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MEAT CHARACTERISTICS OF WILD PHEASANT VERSUS FARMED PHEASANT

Iuliana Ștefania BORDEI, Daniela IANIȚCHI, Monica Paula MARIN, Marius MAFTEI, Teodor GAVRIȘ, Marius GHEȚA, Carmen Georgeta NICOLAE

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Marasti Blvd, District 1, Bucharest, Romania

Corresponding author email: iulianabordei10@gmail.com

Abstract

The pheasant is a widespread bird in most European countries, especially raised to be hunted. The pheasant can be raised in captivity and released before hunting. Nutritionists recommend an increased consumption of pheasant meat due to its nutritional qualities. This meat contains small amounts of fat; it is rich in vitamins, minerals, calcium and has a low percentage of cholesterol and carbohydrates. The pheasant meat also contains B vitamins, iron, zinc, copper, magnesium, phosphorus. It is a good aliment for people who suffer from thyroid disease, due to the large amount of iodine. It is considered that the pheasant reaches culinary maturity at the age of 6 months, at this age reaching a weight of 1.5 kg. According to studies, the slaughter yield of pheasants is 60.9% to 67.7%. Regarding body sizes, in the case of wild pheasant, the size of chest was bigger compared with the thighs. In terms of meat quality, depending on rearing conditions, were reported slightly higher values for the amount of fat in meat in farmed pheasants compared to those in the wild. Compared to broilers, the amount of protein in the dry matter of meat extracted from the breast was much higher, as it follows: 5.16% in females and 9.95% in males.

Key words*: carcass, meat quality, pheasant*.

INTRODUCTION

Pheasant is widespread in most European countries, where birds hunting represent a tradition. It is still practiced today, taking many forms and having a high economic and social effect on rural areas (Lecocq, 2004; Pogurschi et al., 2018). Following the intensification of agriculture, in recent decades the number of pheasants raised in captivity has increased and they are released before hunting, this being a common practice in European countries (Draycott et al., 2002). In Romania pheasants are divided into two large classes: game pheasants and pet pheasants (Dronca et al., 2008). Pheasants are part of Galliformes Order, and Phasianidae Family.

The pheasant have origins in Asia and was introduced to Romania in order to be raised in freedom for hunting or to be kept in aviaries as a species of decoration. Later, the pheasant began to be raised in captivity.

In the fauna of the Asian continent, starting from the eastern shore of the Black Sea to the Far East, from a taxonomic point of view, there are 42 subspecies, but only three subspecies are important for our country:

- Common pheasant – *Phasianus colchicus colchicus* Linnaeus, 1758;
- Mongolian pheasant – *Phasianus colchicus mongolicus* von Brandt, 1844;
- Collared pheasant – *Phasianus colchicus torquatus* Gmelin, JF, 1789 (https://avibase.bsc-eoc.org/).

The oldest and best known in Europe is *Phasianus colchicus colchicus.* The male is called the pheasant rooster, and the female pheasant or pheasant hen. The colour of the male is more intense and more attractive than that of the female. It is native to the Caucasus region, from where it was brought to Europe by Greeks and Romans. It has a smaller body than the collared and Mongolian pheasant and unlike them it does not have a white collar. The general colour is darker than the two mentioned above; metallic dark green with a shade of blue on the head and neck, while the whole body is dark red, with greenish brown wings, and a tail with closed transverse stripes. It is less prolific than the others; instead it has a greater resistance,

requiring less care from people, to stay in the field (Cotta et al., 2008).

The pheasant is an active, diurnal bird, looking for its food in the environment. Its main food source are vegetables (various seeds of wild plants, cereal crops, with small fruits or their seeds, leaves, stems, tubers), as well as animals (larvae, caterpillars, butterflies, Colorado potato beetle, field mice and other small rodents that fall into their claws), a ratio that changes depending on weather and season conditions.

