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*Original Contribution*

# PHYSICOCHEMICAL AND TECHNOLOGICAL PROPERTIES OF JAPANESE QUAIL MEAT

**A. Genchev[1*], S. Ribarski[2], G. Zhelyazkov[2]**

[1]Poultry breeding unit, Faculty of Agriculture, Trakia University, Stara Zagora, Bulgaria
[2] Meat and Meat Products Technology Unit, Faculty of Agriculture, Stara Zagora, Trakia University, Bulgaria

**ABSTRACT**
Meat pH in Manchurian Golden Japanese quails immediately after slaughtering were near to neutral – 6.06-6.21 for breast muscles and 6.58-6.92 for leg muscles. From the time of slaughter to *rigor mortis* resolution, pH values decreased from 6.13±0.04 to 5.91±0.03 in breast meat and from 6.74±0.04 to 6.58±0.04 in leg meat. The water holding capacity (WHC) of meat varied within 18.05 and 21.7%, and water absorption capacity (WAC) in isotonic physiological saline solution varied between 24 and 29.6% for the pectoral muscle (26.36±0.69) and between 28.2 and 37.8% for the b*iceps femoris* muscle (32.89±0.90%). The cooking loss percentage was 28.81±0.76 for breast meat and 33.71±0.86 for leg meat.
Breast meat tenderness in Manchurian Golden quails varied from 201 to 321 $^{o}$P (261.23±2.83 for males and 275.03±3.27 $^{o}$P for females). The tenderness of breast meat increased by about 11% with advancing slaughter age of birds from 31 to 42 days (P<0.001 for males and P<0.01 for females).
Breast meat L* values of Manchurian Golden Japanese quails varied between 40.6 and 56.1 (44.98±0.42 in males and 44.75±0.30 in females). The colour of breast meat became darker with advancing slaughter age. The coordinates in the red/green spectrum (a*) varied from 5.1 до 14.4 (10.46±0.15), and in the yellow/blue spectrum (b*) – from 7.9 to 13.4 (10.8±0.12). Breast meat redness and yellowness accounted for the excellent colourfullness (chroma, C) of the meat of the studied Japanese quail breed (15.09±0.15).
At the age of 35 days, the pectoral muscle of Manchurian Golden Japanese quails was composed mainly of dark muscle fibres (95.72-96.37%). The percentage of light muscle fibres varied within 2.9 and 5.2%. The pectoral muscle was built from 98.37±0.18% muscle tissue, 1.36±0.14% connective tissue and 0.28±0.05% intramuscular fat tissue. In female quails, the values were 97.61±0.20% muscle tissue, 1.79±0.22% connective tissue and 0.59±0.04% intramuscular fat tissue.

**Key words:** Japanese quails, meat quality, histological structure of muscle fibres

## INTRODUCTION
In freshly slaughter birds, meat pH is near to the neutral but when rigor mortis occurs, it decreases to 6.02-6.41. Breast meat pH on the 20[th] min *post mortem* ($pH_{20}$) ranged between 6.2-6.3 (1).

The quality of raw meat in terms of storage and processing depends on its hydrophilic properties – water holding capacity (WHC) and water absorption capacity (WAC). Muscle tissue contains about 75% water but only 10-15% of it is chemically bound to proteins. The other amount is retained by the spatial structure of proteins as "free water". Therefore, WHC is the highest immediately after slaughtering, prior to *rigor mortis* occurrence (2). After *rigor mortis* resolution, the WHC of meat is reduced. Reported data provide evidence for water losses in Japanese quail meat varying from 28-29% (3) to 31.5-33.9% (4).

Low meat pH values decrease the WHC and tenderness of meat and increase cooking loss percentage (5, 6). According to most investigators, meat pH is not sufficient to characterize meat quality as meat technological properties are largely dependent on colour characteristics of breast meat, its structure and water holding capacity (6, 7, 8, 9, 10, 11).

***Correspondence to:** *Atanas Genchev, Poultry Breeding Unit, Faculty of Agriculture, Trakia University, Bulgaria*

Regardless of the abundant information on production systems and the nutrition of Japanese quails, data about the quality of their meat, the processing of carcasses and the possibilities for meat quality management depending on slaughter age are rather few.

