

BIBLIOGRAPHICAL STUDY REGARDING THE QUAILS' MEAT QUALITY IN COMPARISON TO THE CHICKEN AND DUCK MEAT

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Abstract

The purpose of the present paper is to find out the present degree of research regarding the features of the quails' carcass and meat, as well as to compare them to the chicken and duck. From the research we made it turned out that the slaughtering output of the quails varies quite largely between 67.8 - 78.0 %, the average breast proportion varies between 34.4 - 41.04 %, the thighs one between 22.6 - 24.3 %. The features of the quails carcass are resembling to the chicken broiler, whose slaughtering output varies between 68 - 76 %, the average breast proportion varies between 20.4 - 36.8, the thighs one between 23.3 - 30.3 % of the carcass weight (an exception being the average breast which is generally larger in quails). For the duck, the slaughtering output varies between 65.3 - 74.8 %, the average breast proportion between 12.3 - 21.9 %, the thighs one between 10.4 - 15.7 %, features which are in general inferior to the chicken and quail carcasses. The pH of the quails is 6.17, while the pH of the chicken broiler meat is more acid (5.86) and for the duck meat is more alkaline (7.18). The quails meat has a more reduced calories level and a higher protein level than the chicken and the duck meat. The fat content is lower in quail than in chicken and duck meat and the proportions of vitamins (A, C, B2, B6, B12) and minerals (Ca, Fe, P, K, Zn, Cu) higher.

Key words : meat, quality, quail, chicken, duck

INTRODUCTION

Raising quails for meat production is a genuine alternative to other animals raised as sources of animal protein [6]. According to data from [23], in 2007 the main quail meat producing countries were China, with over 160,000 tones, followed by Spain with over 9,000 tones, 8,000 tones France, Italy and SUA 3000 tons each. There are other countries that produce meat quail such as Australia, with over 1,500 tones, Portugal and Brazil with over 1,000 tons each. Major exporting countries of quail meat are Spain (over 3,700 tones, exported mainly in France and Austria), France (over 1600 tones, mainly exported to Germany and Belgium) and Italy (over 650 tons). According the same source, meat quails weight at slaughter is around 200 g and the average yield is 70% of the live weight.

MATERIAL AND METHOD

For the preparation of this bibliographical research several publications (papers, books

and journals) on the quality of Japanese quail meat, chicken broiler and duck have been studied.

RESULTS AND DISCUSSIONS

Carcass characteristics of quail

In a study conducted in Bulgaria by a team of researchers led by [7] in a flock of young quails aged 35 days, were determined the following quail carcass features (on average between males and females): 64.5% carcass yield (carcass with skin), a 25.38% share of the breast of the carcass weight, 16.3% of the legs and the meat from the breast and legs of 34.64% at the age of 35 days.

In a study on the production performances of quails made in Egypt in many meat quails flocks by a group of authors [18] Carcass yield was determined. It varied between 63% and 68% of live weight (199 and 220 g) at the age of 42 days. In a study on the results of slaughtering the quails at 42 days of age [5] conducted in Romania

on male youth from mixed quails were established the following parameters: carcass yield (with skin) 70.86%, 41.04% share of breast of carcass weight, 24.34% the legs, 26.91% that of the back, 10.28% of the wings, 5.45% the blood, 6.71% the feathers and 16.98% the organs and intestines of carcass weight.

In an experiment conducted in Iran on youth quail [21] has resulted a carcass weight in average of 125.9 g, a rate of 40.41% of the breast and 22.61% legs of carcass weight. In another study conducted in Turkey [18] has resulted a body weight at the age of 42 days of 178.23 g, an average carcass weight of 123.92 g and a carcass yield of 69.57%. A similar study conducted in Mexico [8] in youth meat quails was determined an average carcass weight of 159.48 g and a carcass yield of 68.23%.

