate levels of Na and P .On other hand the contents of Ca and Fe in this study was higher than 19 and 1.9mg/100g while, the level of P, Mg and Na was lower than 22,18 and 61 mg/100g which reported by Genchev *et.al*., (2008). The differences of mineral content may be due to the age or the feed of the birds.

**Table 2. Mineral content of preset meat of quail 6 weeks, 8 months and wild (mg/100g dry weight basis).**

| Minerals (mg/l00g) | Breast quail meats | | |
|---|---|---|---|
| | 6 week | 8 month | Wild |
| **Ca** | 55.47 | 42.61 | 41.12 |
| **Mg** | 13.10 | 10.62 | 11 |
| **Na** | 31.30 | 14.93 | 17.86 |
| **P** | 75.75 | 48.72 | 56.42 |
| **Fe** | 5.93 | 5.31 | 9.31 |
| **Cd** | 0.005 | 0.003 | 0.003 |
| **Mn** | 0.091 | 0.066 | 0.094 |
| **Zn** | 0.61 | 0.49 | 0.70 |

### 3.3. Amino acid composition

The dietary value of meat is mostly defined by the composition and ratio among the different groups of nutrients. One criterion for meat evaluation is its protein content and especially the content of essential amino acids (Genchev *et.al*., 2008). The amino acid composition of farmed and wild quail breast meat are presented in Table (3). The total amino acids content recorded 95.90, 96.00 and 96.88g/100g protein for young farmed quail breast meat(6 weeks), spent quail(8 months) and wild quail breast meat; respectively. However, khalifa (1995) reported that the total amino acid content of the breast meat of 6 weeks farmed Japanese quail was 92.54g/100g protein. On other hand, EL-Dengawy and Nassar (2001) found that it was 95.21g/100gprotein (without determination of tryptophan) in the breast of wild quails. The essential amino acids content recorded 37.09, 36.05 and 39.30 g/100g protein of 6 weeks, 8 months and wild quail meat; re-

spectively. As reported by Genchev *et.al.*(2008). Quail meat was very rich in essential amino acid which accounted for about 41% of meat protein. Moreover, the wild quail breast meat contained more essential amino acids (39.30%) compared with the farmed quail meat (36.05-37.09%). The same observation was reported by Uherova *et.al.* (1992). They found that game contains higher level of essential amino acids as compared with traditionally produced meat. However, in the essential fraction, the major amino acids were lysine (8.78 -8.99%) and leucine (8.13 -8.22%) in breast quail meat. such results are in agreement with the results of Khalifa (1995) for farmed Japanese quail and Franco and Lorenzo (2013) for pheasants meat.On other hand, slight variations among the essential amino acids between the farmed and wild quail meat except the content of tryptophan which was very low in wild quail breast meat compared with its content in farmed quail meat and that may due to the wild quails are unable to obtain a balanced diet, they feed on what is currently available depending on the season Brudincki *et.al*.(2012). Moreover, the data indicated that, among all amino acids, glutamic acid recorded the highest value in both farmed (14.15-14.31%) and wild quail (15.40%). The same Trend was reported by Khalifa (1995) and Boni *et.al*. (2010) for farmed quail meat, El-Dengaey and Nassar (2001) for wild quail meat and Brudnicki *et. al.* (2012) for wild and farmed pheasants. However, the relatively higher content of glutamic acid in the breast meat in wild quail comparison with that of farmed quails has a great importance when it comes to the taste of meat as indicated by Brudnicki *et al.* (2012).