The increasing concern of consumers about the quality of foods, including meat, motivated the present study aimed to perform a most detailed analysis of meat quality characteristics in Manchurian Golden Japanese quails.

**MATERIAL AND METHODS**

The experiment was carried out with Manchurian Golden Japanese quails, reared in the Experimental Vivarium of the Poultry Breeding Unit. The analysis of meat quality was performed in the Meat and Meat Products Technology Unit at the Faculty of Agriculture, Trakia University. Forty quails were analyzed (20 females and 20 males). One of studied factors was slaughter age (at 31, 35, 39 and 42 days of age). The pH of meat was measured on post slaughter min 20 ($pH_{20}$) and post slaughter hour 24 ($pH_{24}$). On the 24th *post mortem* hour, drip loss percentage, the colour characteristics, tenderness and hydrophilic properties of meat – water holding capacity (WHC) and water absorption capacity (WAC) and cooking loss percentage were determined.

The birds were slaughter after a 6-hour fasting period. Slaughter and slaughter analysis was carried out according to manipulations described in details by Genchev and Mihaylov (12). After the slaughter and skin removal, $pH_{20}$ values were measured. After evisceration, the carcasses were put in a refrigerator (2-4$^0$C) for 24 hours. Afterwards, chilled carcasses were weighed and $pH_{24}$ values were measured with a pH meter *Testo 205*, equipped with glass electrode and a temperature probe.

The hydrophilic properties of meat were determined through the parameters water holding capacity (WHC) and water absorption capacity (WAC) and cooking loss percentage.

WHC of meat was determined by the 24th *post mortem* hour in samples obtained from the pectoral and biceps femoris muscles. The analysis was performed by the classic method of Grau and Hamm, described by Zahariev and Pinkas (13) with modifications by Petrov (14).

The WAC of meat was determined in isotonic physiological saline. For this purpose, two samples of approximate size of 2.0x1.0x0.5 cm were obtained from the pectoral and biceps femoris muscles. They were weighed with a precision of 0.001 g, and put in tubes containing 15 ml physiological saline. Samples were left for 24 h at 2-4$^0$C. After 24 h meat pieces were removed from tubes, carefully dried on a filter paper from superficial water and weighed on the same scales once again. The WAC of meat was calculated as:

WAC = $\frac{b-a}{a}.100$ ; where:

a – weight of the piece of meat prior to analysis, g;

b - weight of the piece of meat after a 24-stay in physiological saline, g;

Cooking loss percentage of breast and leg meat was determined in a forced convection oven. The method is based on achievement of a temperature of 75-80$^o$C in the core of the sample for 15 min (15).

Breast meat tenderness was determined by means of a penetrometer RA-1, equipped with a penetration probe. The method is base on the depth of penetration of the needle in a meat sample under its own weight (for this unit, 103.3 g). Tenderness values are given as penetration degrees ($^o$P)

The colour of muscles was determined on the 24th post mortem with a “Lovibond SP60” spectrophotometer produce by X-Rite Incorporated. The values of L*, a* and b* colorimetric coordinates were determined on the following scale:

- L* - a value 100 corresponded to absolute white; value 0 – to absolute black;
- a* − a+ corresponded to red spectrum; a– corresponded to green spectrum
- b* − b+ corresponded to yellow spectrum; b– corresponded to blue spectrum

On the basis of a* and b* values we calculated:

Chroma (C)=$(a^{*2}+b^{*2})^{0.5}$

and the Hue angle ($h^o$), that specifies the site of cross point of coordinates a* and b*:

$h^o=tg^{-1}(b^*/a^*)$

Samples for histological analysis were obtained from the pectoral muscle of quails slaughtered at 35 days of age. Samples were fixed in Baker's fixative, embedded on gelatin and cut on sled microtome. Cross sections of 8 μm were stained with Sudan schwarz and Meier's alum carmine for identification of muscle fibre types – dark and light. With a planimeter, the mean diameter of muscle fibres was determined by calculation from the mean cross section area (S) according to the equation $d=(2\sqrt{S})/\pi$, where: d – mean diameter, S - mean cross section area.