In a study conducted in Romania [10] for youth mixed and for meat quails aged 42 days, the following parameters were determined: an average carcass weight of 140.5 in mixed quails and 160 g in meat quails, a blood proportion of 5.54% of the carcass weight at mixed quails and of 5.41% at meat quails, a proportion of feathers at mixed quails of 6.65% and 6.49% at meat quails and the proportion of organs and intestines of 15.43% at mixed quails and of 17.3% at the meat quails. In a study conducted in Nigeria [19] on a flock of Japanese quail males aged 10 weeks was established a carcass yield of 67.82%, a proportion of 34.41% of the breast and 24.02% of the legs.

Researchers [3] (2010, Malaysia) established in an experiment on quail youth aged 8 weeks the following chemical compositions of the carcass: water 68.98%, protein 18.99%, fat 9.21%, minerals 1.52% and carbohydrates 1.30%. Researchers have determined the chemical composition of quails slaughtered carcass of 8 months of age, respectively: 66.97% water, 17.48% protein, 12.91% fat, 1.44% minerals and 1.21% carbohydrates.

The same researchers also determined the pH value of 6.53 of the carcasses from youth quails and 6.62 of carcasses from quails slaughtered at the age of 8 months.

Researchers have also determined that in young quails, of the total composition of fatty acids, saturated fatty acids represent 25% and 75% unsaturated fatty acids, of which 42% monounsaturated fatty acids and 33% polyunsaturated fatty acids, while quails carcasses slaughtered at the age of 8 months saturated fatty acids is 29% and 71% are unsaturated fatty acids, of which 43% monounsaturated fatty acids and 28% polyunsaturated fatty acids. In an experiment on young quails researchers [4] led to a carcass weight of 125.25 g for males, respectively a carcass yield of 78.03% and a carcass weight of 138.19 g for females, ie a carcass yield of 72.66%.

Carcass characteristics of chicken and duck broiler

In a study conducted in Romania [2] on hybrid Ross 308 chickens aged 42 days was determined an average carcass weight of 1792 g, a carcass yield of 74.1%, an average of 36.8% of breast of the carcass weight, 10.55% of the wings, 30.3% of the legs and 21.9% of the back. The same authors determined a ratio of meat / bone of 4.21 / 1, a content of 73.2% water, of 23.79 protein, 0.75% fat and 1.05% a minerals.

Researchers [15] determined in an experiment conducted on broiler chicken an average carcass yield of 75.92%, an average weight of 20.44% of the breast from the carcass weight, a rate of 17.97% of the back, 23.41% of the legs and 8.76% of the wings. In a study conducted in Germany [9] on S457 ISA broilers 84 days of age (extensive) was determined an average carcass weight of 3350 g, a carcass yield of 67.9%, a 23.3% share of the legs and 17% breast muscle.

A study conducted in Vietnam [14] on Muscovy ducks youth aged 70 days was set 1253 g carcass weight and a carcass yield of 73.5%. In a study conducted in Nigeria [17] on youth ducks Rouen, Pekin and Muscovy was determined an average carcass weight of Rouen males of 1286.7 g and 1191.7 g for females, at Pekin ducks an average carcass weight of 1583.3 g in males and 1300 g in females, while in Muscovy ducks an average carcass weight of 1816.7 g in males and

1250 g in females. The carcass yield for the three breeds of ducks used in the experiment had the following values: Rouen ducks from 68.9% in males to 65.28% in females, Pekin ducks from 66.7% in males to 68.78% females and in the Muscovy ducks 71.18% in males and 69.75% in females. Also, the researcher [17] determined the average proportion of blood, respectively: 6.10% in males and 7.12% in females Rouen ducks, 9.52% in males and 4.88% in females Pekin ducks and 7.63% in males and 6.25% in females Muscovy ducks.

