

# Collagen content in fowls musculature in relation with age, sex and anatomic region

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The collagen contents of the organism of adult animals is in generally constant. Determination of the collagen content in pectoral and shank musculature in broilers at age of: 42, 49, 56, 63 days, which has been administrating the diet 21/1 (romanian recipe).

Collagen determination was carried out by indirect biochemical method, which considers hydroxyproline dosing in accordance with the method described by Neuman and Logan.

At the ages of 42, 49, 56 and 63 days demonstrate a tendency to increase the collagen content in the breast musculature appears in both sexes.

The same tendency of collagen content increase is also observed in the thigh musculature of female chickens, while in males was observed a slight diminution.

Comparing the collagen content of breast musculature, no significant differences between the sexes could be established, excepting the 49 day old chickens, where values were higher in the females than in the males.

In the thigh musculature significant differences ( $P < 0.01$ ) were observed only at the age of 42 days, when values were smaller in the females ( $3.65 \pm 0.23$  g/100 g protein) than in the males ( $4.61 \pm 0.09$  g/100 g protein). In both sexes there was a higher content in the thigh musculature than in the breast.

**Keywords:** broilers; collagen; breast; thigh; age

## Introduction

Collagen is a scleroprotein, similar to the two components of the conjunctive tissue: elastine and reticuline. Collagen represents 15-50% from the total conjunctive tissue and 30-35% from the total protein of the body (Curcă et al., 1980; 1999). The collagen contents of the organism of adult animals is in generally constant, but in some physiological states and especially in physiopathological ones, marked modifications of it take place, both quantitatively and qualitatively.

Quantitative and qualitative modifications are highly important in the understanding of different biologic processes such as growth and development or pathologic processes with the implication of this protein, which is spread very much in the body (Arthur, 1989; Arthur et al., 1989; Curcă et al., 2001; Smith et al., 1976; May, 1980).

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Endocrine glands, through the hormones they produce, influence both the quantity and quality of collagen, thyreotropine is a mainly for the hyaluronic acid in the ground substance, while thyroxine stimulates the connective tissue in thyroidectomized animals (May, 1980; Curcă, 1999), the relationship of sex, dietary energy and collagen in broilers skin tissue (Smith et al., 1976).

## Materials and Methods

Determination of the collagen content in pectoral and shank musculature in broilers at age of: 42, 49, 56, 63 days. Collagen determination was carried out by indirect biochemical method, which considers hydroxyproline dosing in accordance with the method described by Neuman and Logan (1950).

Determination of the collagen content in breast and thigh musculature in broilers, expressed in g of collagen/100 g of protein points to changes depending on to age, sex and anatomic region.

At the ages of 42, 49, 56 and 63 days a tendency of the collagen content to increase in the breast musculature appears in both sexes.

The same tendency of collagen content increase also observed in the thigh musculature of female chickens, while in males a slight diminution was observed.

## Results and discussion

Comparing the collagen content of the breast musculature, no significant differences between the sexes could be established, excepting the 49 day old chickens, where values were higher in the females than in the males.

At the 42 days content of collagen in breast musculature, at males, was  $1.96 \pm 0.12$  g/100 g protein; at females the value was  $1.80 \pm 0.14$  g/100 g protein, the difference was insignificant ( $P > 0.05$ ).

In the thigh musculature, at males, content of collagen was  $4.61 \pm 0.09$  g/100 g protein; in females values was  $3.65 \pm 0.23$  g/100 g protein (Fig. 1), the difference was insignificant ( $P > 0.05$ ).

The differences of muscular collagen in breast musculature and the thigh musculature was very significantly ( $P < 0.001$ ) at males and females too.

At 49 days content of collagen in breast musculature, at males, was  $1.34 \pm 0.06$  g/100 g protein; in females values was  $1.73 \pm 0.06$  g/100 g protein the difference was distinctly significant ( $P < 0.01$ ).

In the thigh musculature, at males, content of collagen was  $3.24 \pm 0.33$  g/100 g protein (Fig. 2); in females the value was  $3.43 \pm 0.17$  g/100 g protein, the difference was insignificant ( $P > 0.05$ ).