The proportions of muscle, connective and fat tissues were quantitated on 1 $cm^2$ cross sections by means of "ISA" device for "Min-6" light microscopic sections planimetry (14).
The results were processed by routine methods of statistical analysis included in the *MS Excel 2003* package.

**RESULTS**
Immediately after slaughtering, meat pH was 6.06-6.21 for breast muscle and 6.58-6.92 for leg muscle (Table 1). The rate of breast meat pH reduction was higher than that of leg meat. From the time of slaughter to *rigor mortis* resolution, pH values decreased from 6.13±0.04 to 5.91±0.03 (breast meat) and from 6.74±0.04 to 6.58±0.04 (leg meat). Unlike breast meat, the pH values of leg meat of both genders correlated with the slaughter age of quails.

Drip loss percentages of meat varied from 1.07 and 0.6% of carcass weight, with a weak tendency for reduction of values in both sexes with slighter age advancing.

The WHC of pectoral muscle and biceps femoris muscle ranged between 18.05-21.7%. The average water loss from the pectoral muscle after pressing force application (WHC) was 19.32±0.46 % in males and 20.64±0.52 % in females. The respective values for the biceps femoris muscle were 19.07±0.65 % in males and 18.34±0.68 % in females.

The WAC of meat in isotonic physiological saline varied between 24 и 29.6% for the pectoral muscle (26.36±0.69 %) and between 28.2 and 37.8 % (32.89±0.90 %) for the biceps femoris muscle.
The average cooking loss percentage was 28.81±0.76 for breast meat and 33.71±0.86 for leg meat. In general, the values recorded in male birds were higher compared to those in females – 31.20±1.09 vs 26.42±0.79 ($P<0.001$) for breast meat and 35.71±1.33 vs 31.72±0.96 ($P<0.05$) for leg meat, respectively. The sex-related difference was more pronounced after the age of 35 days, when it attained 18.3-31%.

Breast meat tenderness in Japanese quails varied from 201 to 321 $^{o}$P. This parameter averaged 261.23±2.83 $^{o}$P in males and 275.03±3.27 $^{o}$P in females, with statistically significance ($P<0.01$) of the 5% difference **(Table 2).** The tenderness of breast meat increased in both sexes by about 11% with advancing slaughter age of birds from 31 to 42 days ($P<0.001$ for males and $P<0.01$ for females).

The histological examination proved that the pectoral muscle in Manchurian Golden quails slaughtered at the age of 35 days was built of 97.6-98.4% muscle tissue, 1.4-1.8% connective tissue and 0.3-0.6% intramuscular fat tissue **(Fig. 2).** Muscle tissue morphology showed that the pectoral muscle was composed mainly of dark muscle fibres **(Fig. 3)**. At the age of 35 days, their percentage was 95.72±0.35 in males and 96.37±0.27 in female birds. Light muscle fibre percentage varied between 2.9 and 5.2%, with average values of 4.28±0.35 in males vs 3.63±0.27 in females.

Meat colour is an important parameter for its quality **(Table 2)**. Breast meat L* values of Manchurian Golden Japanese quails was very slightly influenced by birds' sex. The average L* values in males were 44.98±0.42 and in females – 44.75±0.30, the overall range was between 40.6 and 56.1 Only in birds slaughtered at 31 days of age, the difference between genders was 5.6% and statistically significant ($P<0.01$). Slaughter age has a more pronounced effect on breast meat lightness with tendency towards a darker colour with advancing slaughter age **(Fig. 4)**. In both sexes, the difference of fillet L* between the age of 31 and 42 days was statistically significant ($P<0.001$).