**Table 3. Amino acid composition of breast quail meat.**

| Amino acid g/100g protein | Breast Quail meats | | |
|---|---|---|---|
| | 6 weeks | 8 months | Wild |
| **Threonine** | 4.58 | 4.50 | 4.59 |
| **Valine** | 5.20 | 5.12 | 5.40 |
| **Methionine** | 2.69 | 2.64 | 2.64 |
| **Isoleucine** | 5.10 | 4.99 | 4.98 |
| **Leucine** | 8.15 | 8.13 | 8.22 |
| **Phenylalanine** | 4.68 | 4.72 | 4.63 |
| **Lysine** | 8.99 | 8.93 | 8.78 |
| **Tryptophan** | 1.07 | 1.02 | 0.18 |
| **Total essential amino acids** | 37.09 | 36.05 | 39.30 |
| **Histidine** | 4.45 | 3.53 | 4.40 |
| **Arginine** | 6.69 | 6.87 | 6.60 |
| **Aspartic acid** | 10 | 9.93 | 9.90 |
| **Serine** | 3.81 | 4.05 | 3.98 |
| **Glutamic acid** | 14.15 | 14.31 | 15.40 |
| **Proline** | 4.03 | 4.35 | 3.95 |
| **Alanine** | 6.15 | 6.63 | 6.80 |
| **Cysteine** | 1.34 | 1.50 | 1.08 |
| **Tyrosine** | 3.49 | 3.74 | 3.62 |
| **Glysine** | 4.80 | 5.04 | 4.85 |
| **Total non- essential amino acids** | 58.91 | 59.95 | 57.88 |
| **Total amino acids** | 95.90 | 96.00 | 96.88 |
| **E/NE ratio** | 0.63 | 0.60 | 0.68 |

E= Essential amino acids, NE= Nonessential amino acids

As the presented data in Table (4) the chemical score indicated that the first limiting amino acid of breast meat quail of 6 weeks was valine and the second limiting amino acid was methionine whereas the first limiting amino acid was tryptophan followed by valine in farmed 8 months quail breast meat as well as wild quail breast meat.

**Table 4. Chemical score and limiting amino acid of breast quail meat.**

| Essential amino acid | Whole Egg(E) mg (E.A.A)/g protein | Chemical score (A / E × 100) | | |
|---|---|---|---|---|
| | | Breast quail meats | | |
| | | 6 weeks | 8 months | Wild |
| **Threonine** | 51 | 89.80 | 88.23 | 90.00 |
| **Valine** | 76 | 68.42 | 67.37 | 71.05 |
| **Methionine** | 32 | 84.06 | 82.50 | 82.50 |
| **Isoleucine** | 56 | 91.07 | 89.11 | 88.93 |
| **Leucine** | 83 | 98.19 | 97.95 | 99.04 |
| **Phenylalanine** | 51 | 91.77 | 92.55 | 90.78 |
| **Lysine** | 63 | 142.70 | 141.75 | 139.37 |
| **Tryptophan** | 18 | 94.44 | 56.67 | 10.56 |
| **First limiting amino acid** | | Valine | tryptophan | Tryptophan |
| **Second limiting amino acid** | | Methionine | Valine | Valine |

A=mg amino acid /g protein of sample, E =mg amino acid /g protein for egg

The data presented in Table (5). Indicated the A/E ratio of amino acids of quail meats compared the recommendation of FAO/WHO/UNU for school children and adult. The data indicated that, the amino acid of quail meats meet or better than the recommendation of the most essential amino acid for school children and adult except methionine and phenylalanine for adults and threonine for schoolchildren. Also, tryptophan was less than the recommendation in the spent quail meat and the wild quail meat.

**Table 5. A/E ratio of breast quail meat compared with FAO/WHO/UNU (1985).**

| Essential amino acid | Breast quail meat | | | FAO (1985) | |
|---|---|---|---|---|---|
| | 6weeks | 8months | wild | Schoolchildren | Adult |
| **Threonine** | 123.48 | 124.83 | 116.79 | 126 | 81 |
| **Valine** | 152.54 | 142.03 | 137.41 | 112 | 117 |
| **Methionine** | 72.53 | 72.33 | 67.18 | 99 | 53 |
| **Isoleucine** | 137.50 | 138.42 | 126.72 | 126 | 117 |
| **Leucine** | 219.74 | 225.52 | 209.16 | 198 | 171 |
| **Phenylalanine** | 126.18 | 130.93 | 117.81 | 99 | 171 |
| **Lysine** | 242.38 | 247.71 | 223.41 | 198 | 144 |
| **Tryptophan** | 45.84 | 28.29 | 4.58 | 40 | 45 |

