

## INDICATORS OF BIOLOGICAL VALUE OF THE PHEASANT MEAT ORIGINATED FROM NATURAL AND CONTROLLED BREEDING

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### ABSTRACT

The authors made a comparative research of the influence of natural food and mixture prepared according to prescription on the metabolism of pheasants, which is evident as biological value of meat. The results indicated that pheasants fed on natural food had much higher biological value of meat compared to those which consumed commercially prepared mixture. The recommendation of the study is that people as the ultimate consumers take an opportunity to choose meat of the pheasants, or other winged game originated from natural way of life.

Key words: pheasants / breeding / animal nutrition / meat / biological value

## KAZALCI BIOLOŠKE VREDNOSTI MESA FAZANOV IZ NARAVNIH IN KONTROLIRANIH REJ

### IZVLEČEK

Avtorji so primerjali vpliv krme na metabolizem pri fazanih, izražen kot biološka vrednost mesa. Primerjali so živali, ki se prehranjujejo prosto živeče v naravi, s tistimi, ki so jih krmili s krmno mešanico. Rezultati kažejo na boljšo biološko vrednost mesa pri fazanih, ki so se prehranjevali s krmo iz naravnega okolja v primerjavi s fazani krmljenimi s komercialno krmno mešanico. Avtorji potrošnikom priporočajo izbiro mesa fazanov in druge divje perutnine iz naravnega okolja.

Ključne besede: fazani / reja / prehrana živali / meso / biološka vrednost

### INTRODUCTION

The point of our researches was to establish biological value of pheasant meat (*Phasianus colchicus*) bred in nature and in pheasants farm. Pheasants which are used in our research were shut down during the November and December 2002.

### MATERIALS AND METHODS

The pheasant (Kiessling, 1977; Treer end Tucak, 1991; Tucak end *et al.*, 2002) in our researches are from Osijek - Baranya county in The Republic of Croatia, in which are placed numbers of hunting-grounds and pheasants farm «Darda».

Analized meat samples were from two experiment groups:

- pheasant bred in nature: 20 pieces (10 males and 10 females)
- pheasant bred in pheasants farm «Darda»: 20 pieces (10 males and 10 females).

After pheasant had been killed, we determined the total weight of each pheasant.

- total weight of each pheasant with feathers
- total weight of each pheasant with out feathers.

Preparing the body for analyzing:

- 1) remove the head and tights with drumsticks
- 2) body chopped in parts: breasts, tights with drumsticks, backs, wings, heart and liver.

Samples had been taken separately, from breast muscle (white meat) and muscle from tights with drumsticks (dark meat). Muscles were separated from bones, and from muscles skin with subcutaneous fat were removed. Prepared samples of «white and dark» meat were cut up in small pieces and homogenized for purpose of analysis.

Every sample had been chemically analyzed (Christie and Moore, 1972; Grahn *et al.*, 1993; Grahn *et al.*, 1993) to establish ratio (%) of moisture, proteins (Kjeldahl), fat (Soxhlet), calcium, phosphorus, ash and energetic value. Results were processed by STATISTICA program version 6.0.

For establishing the difference between experimental groups were used ANOVA.

## RESULTS AND DISCUSSION

In Table 1. had been shown weight (g) and base parts of pheasant body in absolute (g) and relative (%) values. The highest weight achieved males of wild pheasant ( $1232.4 \pm 147.36$  g). The differences between pheasant testing groups were statistically very significant ( $P < 0.001$ ). The highest breast and tights with drumsticks weights had been also notified by wild pheasant males ( $351.0 \pm 61.31$  g i. e.  $265 \pm 47.02$  g).