***Table 1.*** *Physocochemical and technological properties of meat , %*

| Traits | Age, days | Males n=20 | | Difference, % | Females n=20 | |
|---|---|---|---|---|---|---|
| | | x | ±Sx | | x | ±Sx |
| $pH_{20}$, breast meat | 31 | 6,18 | 0,16 | -2,0 | 6,06 | 0,06 |
| | 35 | 6,10 | 0,05 | 1,9 | 6,21 | 0,06 |
| | 39 | 6,18 | 0,05 | -1,9 | 6,06 | 0,08 |
| | 42 | 6,11 | 0,11 | 0,9 | 6,16 | 0,09 |
| $pH_{24}$, breast meat | 31 | 5,90 | 0,05 | -1,7 | 5,80 | 0,05 |
| | 35 | 6,00 | 0,05 | -0,1 | 5,99 | 0,08 |
| | 39 | 5,91 | 0,06 | -0,7 | 5,86 | 0,05 |
| | 42 | 5,88 | 0,09 | 1,2 | 5,95 | 0,06 |
| $pH_{20}$, leg meat | 31 | 6,63 | 0,12 | -0,9 | 6,58 | 0,08 |
| | 35 | 6,70 | 0,09 | 0,7 | 6,74 | 0,05 |
| | 39 | 6,78 | 0,03 | -0,4 | 6,75 | 0,06 |
| | 42 | 6,84 | 0,04 | 1,2 | 6,92 | 0,03 |
| $pH_{24}$, leg meata | 31 | 6,52 | 0,11 | -2,3 | 6,37 | 0,07 |
| | 35 | 6,53 | 0,11 | -0,2 | 6,52 | 0,13 |
| | 39 | 6,65 | 0,07 | -1,1 | 6,58 | 0,06 |
| | 42 | 6,66 | 0,09 | 2,9 | 6,85 | 0,04 |
| Drip loss,% | 31 | 1,07 | 0,05 | -2,0 | 1,09 | 0,03 |
| | 35 | 0,88 | 0,08 | 1,9 | 0,77 | 0,11 |
| | 39 | 0,78 | 0,09 | -1,9 | 0,80 | 0,12 |
| | 42 | 0,63 | 0,03 | 0,9 | 0,74 | 0,07 |
| WHC, pectoral muscle | 31 | 19,32 | 0,63 | 2,1 | 19,73 | 0,91 |
| | 35 | 20,14 | 0,55 | 1,0 | 20,35 | 0,41 |
| | 39 | 19,74 | 1,19 | 4,9 | 20,77 | 1,46 |
| | 42 | 18,07 | 1,40 | 16,7 | 21,70 | 1,51 |
| WHC, biceps femoris muscle | 31 | 18,33 | 0,56 | 2,9 | 18,88 | 1,31 |
| | 35 | 19,92 | 1,43 | -9,4 | 18,20 | 1,27 |
| | 39 | 18,44 | 1,78 | -2,2 | 18,05 | 1,91 |
| | 42 | 19,58 | 1,84 | -7,3 | 18,24 | 1,80 |
| WAC, pectoral muscle | 31 | 29,59 | 1,79 | -8,3 | 27,33 | 1,76 |
| | 35 | 26,53 | 2,22 | 8,7 | 29,07 | 2,20 |
| | 39 | 24,53 | 1,82 | 3,0 | 25,30 | 1,12 |
| | 42 | 23,97 | 3,27 | 2,3 | 24,54 | 1,88 |
| WAC, biceps femoris muscle | 31 | 37,79 | 3,65 | -21,8 | 31,03 | 0,87 |
| | 35 | 34,24 | 2,24 | 2,5 | 35,11 | 1,24 |
| | 39 | 28,16 | 2,05 | 8,1 | 30,65 | 2,56 |
| | 42 | 34,56 | 4,47 | -9,5 | 31,56 | 2,30 |
| Cooking loss, breast meat (%) | 31 | 28,90 | 2,47 | -10,9 | 26,05 | 0,85 |
| | 35 | 29,06 | 2,79 | -2,5 | 28,34 | 1,88 |
| | 39 | 33,71 | 2,39 | -31,0** | 25,73 | 1,56 |
| | 42 | 33,10 | 0,97 | -18,3*** | 27,98 | 0,78 |
| Cooking loss, leg meat (%) | 31 | 32,53 | 2,97 | -17,6 | 27,65 | 0,65 |
| | 35 | 31,02 | 1,23 | 5,6 | 32,87 | 1,94 |
| | 39 | 40,67 | 2,77 | -19,1 | 34,15 | 1,74 |
| | 42 | 38,60 | 1,26 | -19,9* | 32,20 | 2,49 |