Pheasants are polygamous birds. Males choose a high place in their territory and begin to sing until they attract between 4-6 females who begin to build their nest. The females lay eggs, depending on the climatic conditions of the area, from the end of April to the beginning of May. They produce 7 to 18 eggs, which they hatch for 23-27 days. The average size of the egg is 4.5 x 3.6 cm. The chicks become independent 12-14 days after hatching. At the age of 9 months, pheasants reach sexual maturity. Body weight in females is 600 – 900 g, and in males between 1 – 1.5 kg. The pheasant carcass has a triangular shape, the chest and waist are narrow, and the back and legs are thin, being different from the carcasses of other birds (Figure 1).

Figure 1. The pheasant carcass aspect (www.wildmeat.co.uk)

The colour of the meat is reddish with a mixture of blue. It is considered that the pheasant reaches culinary maturity at the age of 6 months, at this age reaching a weight of 1.5 kg.

Pheasant meat is tender, very juicy, tasty and nutritious. It is considered to be dietary and has low cholesterol content. The energy value is relatively low, 253.9 kcal per 100 g because it contains a small amount of fat (https://ro.blabto.com).

The presence of large amounts of B vitamins and the balance between protein and fat makes this meat beneficial for health and it has a wide range of minerals that fully meet the needs of the body. With such properties, pheasant meat is highly valued and is considered a delicacy.

MATERIALS AND METHODS

This article presents a review of several relevant literatures on pheasant species, biology, and carcass structure, chemical and physical characteristic of pheasant meat. The study can represent a base for further studies about pheasant meat characteristics, useful for human nutrition, health, food processing and safety.

RESULTS AND DISCUSSIONS

In the literature, pheasant meat is presented as having a high content of proteins and a low fat content, which makes it nutritionally superior to chicken. Also, the chest muscles have a higher nutritional value than the haunch muscles (Straková et al., 2012). It was observed that there are differences in carcass structure and chemical composition of muscle tissues (Tucak et al., 2008).

The chemical composition of pheasant meat and chicken meat is presented in Table 1.

Table 1. Chemical composition of chicken and pheasant meat

Chemical Composition	Species	
	Pheasan	Chicken
Water	72.05%	72-74%
Protein	22.15%	18-22%
Lipid	0.98%	3%
Mineral salts	1.16%	0.9-1.2%

According to Franco et al. (2013), the dry protein content was much higher compared to meat from broiler chickens. The breast of pheasant females has a 5.16% higher protein content than the broiler chicken breast, and the pheasants meal can exceed the protein content compared to the broiler chickens by 9.95%.

Following the studies performed by Tucak et al. (2008), he made a comparison between hunting pheasants and breeding pheasants, by sex, analyzing both the physical aspect of pheasants and the chemical composition of the chest and leg muscles.

Table 2 shows the weight and the main parts of the pheasant's body, presented as a percentage. The study was performed on a number of 10 pheasants in each group. The male hunter pheasant weighed the most. The differences between these group are significant, the largest haunch and the largest chest being also recorded in the male hunting pheasant.

Table 2. The weight and main parts of the pheasant (Tucak et al., 2008)

Specification	Farmed pheasant		Wild pheasant	
	Male	Female	Male	Female
Weight (g)	1144.20±197.58	969.80±157.42	1232.4±147.36	918.80±89.88
Weight without feathers (%)	95.30±1.09	95.61±2.37	95.08±2.93	95.68±1.69
Breasts (%)	26.74±3.23	26.88±2.84	29.89±3.14	31.41±1.38
Backs (%)	19.96±2.79	19.43±1.72	15.55±2.47	16.70±2.28
Tights (%)	20.08±1.37	20.30±1.35	22.52±1.95	21.51±1.00
Wings (%)	8.15±0.56	7.83±057	8.78±1.14	8.77±0.76
Liver and heart (%)	3.14±0.57	3.44±0.60	2.77±0.24	2.72±0.73
Head and legs (%)	7.46±0.88	6.25±0.73	6.51±0.60	6.10±0.30
Subcutaneous skin and fatty tissue (%)	6.54±1.66	13.98±5.02	4.58±1.13	5.35±1.47
Bones (%)	12.05±3.54	95.61±2.37	15.50±5.62	17.20±3.89

As with other hunting birds, female pheasants have a body weight with 15-40% smaller than male pheasants, of the same age and growing conditions (Richter et al., 1992; Tucak et al., 2008; Golze, 2010). Also, race, age and diet, can have a significant influence on body weight (Tucak et al., 2008; Golze, 2010).