Table 1. Weight (g) and fundamental parts of pheasant body (g, %)

	Cultivation pheasant		Wilde pheasant		P
	m* (n=10)	f** (n=10)	m* (n=10)	f** (n=10)	
Weight, g	1144.20±197.58	969.80±157.42	1232.4±147.36	918.80±89.88	<0.001
Weight without feathers, g	1089.40±182.88	925.60±139.24	1172.4±149.98	878.80±84.07	<0.001
Weight without feathers, %	95.30±1.09	95.61±2.37	95.08±2.93	95.68±1.69	0.174
Tights with drumsticks, g	219.40±44.10	189.00±37.51	265.00±47.02	188.60±14.39	<0.001
Tights with drumsticks, %	20.08±1.37	20.30±1.35	22.52±1.95	21.51±1.00	0.002
Breasts, g	295.20±74.29	248.10±39.47	351.00±61.31	276.40±31.73	0.001
Breasts, %	26.74±3.23	26.88±2.84	29.89±3.14	31.41±1.38	<0.001
Backs, g	218.60±55.95	180.20±32.92	183.80±45.09	147.40±27.42	0.006
Backs, %	19.96±2.79	19.43±1.72	15.55±2.47	16.70±2.28	<0.001
Wings, g	88.60±14.85	71.80±6.49	102.40±15.57	76.80±6.94	<0.001
Wings, %	8.15±0.56	7.83±0.57	8.78±1.14	8.77±0.76	0.023
Liver and heart, g	34.60±9.09	31.30±3.77	32.40±4.09	23.60±5.80	0.002
Liver and heart, %	3.14±0.57	3.44±0.60	2.77±0.24	2.72±0.73	0.023
Head and legs, g	80.40±11.11	57.20±5.98	57.20±9.29	53.60±6.17	<0.001
Head and legs, %	7.46±0.88	6.25±0.73	6.51±0.60	6.10±0.30	<0.001

m\*=male, f\*\*=female

The differences between groups relating to leg weights were statistically very significant ( $P < 0.001$ ).

Breast part in body were the highest by wild female pheasant ( $31.41 \pm 1.68\%$ ). Between breast part (%) and thighs with drumsticks part (%) were notified statistically high significances ( $P < 0.001$ ) i.e. high ( $P = 0.002$ ) differences.

Weight (g) and parts (%) fundamental parts of breasts and thighs with drumsticks had been shown in Table 2. and 3. As it been expected, parts of skin and subcutaneous fatty tissue in breasts were lower at wild pheasant in both sex relating the cultivated pheasants.

Table 2. Weight (g), fundamental parts of breast tissue

	Cultivation pheasant		Wild pheasant		P
	m* (n=10)	f** (n=10)	m* (n=10)	f** (n=10)	
Skin+subcutaneous fatty tissue, g	19.8±8.66	18.4±6.79	15.8±3.46	15.0±5.27	0.308
Skin+subcutaneous fatty tissue, %	6.54±1.66	7.18±1.91	4.58±1.13	5.35±1.47	0.003
Muscles, g	241.2±62.43	195.4±32.07	282.6±63.53	214.4±32.14	0.003
Muscles, %	81.41±4.23	78.82±4.21	79.92±5.75	77.44±5.93	0.367
Bones, g	34.20±7.80	34.38±12.74	52.6±14.45	47.2±9.07	0.011
Bones, %	12.05±3.54	13.98±5.02	15.50±5.62	17.20±3.89	0.196

m\*=male, f\*\*=female

Table 3. Fundamental parts of tissue in thighs with drumsticks

	Cultivation pheasant		Wild pheasant		P
	m* (n=10)	f** (n=10)	m* (n=10)	f** (n=10)	
Skin+subcutaneous fatty tissue, g	15.6±4.30	19.22±6.61	20.5±3.92	17.4±3.66	0.131
Skin+subcutaneous fatty tissue, %	7.19±1.27	9.91±1.71	7.81±1.19	9.21±1.65	<0.001
Muscles, g	165.4±29.89	147.4±31.54	206.2±37.88	139±13.17	<0.001
Muscles, %	76.84±2.68	77.80±3.49	77.75±3.54	73.69±3.98	0.036
Bones, g	34.4±8.21	23.6±2.46	38.3±11.59	32.2±6.70	0.002
Bones, %	15.97±2.40	13.02±3.33	14.44±3.53	17.11±3.36	0.037

m\*=male, f\*\*=female

The differences between groups were statistically significant ( $P < 0.003$ ). The weight of breast muscles and legs were higher by female pheasants related to males, with statistically very high differences ( $P < 0.001$ ).