**Note:** Differences between sexes, marked with * are significant: * P<0.05; ** P<0.01; *** P<0.001.

***Table 2.*** *Breast meat tenderness and colour in Manchurian Golden quails*

| Traits | Age, days | Males n=20 | | Difference, % | Females n=20 | |
|---|---|---|---|---|---|---|
| | | x | ±Sx | | x | ±Sx |
| Tenderness of meat, $^{o}$P | 31 | 243,47 | 5,19 | 5,6 | 257,87 | 7,21 |
| | 35 | 257,87 | 7,21 | 1,5 | 261,67 | 5,16 |
| | 39 | 265,87 | 4,65 | 5,7** | 282,07 | 4,14 |
| | 42 | 273,93 | 5,42 | 5,4 | 289,67 | 6,47 |
| Lightness of meat (L*) | 31 | 48,19 | 0,83 | -5,6** | 45,62 | 0,51 |
| | 35 | 44,32 | 0,82 | 2,9 | 45,62 | 0,73 |
| | 39 | 44,16 | 0,60 | -0,4 | 44,00 | 0,43 |
| | 42 | 43,25 | 0,51 | -1,4 | 42,66 | 0,42 |
| Redness (a*) | 31 | 9,26 | 0,39 | 8,1 | 10,07 | 0,50 |
| | 35 | 9,91 | 0,45 | 6,4 | 10,58 | 0,52 |
| | 39 | 10,65 | 0,27 | -0,8 | 10,56 | 0,30 |
| | 42 | 11,83 | 0,36 | -9,2 | 10,83 | 0,46 |
| Yellowness (b*) | 31 | 11,18 | 0,43 | -3,5 | 10,79 | 0,30 |
| | 35 | 10,92 | 0,38 | 3,8 | 11,36 | 0,38 |
| | 39 | 10,61 | 0,36 | -2,4 | 10,36 | 0,34 |
| | 42 | 11,00 | 0,27 | -7,8 | 10,20 | 0,20 |
| Chroma (C) | 31 | 14,60 | 0,40 | 1.5 | 14,82 | 0,46 |
| | 35 | 14,79 | 0,50 | 5,0 | 15,58 | 0,58 |
| | 39 | 15,05 | 0,39 | -1,6 | 14,81 | 0,40 |
| | 42 | 16,16 | 0,41 | -8,5* | 14,90 | 0,44 |
| Hue (h$^{o}$) | 31 | 0,41 | 0,08 | 22.1 | 0,53 | 0,07 |
| | 35 | 0,50 | 0,06 | 5,9 | 0,53 | 0,07 |
| | 39 | 0,65 | 0,04 | 2,9 | 0,67 | 0,04 |
| | 42 | 0,72 | 0,05 | 3,7 | 0,74 | 0,03 |