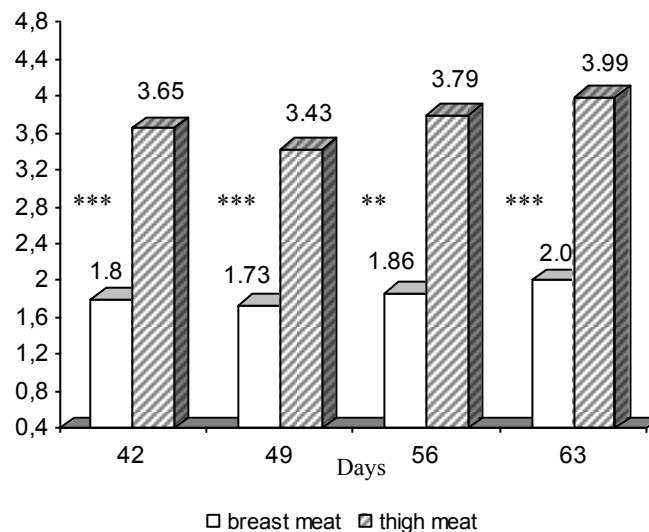
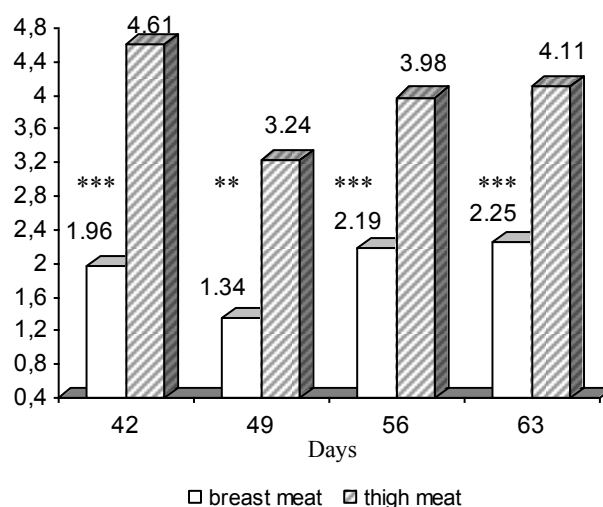


Fig. 1 – Collagen content in females broilers musculature statistically differences: \*\*\* ( $P < 0.001$ ); \*\* ( $P < 0.01$ )



**Fig. 2 – Collagen content in males broilers musculature statistically differences: \*\*\* (P<0.001); \*\* (P<0.01)**

In the thigh musculature were observed significant differences (P<0.01) only at the age of 42 days, when values were smaller in the females (3.65±0.23 g/100 g protein) than in the males (4.61±0.09 g/100 g protein). In both sexes there was a higher content of collagen in the thigh musculature than in the breast (Table 1).

**Table 1 Collagen content in male and female broilers musculature in relation with age, sex and anatomic region (g/100g protein)**

Sex	Statistical parameters	42 days		t	49 days		t	56 days		t	63 days		t
		B	T		B	T		B	T		B	T	
MALE	n	5	5	18.93 ***	5	5	3.90 **	5	5	6.88 ***	5	5	10.94 ***
	X± s <sub>x</sub>	1.96±0.12	4.61±0.09		1.34±0.06	3.24±0.33		2.19±0.21	3.98±0.18		2.55±0.12	4.11±0.13	
	S	0.26	0.20		0.14	0.75		0.47	0.41		0.26	0.30	
	V%	13.27	4.34		10.53	23.15		21.46	10.30		11.56	7.30	
	Range	1.64 – 2.24	4.47 – 49.91		1.22 – 1.52	2.51 – 4.26		1.75 – 2.93	3.58 – 4.66		1.86 – 2.48	3.78 – 4.48	
FEMALE	n	5	5	7.12 ***	5	5	9.44 ***	4	4	5.36 **	5	5	7.11 ***
	X± s <sub>x</sub>	1.80±0.14	3.65±0.23		1.73±0.06	3.43±0.17		1.86±0.23	3.79±0.29		2.00±0.19	3.99±0.20	
	S	0.32	0.52		0.14	0.37		0.46	0.57		0.42	0.46	
	V%	17.78	6.30		8.09	4.96		24.73	15.04		21	11.53	
	Range	1.49 – 2.17	3.00 – 4.24		1.52 – 1.86	2.84 – 3.74		1.46 – 2.43	3.18 – 4.40		1.64 – 2.67	3.42 – 4.620	
t	0.88 n.s.	3.84 **		4.44 **	0.504 n.s.		1.06 n.s.	0.56 n.s.		1.14 n.s.	0.49 n.s.		

Key: B=breast musculature; T=thigh musculature; \*\* (P<0.01); \*\*\* (P<0.001); n.s. (P>0.05); t=differential test

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