In Tables 4. and 5. had been shown chemical composition of breast muscles and legs. Statistically significant differences ( $P < 0.001$ , i.e.  $P = 0.040$ ) were established in Ca and P composition (%) in breast muscles (Table 4).

However, related to chemical composition of leg muscles (Table 5.) were notified very high statistical differences ( $P < 0.001$ ) between groups in parts of moisture, fat, proteins, Ca, and energetic values. Wild pheasants had higher part of water, proteins and Ca.

Cultivated (Tucak and Klaić, 1997) pheasants had higher part of fat and consequently higher energetic value (kJ/100 g) in thighs with drumsticks muscles.

Table 4. Probably chemical composition of breast

	Cultivation pheasant		Wilde pheasant		P
	m*(n=10)	f** (n=10)	m* (n=10)	f** (n=10)	
Moisture, %	72.61±0.69	71.77±1.22	72.33±10.6	72.43±0.62	0.221
Fatt, %	1.15±0.33	1.69±1.21	0.96±0.25	1.14±0.39	0.100
Proteines, %	25.11±0.62	25.38±0.68	25.57±1.07	25.32±0.47	0.586
Ash, %	1.16±0.03	1.15±0.04	1.14±0.04	1.12±0.06	0.105
Ca, %	0.019±0.003	0.018±0.003	0.032±0.006	0.029±0.006	<0.001
P, %	0.219±0.021	0.230±0.009	0.239±0.017	0.228±0.009	0.040
Energetic value, kj/100 g	485.66±16.24	512.23±45.57	487.02±19.83	489.45±17.21	0.121

m\*=male, f\*\*=female

Table 5. Chemical composition of thighs with drumsticks

	Cultivation pheasant		Wilde pheasant		P
	m (n=10)	f (n=10)	m (n=10)	f (n=10)	
Moisture, %	71.58±2.58	71.42±1.94	74.50±1.24	73.65±1.01	<0.001
Fatt, %	6.62±2.05	6.81±2.18	2.11±0.74	2.92±1.45	<0.001
Proteines, %	20.71±1.04	20.63±0.71	22.22±0.80	22.32±1.04	<0.001
Ash, %	1.09±0.06	1.06±0.04	1.15±0.08	1.11±0.06	0.014
Ca, %	0.021±0.004	0.020±0.006	0.039±0.009	0.039±0.007	<0.001
P, %	0.205±0.010	0.197±0.017	0.209±0.011	0.208±0.012	0.179
Energetic value, kj/100 g	621.91±109.07	629.20±79.99	472.92±34.35	506.01±45.27	<0.001

m\* = male, f\*\* = female

## CONCLUSIONS

- The highest weight achieved wilde pheasant males ( $1232.4 \pm 147.36$  g). The differences between tested pheasant groups were statistically very high significant ( $P < 0.001$ ).
- The differences between groups related to breast weight and thighs with drumsticks weight were statistically very high significant ( $P < 0.001$ ). Between breast parts (%) and legs parts (%) were notified very high ( $P < 0.001$ ) i.e. high ( $P = 0.002$ ) differences.
- The highest weight breast muscles and thighs with drumsticks had wilde pheasants ( $282.6 \pm 63.53$  g i.e.  $206.2 \pm 37.88$  g). Wilde pheasants had lower part (%) and lighter (g) skin with subcutaneous fatty tissue on breasts. Female pheasants cultivated on both ways had higher skin part (%) and subcutaneous tissue in thighs with drumsticks.
- Related to chemical composition of breast muscles is established statistically significant differences ( $P < 0.001$  i.s.  $P = 0.040$ ) in part of Ca (%) and P (%). In wilde pheasant thighs with drumsticks muscles established statistically very significant ( $P < 0.001$ ) higher part of moisture, proteins and Ca, i.e. statistically very high significant ( $P < 0.001$ ) lower part of fat and energetic value.

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