**Note:** Differences between sexes, marked with * are significant: * P<0.05; ** P<0.01.

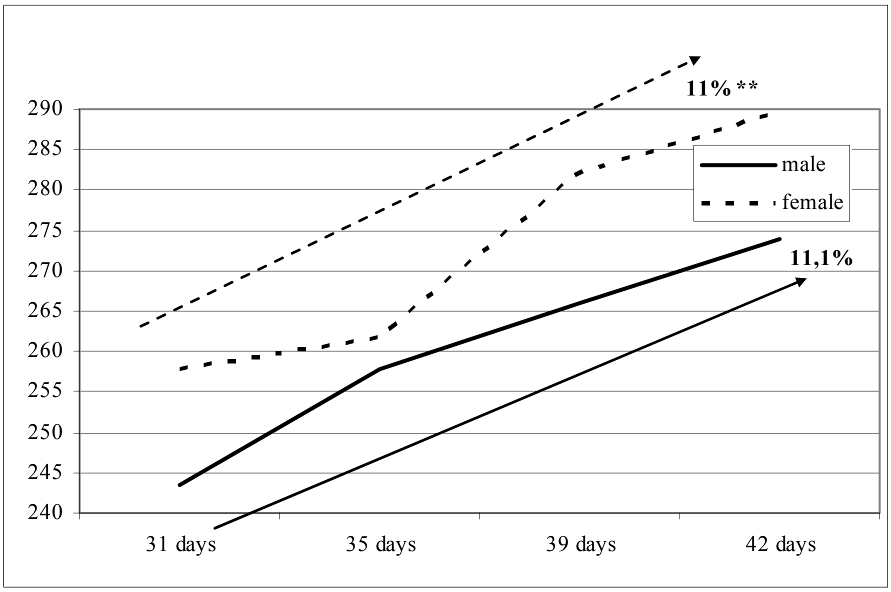


**Fig. 1.** Breast meat tenderness

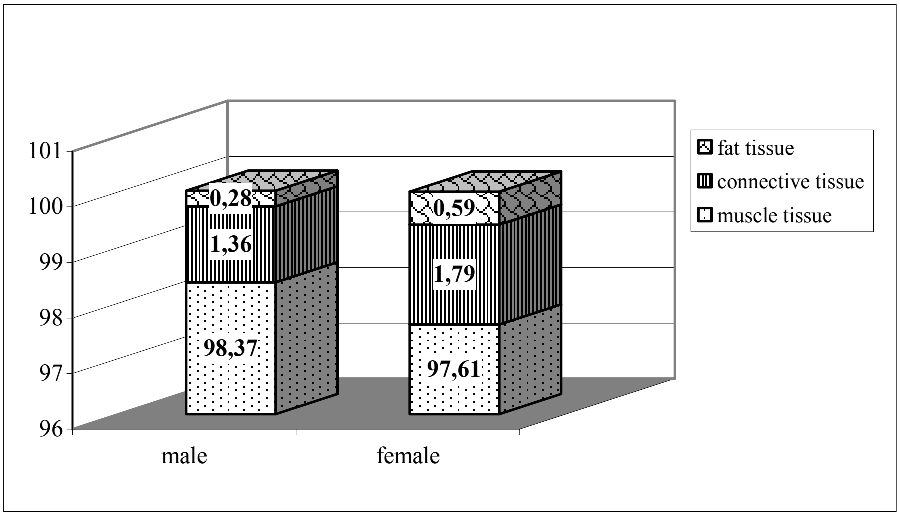


**Fig. 2.** Pectoral muscle tissue proportions, %

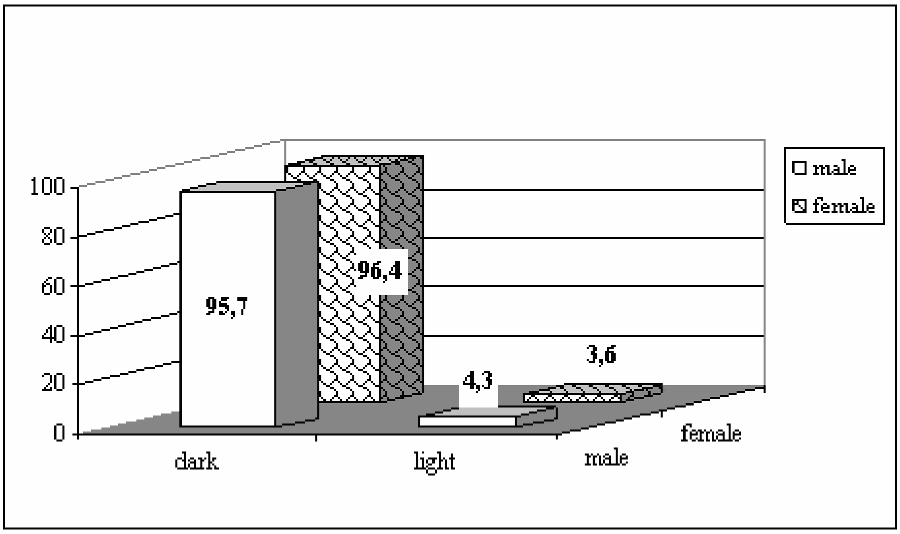


**Fig. 3.** Ratio of dark to light muscle fibres in the pectoral muscle, %

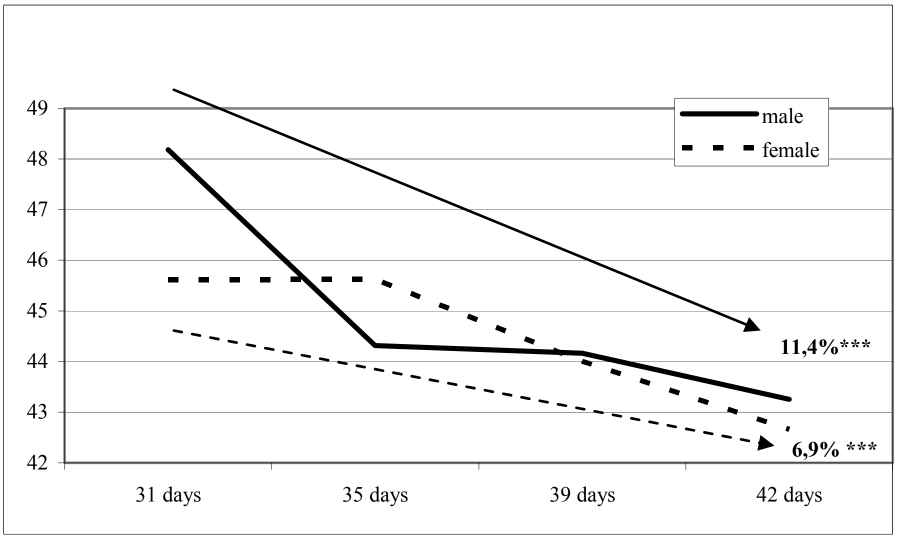


**Fig. 4.** L* values of breast meat.

The coordinates in the red/green spectrum (a*) varied from 5.1 до 14.4 (average for all samples 10.46±0.15). The coordinates in the yellow/blue spectrum (b*) ranged between 7.9 and 13.4 (10.8±0.12 on the average). Similarly to a*, the gender-related differences in b* were insignificant (10.93±0.18 in males and 10.68±0.16 in females). Breast meat redness and yellowness accounted for the excellent chroma of the meat of the studied Japanese quail breed (15.09±0.15). The average C values in males were 15.15±0.22, with a tendency towards increased chroma of meat from 14.6±0.4 to 16.2±0.4 ($P<0.05$). The average C values of breast meat in female quails were 15.03±0.22 and age-related changes were not demonstrated. This relative stability in females, together with the increasing chroma of the meat of males caused the statistically significant 8.5% difference between both genders at the age of 42 days ($P<0.05$).

**DISCUSSION**

Meat $pH_{24}$ values are influenced by numerous factors, including the morphology of muscles (16) and glycogen content, the latter being largely dependent on the locomotor activity and the presence of stress factors in the preslaughter period (17, 18, 19).