The average ratio of feathers was of 10.98% in males and 12.39% in females at Rouen ducks, 10.48% in males and 12.10% in females at Pekin ducks and 9.32% in males and 12.25% in females in Muscovy ducks. The investigator [17] determined the average weight of the carcass parts: thus the wings proportion was of 12.19% in males and 10.57% in females at Rouen ducks, 15.71% in males and 13.67% in females at the Peking ducks, and 15.27% in males and 13.16% in females at Muscovy ducks. The average legs ratio was 10.37% in males and 10.91% in females at Rouen ducks, 9.24% in males and 10.41% in female Pekin ducks and 10.38% in males and 9.95% in females Muscovy ducks; the average proportion of the breast was 15.54% in males and 12.32% in females Rouen ducks, 14.65% in males and 18.74% in females at Pekin ducks and 20.03% in males and 18.78% in females of Muscovy ducks; the average ratio of back was of 16.85 in males and 14.93% in females at Rouen ducks, 13.38% in females and 18.51% in males at Pekin ducks and 18.34% in males and 18.31% in females at Muscovy ducks. Other researchers [20] were determined in an experiment on ducks youth aged 8 weeks an average carcass yield of 71.58% in Pekin ducks and 74.8% in Muscovy ducks, an average rate of 21.86% of the breast in Peking and 21.93% in Muscovy ducks, and a proportion of legs of 14.9% in Pekin and 15.75% in Muscovy ducks.

Water retention capacity, meat pH and quail carcass temperature

In a study conducted in Bulgaria [7] in a flock of quails aged 35 days, were determined values of water retention capacity (22.08% for the breast and 25.51% for the legs) and the carcasses quail pH, 24 hours after slaughter (6.17), and quail carcass temperature after slaughter (14.3 °C at 30 minutes, 6.4 °C at 24 hours and 6.3° C at 7 days after slaughter). The researcher [1] has determined chicken carcasses stored for 24 hours at a temperature of 4 °C pH value of 6, the average breast and thigh chicken carcasses. The researchers [12] (2008, Thailand) determined in chicken meat the water holding capacity of 23.63% and a pH value of 5.89. In another study [13] (Thailand 2008) determined a pH value of chicken meat from 5.96 to 45 minutes of slaughter and a value of 5.86 to 24 hours of slaughter. The same researchers also determined the amount of water retention capacity of 22.89% of the breast meat and 19.92% for the legs. The researchers [11] (2010, Malaysia) determined in the duck meat the water holding capacity of 65.23% and a pH of 7.18

Fat content of quail meat compared to chicken meat and duck meat

The carcasses of chickens kept for 24 hours at a temperature of 4 °C, the researcher [1] determined a rate of 65.3% water, the protein content of 19.2%, 14.5% fat and substances 1% minerals.

As Table 1 shows, the flesh of quails [22] has a lower calorie level and a higher protein level than chicken and duck meat. Quail meat also has a lower fat content than chicken and duck meat. Given the fact that the high proportion of duck meat and fat content in monounsaturated and polyunsaturated fats is higher compared with chicken and quail meat. Omega 3 fatty acids content is higher in quail meat, followed by the duck meat and then the chicken. The proportion of omega-6 fatty acids is higher in duck meat, followed by the meat of chicken and quail. Cholesterol content is approximately the same for all three types of meat.

Table 1 : Energy value, protein and fat content of quail meat compared to chicken and duck (Food and Nutrition Information Center, USDA)

Specification	Quail meat	Broiler chicken meat	Adult duck meat
Water, %	69.7	66	48.5
Energy value	192 Kcal (804 kJ)	215 kcal (900 kJ)	404 kcal (1691 kJ)
Proteins, g	19.6	18.6	11.5
Total fat, g, which:	12.1	15.1	39.3
- Saturated fat	3.4	4.3	13.2
- Monounsaturated fat	4.2	6.2	18.7
- Polyunsaturated fat	3	3.2	5.1
Omega 3 fatty acids, mg	460	190	390
Omega 6 fatty acids, mg	2300	2880	4691
Cholesterol, mg	76	75	76