A/E ratio = $\frac{\text{mg of individual essential amino acid}}{\text{g of total essential amino acids}}$ FAO (1985)

## 4.4. Fatty acid composition

The fatty acid composition data of total lipids of farmed and wild breast quail meats are presented in Table (6). The obtained data revealed that, in farmed quail the lipid profile is determined by four fatty acid: Oleic (c18:1), linoleic (c18:2), palmitic (c16:0) and steric (c18:0). The same observation was reported

for quail meat by Genchev *et.al.* (2008), Bonos *et.al*.(2010), Sartowska *et.al*.(2014) and Gecgel *et.al*.(2015). However, the sum of these fatty acids accounted for 87.76 and 89.20% of total lipid content of breast meat in young (6 weeks) and spent (8 months) quails; respectively. It was nearly close to 88.26 and 88.28% which reported for breast meat and leg meat of quails by Genchev *et.al*.(2008).

**Table 6. Fatty acid composition of total lipids of farmed and wild breast quail meats.**

| Fatty acid | Name | Breast quail meat | | |
|---|---|---|---|---|
| | | 6 week | 8 months | wild |
| C14:0 | Myristic acid | 0.78 | 0.70 | 0.83 |
| C16:0 | Palmitic acid | 19.81 | 15.57 | 13.47 |
| C16:1 ω9 | Palmitolic acid | 3.85 | 2.78 | 3.65 |
| C16:1 ω7 | Palmitolic acid | 0.15 | 0.27 | 0.29 |
| C16:1 ω5 | Palmitolic acid | 0.16 | 0.40 | 0.24 |
| C17:0 | Heptadeconoic acid | ND | 0.22 | ND |
| C18:0 | Stearic acid | 6.27 | 5.79 | 5.12 |
| C18:1 ω9 | Oleic acid | 35.36 | 38.99 | 35.17 |
| C18:1 ω7 | Vaccinic acid | 1.90 | 2.46 | 35.72 |
| C18:1 ω5 | 6-Octadecosanoic acid | ND | ND | 0.56 |
| C18:2 ω6 | Linoleic acid | 26.32 | 28.85 | ND |
| C18:3 ω3 | Linolanic acid | 2.18 | 0.93 | 2.65 |
| C20:0 | Arachidic acid | 0.36 | 0.65 | 0.22 |
| C20:1 ω9 | Gondoic acid | 0.73 | 0.45 | 0.77 |
| C20:4 ω3 | Eicosatrienoic acid | ND | ND | 0.38 |
| C20:5 ω3 | Eicosapentaenoic acid | 0.97 | 0.88 | 0.20 |
| C22:0 | Behenic acid | 0.60 | 0.83 | 0.34 |
| Non identified fatty acid | | 0.65 | 0.00 | 0.39 |
| Total saturated fatty acid(SFA) | | 27.82 | 23.76 | 19.98 |
| Total unsaturated fatty acid(UFA) | | 71.60 | 76.01 | 79.63 |
| Total monounsaturated fatty acid(MUFA) | | 42.15 | 44.55 | 76.40 |
| Total polyunsaturated fatty acid(PUFA) | | 29.47 | 30.66 | 3.32 |
| PUFA/SFA ratio | | 1.06:1 | 1.29:1 | 0.16:1 |