The histological profile of the pectoral muscle at the age of 35 days showed that in Manchurian Golden quails, it was mostly composed of dark muscle fibres, whose proportion to light fibres was considerably wider than data reported by Riegel et al. (1) at the age of 179 days: 84.5% vs 15.5%. The comparison of our results supports the earlier conclusions of Ribarski et al (16) for increased proportion of light muscle fibres in the pectoral muscle of quails with age. Also, the increased amount of glycolytic type muscle fibres reduces the glycolysis potential of pectoral muscles (18). Muscle fibres of the glycolytic type are characterized with high glycogen and low creatine phosphate content, i.e. the glycogen stores of these muscles are faster depleted. This is the main reason for the difference in $pH_{24}$ values in two studied topographic sites. The higher reduction of pH values of breast meat found in this study could be related to the morphology of the muscle, characterized with higher relative proportion of light fibres as compared to leg muscle. It is acknowledged that the increased relative share of glycolytic muscle fibres in muscle bundles enhances meat pH decrease (20, 21).

Contrary to breast meat, leg meat in both genders exhibited a correlation between meat pH and slaughter age. Leg muscles are mainly composed of oxidative type muscle fibres (1, 16) with considerable creatine phosphate depots, providing energy for ATP resynthesis. The high content of mitochondria in these fibres supplies oxygen for the slower aerobic glycolysis that is the main reason for high leg muscle pH values (21, 22).

The reduction in drip loss percentages with increasing slaughter age of birds correlated with age-related change in meat L* values, for according to numerous investigators, lighter meats tended to exhibit higher drip losses (8, 9, 23).

The good water holding capacity of breast and leg meat guarantees excellent technological properties of meat. The lower WHC of the pectoral muscle in female quails could be related to slightly lower breast meat pH values. Poultry meats with lower pH are characterized with lower water holding capacity (10, 11, 23).