Vitamin and mineral content of quail meat compared to chicken meat and duck meat

Table 2 : Vitamin and mineral content of quail meat compared to chicken meat and duck meat (100 g meat)*

Specificare	U.M.	Quail meat	Broiler chicken meat	Adult duck meat
Vitamin A	UI	243	140	168
Vitamin C	mg	6.1	1.6	2.8
Vitamin E	mg	-	0.3	0.7
Vitamin B2 (riboflavin)	mg	0.3	0.1	0.2
Folic acid	mcg	8	6	13
Vitamin B12	mg	0.4	0.3	0.3
Vitamin K	mcg	-	1.5	5.5
Vitamin B1 (thiamine)	mcg	0.2	0.1	0.2
Vitamin B3 (niacin)	mg	7.5	6.8	0.2
Vitamin B6	mg	0.6	0.4	0.2
Vitamin B 5 (Pantothenic acid)	mg	0.8	0.9	1
Vitamin B4 (choline)	mg	-	59.7	31
Calcium	mg	13	11	11
Iron	mg	4	0.9	2.4
Magnezium	mg	23	20	15
Phosphorus	mg	275	147	139
Potassium	mg	216	189	209
Sodium	mg	53	70	63
Zinc	mg	2.4	-	1.4
Copper	mg	0.5	-	0.2
Manganese	mg	-	-	0.38
Selenium	mcg	16.6	14.4	12.4

* after Condé Nast Publications, Nutritiondata

According to Table 2, the flesh of quails have higher proportions of vitamin A, vitamin C, vitamin B2, vitamin B3, vitamin B6 and vitamin B12 than chicken and duck meat, duck meat have higher proportions of vitamin E acid Folic acid and vitamin K pantotanic than quail and chicken meat, while chicken meat have higher proportions of vitamin B4 compared with quail and duck meat. With regard to mineral content, quail meat is rich in calcium, iron, magnesium,

phosphorus, potassium, zinc and copper compared with chicken and duck meat, duck meat is rich in manganese and selenium compared with the quails and chickens, while chicken meat contains more sodium than the quail and

CONCLUSIONS

Carcass yield of quails at the age of 42 days varies quite largely, between 67.8 and 78.0% respectively. Quail carcass

characteristics are similar to those of broiler chicken carcasses, except the average weight of the chest, which is generally higher. Regarding common and Muscovy duck carcasses characteristics, they are generally lower than quail and chicken carcasses. If any meat of quail and chicken proportion of water is quite similar (69.7% for meat quail and 66% for chicken meat), duck meat is lower (48.5%). The protein quail meat (19.6%) is higher than that of chicken meat (18.5%) and higher than that of meat duck (11.5%). Quail meat has a calorific value of 192 g kcal/100 meat, chicken meat 215 g kcal/100, while the duck meat has a calorific value twice that of quail meat (404 g kcal/100 meat).

Quail meat is low in fat content (12.1 mg/100 g meat) than chicken (15.1 mg/100 g meat) and duck (39.3 mg/100 g meat). However, quail meat has the highest amount of Omega 3 fatty acids. Also quail meat has a high quantity of vitamin A (243 UI/100 g meat) compared with chicken (140 UI/100 g meat) and duck (168 UI/100 g meat) and vitamin C (6.1 to 1.6 mg/100 mg/100 g meat meat chicken and duck meat 2.8 mg/100 g). quail meat has a very high amount of iron (4 mg/100 g meat, compared to 0.9 mg/100 g of chicken meat and 2.4 mg / 100 g duck), phosphorus (247 mg/100 g compared with 147 mg/100 g meat chickens and ducks to 139 mg/100 g) and zinc (2.4 mg/100 g meat quails). Quail meat has a neutral pH at 24 hours after slaughter (6.17), while chicken meat has a slightly acid pH (5.86) and duck meat has a more alkaline pH (7.18). Cholesterol content is about the same in all three species (75-76 mg / 100 mg meat).

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