On other hand, the fatty acid profile of wild quail shows some differences hens consisted mainly of oleic, vaccinic, palmitic and stearic acids whereas linoleic acids was not detected with sum of 89.48% of total lipid content for these fatty acids. However, the fatty acid composition can be affected by different factors like breed, sex, age, diet, geographical location, chimate and the used methodology (Franco and Lorenzo, 2013 and Katarzyna *et.al*. 2014) the obtained data also revealed that, the oleic acid constituted over than one-third of lipid content of breast meat of farmed and wild quail. As mentioned by Hargove *et.al*.(2001). The oil with high content of oleic acid has been associated with lowering the risk of cardiovascular disease. Oleic acid (C18:1) hasa beneficial

effect of decreasing plasma cholesterol and it has been estimated to lessen coronary heart disease risk by 20-40% principally by means of reduction LDL cholesterol as reported by Kris-Etherton *et.al*.(1999). From this side, quail meat consider superior than chicken and duck meats which contained low contents of Oleic acid by 47.7% and 37.1% for broiler chicken meat and duck meat; respectively as found by Wolaszyn *et.al*.(2003). So, Japanese quail meat should be taken into consideration due to high Oleic acid contents and prevention of heart diseases (Gecgel *et.al.,* 2015). High concentration ofoleic acid in quail meatalso was recorded by Genchev *et.al*. (2008). as 35.38- 35.52%, for farmed quail meat and by El-Dengawy and Nassar (2001). As 34.48- 39.3% for wild quail meat.As shown in Table (6) the breast meat of the wild quail contained a considerable amount of vaccinic acid (34.72%). Vaccinic acid is an omega 7 fatty acid. omega7 helps regulate fat and blood sugar metabolism and presence of omega7 in the epithelial cell membranes play a protective role including inhibiting bacterial growth as well promoting tissue recovery and healing (Koff, 2010). Regarding to saturated fatty acids (SFA), the highest content was that of palmitic acid (C16:1) recoded 19.81, 15.57 and 13.47% in breast meat of young, spent and wild quails; respectively. This result was in agreement with the result of Genchev *et.al*. (2008). and Poltowicz, K. and Doktor, J. (2013) For farmed quail meat but not agree with the result of El- Dengawy and Nassar (2001). Who reported that, myristic acid (C14:0) was the major saturated fatty acid in wild quail meat. Linoleic acid (C18:2) was the predominant polyunsaturated fatty acid in farmed quail meat which recorded 26.32 and 28.85% of total fatty acids in breast meat of young and spent quails; respectively. Whereas it was absent in wild quail meat as shown in Table (6) the absenteeism of linoleic acid in wild quail meat in this study may be due to the quail diet. Morever, the composition and the ratio between the different groups of lipids in poultry meat are essential in the evaluation of its dietary properties Genchev *et.al*. (2008). The total saturated fatty acid content (SFAs) recorded 27.82, 23.76 and 19.98% for young, spent and wild quail breast meat; respectively. Genchev *et.al*.(2008**)** reported that (SFAs) contents were found as 34.13 and 33.72% for quail breast and leg meats; respectively. While, Boni *et.al.,* (2010). Reported that, young and spent quail meats contents 25.84 and 29.07% of SFAs; respectively. El-Dengawy and Nassar (2001) reported that SFAs constituted from 25.07 to 30.11% of total fatty acids in thigh and breast of wild quails. Unsaturated fatty acids (UFAs) constituted 71.60, 76.01 and 79.63% of the total fatty acid of young farmed, spent farmed and wild breast quail meats; respectively. The obtained result are relatively higher than 63.95 and 62.54% which reported by Gecgel *et.al*.(2015) for female and male Japanese quail meats; respectively. The monounsaturated fatty acids (MUFAs) contents recorded 42.15 and 44.55% of total fatty acid in breast of young and spent farmed

quail; respectively. While, it was 76.40% in the breast meat of wild quail.The high content of MUFAs in wild quail meat in this trail may be due to the presence of vaccinic acid (C18:1ω7) which recorded high proportion (35.72%) of total fatty acids. On other hand, polyunsaturated fatty acids (PUFAs) content recorded 29.17 and 30.66% of total fatty acids in breast of young and spent farmed quails; respectively, while its value recorded only, 3.23% for wild quail meat as a result of absent of linoleic acid as revealed in Table (6). However, Genchev *et.al*.(2008) reported that the PUFA in breast and leg meat of Japanese quails were 24.98 and 24.48% ; respectively. Whereas it recorded 14.24 and 13.81% for female and male quail meat; respectively as mentioned by Gecgel *et.al*.(2015). When SFAs and PUFAs are consumed together, the ratio (P: S) is an important measure of the relative risk factor of the cholesterol content in a foodstuff (Hoffman *et.al*., 2013).