After sacrificing the birds, values of 875.4 ± 86.6 g and 555.3 ± 88.8 g were obtained for the eviscerated carcasses of male and female pheasants from hunting, which represents 65.5 ± 1.8 %, respectively 60.9 ± 3.7 % of the mass of whole birds. Other studies have shown better carcass yield results, such as 67.7 % and 64.5 % according to Richter et al. (1992), and 66 - 68 % according others (Golze, 2010).

For the male pheasant, the edible viscera (the lower part of the lower stomach, heart, liver), chest and haunch are 75.0 ± 9.9 g, 270.8 ± 27.7 g, 264.0 ± 22.4 g, and for the female pheasant it is 70.4 ± 8.5 g, 169.2± 28.7 g and 166.8 ± 23.9 g (Tucak et al., 2008; Richter et al., 1992). Also, the chest and thigh muscles represent 61.2 ± 2.8 % for females versus 61.5 ± 2.5 % for males in the mass of the eviscerated carcass. A number of studies indicate that gender does not influence the percentage of carcass muscle weight (Kuzniacka et al. 2007; Tucak et al. 2008; Golze 2010), while the free range versus pheasantry system will influence the ratio between the thighs and chest (Golze, 2010).

Table 3. Chemical composition of chest and thights muscles (Tucak et al., 2008)

Specification	Farmed pheasants				Wild pheasants			
	Male		Female		Male		Female	
	Breast	Tights	Breast	Tights	Breast	Tights	Breast	Tights
Water (%)	76.61	71.58	71.77	71.42	72.33	74.50	72.43	73.65
Lipides (%)	1.15	6.62	1.69	6.81	0.96	2.11	1.14	2.92
Proteins (%)	25.11	20.71	25.38	20.63	25.57	22.22	25.53	22.32
Mineral salts (%)	1.16	1.09	1.15	1.06	1.14	1.15	1.12	1.11
Ca (%)	0.019	0.021	0.018	0.020	0.032	0.039	0.029	0.039
P (%)	0.219	0.205	0.230	0.197	0.239	0.209	0.228	0.208
Energy value KJ/100g	485.66	621.91	512.23	629.20	487.02	472.92	489.45	506.01

In the experiment made by Tucak et al., in 2008, it was reported higher lipid values in farmed pheasants compared to hunting pheasants, the highest amount of lipids being recorded in the leg muscles in farmed pheasant (Table 3). The protein content, the energy value of the meat and

the mineral salts content having similar values in both groups of birds studied.

On the other hand, according to the study by Straková et al. (2011), protein and fat levels were 93.72% and 2.95%, respectively, compared to the dry matter of the pheasant breast, while in the haunch there were found concentrations of 78.18% for protein and 16.36% for fat.

Also the same parameters were analyzed in fresh meat where there were found the following proportions: for the breast 20.73% protein and 0.13% fat, while in the meat from the haunch were found 25.66% for protein and 3.9% for fat (Severin et al., 2006; Hofbauer et al., 2010; Franco & Lorenzo, 2013).

Nuernberg et al. (2011), noted that both the wild pheasant and the farmed pheasant accumulate more fat in the thigh muscles than in the chest muscles. It also should be noted that the chemical composition of poultry meat in general, and especially of pheasant, is not a constant attribute (Ciobanu et al., 2019). It is affected by season (Smankó et al., 2007), gender (Piaskowska et al., 2015; Purchas et al., 2010), age (Dannenberger et al., 2013) and muscle type (Razmaité et al., 2015).

There are not many information in the literature on the physical characteristics of pheasant meat, such as colour, pH, water retention capacity (Fletcher, 1999; Bendall, 1988; Mach et al., 2008).

Pheasant meat has a slightly acidic pH, between 5.66 - 6.03 values and the water retention capacity varies between 1% and 3% (Hofbauer et al., 2010).