The higher WAC of the biceps femoris muscle compared to the pectoral muscle could be explained by the metabolic profile of muscle fibres of respective muscles. Muscles with higher relative share of oxidative type muscle fibres have a higher WAC than lighter muscles (24, 25). The lack of relationship between the breast meat WAC and L* values could be explained by the relatively constant L* values with age from one side, and with the age-related increase in oxidative type muscle fibres percentage, on the other (1).

Meat tenderness is a complex parameter depending on numerous factors, including the proportion of tissue that builds up the muscle. The higher tenderness of the pectoral muscle in female quails could be attributed to the slightly higher percentage of dark muscle fibres, whose diameter is smaller than that of light ones (1, 16), as well as to the higher content of connective and especially intramuscular fat tissue (2).

The higher proportion of muscle tissue in the pectoral muscle of male quails could partly account for the higher cooking losses of breast meat in this gender. It is acknowledged that only 10-15% of muscle water is chemically bound to proteins. The other amount (about 60-65%) is "free water", that is lost during cooking as a result of protein denaturation (2).

Lower breast meat lightness (L*) values in this study, compared to other literature data for the same muscle in broiler chickens (7, 26) and turkeys (9, 27), could be explained with the morphological profile of the pectoral muscle in quails, with domination of myosin-rich oxidative-type muscle fibres. Although the difference between both muscle types increases with age of quails, Riegel et al. (1) report a continuous reduction of L* values until 38.9-40 at the age of 179 days.

The high relative proportion of oxidative type muscle fibres in breast meat of Manchurian Golden quails influences positively the other two colour characteristics (a*) and (b*). The obtained values are comparable to those published by Riegel et al. (1) for Japanese quail breast meat: 10.9-12.4, and considerably higher than values obtained in broiler chickens – from 2.2 (24) to 5.45 (25) and in turkeys: 4.9-5.5 (9). The significant differences in breast meat colour in the red/green and yellow/blue spectra between Japanese quails vs chickens and turkeys come from the different morphological structure of the pectoral muscle. The dark muscle fibres, rich in myosin that build up the breast muscles in Japanese quails, give a more saturated colour in both the red and yellow zone of the spectrum.

## CONCLUSION

Meat pH in Manchurian Golden Japanese quails from the time of slaughter to *rigor mortis* resolution, decreased from 6.13±0.04 to 5.91±0.03 in breast meat and from 6.74±0.04 to 6.58±0.04 in leg meat.

The water holding capacity (WHC) of meat varied within 18.05 and 21.7%. The water absorption capacity (WAC) of meat in physiological saline varied between 24 and 29.6% for the pectoral muscle (26.36±0.69) and between 28.2 and 37.8% for the biceps femoris muscle (32.89±0.90%).

Breast meat tenderness in Manchurian Golden quails varied from 201 to 321 $^{o}$P (261.23±2.83 for males and 275.03±3.27 $^{o}$P for females). The sex-related difference of average values was 5% (P<0.01). The tenderness of breast meat increased by about 11% with advancing slaughter age of birds from 31 to 42 days (P<0.001 for males and P<0.01 for females).

Breast meat L* values of Manchurian Golden Japanese quails varied between 40.6 and 56.1. The colour of breast meat became darker with advancing slaughter age.

The coordinates in the red/green spectrum (a*) varied from 5.1 to 14.4, and in the yellow/blue spectrum (b*) – from 7.9 to 13.4. Breast meat redness and yellowness accounted for the excellent chroma of the meat of the studied Japanese quail breed (15.09±0.15). With advancing slaughter age in males, a tendency towards increased chroma of meat from 14.6±0.4 to 16.2±0.4 (P<0.05) was observed. In females, age-related changes were not demonstrated.

At the age of 35 days, the pectoral muscle of Manchurian Golden Japanese quails was composed from 95.7-96.4 % dark muscle fibres . The percentage of light muscle fibres varied within 2.9 and 5.2%. In male quails pectoral muscle was built from 98.37±0.18% muscle tissue, 1.36±0.14% connective tissue and 0.28±0.05% intramuscular fat tissue. In female quails, the respective values were 97.61±0.20% muscle tissue, 1.79±0.22% connective tissue and 0.59±0.04% intramuscular fat tissue.

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