Aminimum ratio of PUFA/ SFA of 0.4- 0.5 is recommended for human health (WHO, 2003). In farmed quail meats, PUFA/ SFA ratio recorded 1.06:1 and 1.29:1 for young and spent breast meat; respectively. However, this ratio was higher than 0.73:1 which reported for breast and leg quail meat by Genchev *et.al.* (2008), 0.43:1 and 0.40:1 which reported by (Gecgel *et.al.,* 2015). For female and male Japanese quail meat. Morever, PUFA/SFA ratio was 0.19:1 in wild quail meat and less than the recommendation of the WHO. The differences in P: S ratio of the quail meats might have resulted from diet (Gecgel *et.al*. 2015).

**Conclusion**

The obtained data indicated that, there is an increment in protein, fat and caloric value content with increasing the age of farmed quail breast meat. The wild quail meat recorded higher levels of protein, Fe and Zn compared to the farmed quail meat. The quail meats consider a good source of essential amino acids and the fatty acids profile consisted menially from oleic, linoleic, palmitic and stearic acids.

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# القيمة الغذائيه للحوم سمان المزارع والسمان البرى

**احمد حامد خليفة[١] ، محمد بهاء الدين عمر[١]، صالح محمود حسين[٢] ، هشام السيد عبد المبدى[٢]**

[١] قسم علوم وتكنولوجيا الأغذيه ؛كليه الزراعة؛ جامعة اسيوط؛ اسيوط ؛ مصر.

[٢] قسم علوم وتكنولوجيا الأغذيه ؛كليه الزراعة؛ جامعة الأزهر ؛ اسيوط ؛ مصر.

**الملخص**

هدفت هذه الدراسة الى تقدير التركيب الكيماوى والمحتوى المعدنى وتركيب الأحماض الأمينيه وتركيب الاحماض الدهنيه للحم صدر سمان المزارع اليابانى عند العمر التسويقى (٦ أسابيع) والطيور المسنه (٨ أشهر) الى جانب السمان البرى لتقييم القيمه التغذويه للحم السمان.

أوضحت النتائج أن محتوى اللحم من البروتين والدهن والقيمة السعرية يزداد بزيادة العمر فى لحم سمان المزارع. وقد إحتوى لحم السمان البرى مستويات أعلى فى البروتين والحديد والزنك مقارنة بلحم سمان المزارع .

سجلت الأحماض الأمينية الضرورية قيما بلغت٣٧,٠٩، ٣٦,٠٥،٣٩,٣٠ جم/١٠٠ جم بروتين فى لحم صدر سمان المزارع الصغير والمسن والسمان البرى على الترتيب. وبالنسبة لتركيب الأحماض الدهنية ، فإن الأحماض الدهنية السائدة فى لحم صدر سمان المزارع هى أحماض الأوليك ، اللينوليك، البالمتيك والاستياريك بينما كانت الأحماض الأوليك، الفاكسينيك، البالمتيك والاستياريك هى السائدة فى لحم صدر السمان البرى.

وقد شكل الحامض الدهنى الأوليك قيما بلغت اكثر من ثلث مجموع الأحماض الدهنية فى لحم الصدر لكل الأنواع المدروسه ولذا يجب أن يؤخذ لحم السمان فى الإعتبار فى التغذيه حيث أن المحتوى المرتفع لحامض الأوليك يكون مصحوبا بتقليل مخاطر الإصابه بأمراض القلب.