In Table 4 are presented, according to Hofbauer et al. (2010), the variation of pH and water-holding capacity (drip loss) in both chest and thigh muscles for hunting pheasants and farmed pheasants. Water-holding capacity has implications in fresh meat shelflife and in meat processing technology. It is influenced by meat pH.

Table 4. Physical characteristics of the chest and thigh muscles (Hofbauer et al., 2010)

Specification	Farmed pheasant		Wild pheasant	
	Breast	Tights	Breast	Tights
pH	5.66±0.08	6.03±0.20	5.55±0.16	5.93±0.25
Water-holding capacity (%)	3.03±0.57	1.49±0.36	2.19±1.37	1.00±0.56

In both studied groups of birds, the pH has a significant value, 0.4 units in the thigh muscles, similar to previous studies conducted by Richter et al., 1992; Kuzniacka et al., 2007; Paulsen et al., 2008.

In muscle composition, the pheasant breast is predominantly made of muscle fibres with rapid contraction or glycolytic metabolism (>70 %), while the thigh muscles are composed of muscle fibres with glycolytic-oxidative metabolism or other types of fibres with oxidative metabolism (Kissling, 1977). This is specific to all poultry, being an advantage of fast take-off in flight at the expense of long-haul flights (Pyörnilä et al., 1998).

Also, stress in the *prerigor mortis* period can greatly influence the structure of muscles rich in type II B fibres but, given the cited studies on pheasants, it is not clear how to assess the stress caused by hunting.

Water-holding capacity was higher in muscles with a lower pH (Hofmann, 2004).

In the farmed pheasant, the quality of the meat is influenced, as in the other birds, by species, breed, gender, age, food, maintenance condition and slaughter conditions (Marin et al., 2015).

The quality of wild pheasant meat, according to Cristescu (2004), can be influenced by a number of factors that can sometimes determine its total or partial elimination from consumption. The factors that influence the quality of game pheasant meat are: how the pheasant is shot, the removal of internal organs, the cooling of the body, transport and storage, as well as the diseases it suffers from before harvesting.

The wound must be protected from dirt and moisture, as it can become infected and develop microbial flora. At the same time, the wound must be protected from flies because from their eggs become worms, which can penetrate into the muscle tissues.

The quality of the meat is also influenced by the place where the bullet enters in the body of the pheasant. For example, the penetration of the bullet into the abdomen, produces in most cases,

the overflow of the intestinal contents in which various microbes are found that influence the quality of the meat and give it an unpleasant odour (Nesterov, 1969).
The cooling of the venison after the shooting has a significant importance for the quality of the meat, its preservation and use in human food. The time required to cool the pheasant body differs from ambient and seasonal temperatures. The cooling time in autumn is 4 - 5 h and in winter 3 - 4 h. It is very important to respect the cooling time because it can lead to burning of the meat, biochemical process of decomposition of substances in the muscles, damaging the meat, printing them an unpleasant, repulsive, sour smell.
To prevent the depreciation of pheasant meat, it is necessary to remove the intestines because the intestinal contents decompose easily, producing gases and bad-smelling substances, which are transmitted to the meat.
Transporting shot pheasants is the most difficult part. During transport, overlapping, crowded storage, wounding of the wound must be avoided. Packing in plastic bags should be avoided as there is a danger of quickly alteration due to the fact that complete ventilation and cooling cannot be ensured.
All these factors contribute to the quality of pheasant meat. Food quality is a concept associated to products requirements to comply with standards, specifications, and consumer expectations (Nicolae et al., 2016).

CONCLUSIONS

As shown above, pheasant meat is suitable for consumption because it can be considered dietary due to its low fat content and is extremely rich in protein, B vitamins and high mineral content with increased bioavailability and bioactivity. In terms of economic efficiency, the pheasant contributes to the development of areas where hunting is practiced.
The studies show a significant difference between farmed pheasant and wild pheasant, in term of lipid content. It has been found that the farmed pheasant contains a higher amount of fat in the thigh muscles than the wild pheasant. Instead, the content of protein and minerals shows similar values for both rearing systems.
Regarding the weight related aspects, the highest weight recorded in the body, breasts and tights muscles was in the male wild pheasant.

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