

RESEARCH ON THE THICKNESS AND PROFILE OF SUPERFICIAL PECTORAL MUSCLE MYOCYTES OF MEAT TYPE HYBRID COBB-500 SLAUGHTERED AT DIFFERENT AGES

V. Teușan^{1*}, Anca Prelipcean (Teușan)¹, A.A. Prelipcean¹

¹ University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

Abstract

From 30 chickens belonging to the avian hybrid COBB-500 slaughtered at the age of 35, 42 and 49 days, histological samples were collected from superficial pectoral muscle. Chickens body weight at slaughter was 1406 – 1614 grams, at 35 days was of 2168 to 2296 grams at 42 days and from 2350 to 2378 grams at 49 days. The histological samples collected were processed by paraffin technique stalk, finally resulting in 50 slides that were then studied with a binocular microscope photon MC3 type. We measured the microscopic field using a micrometer device, to determine the large and small diameters of about 500 muscle fibers. Average diameter, the index profile and index format for these muscle cells were determined by calculation. We obtained the following results: at the age of 35 days, the average diameter of the muscle fibers was $28.253 \pm 0.59 \mu$, for males and $24.525 \pm 0.53 \mu$ for females. At the age of 42 days the muscle fibers had an average diameter of 34.745μ , for males and one of $29.335 \pm 0.55 \mu$ for females. At the age of 49 days, the average diameter of myocytes in the studied muscle was $37.138 \pm 0.74 \mu$, for males and $32.73 \pm 0.75 \mu$, for females. The appearance of muscle fibers was cylindroids index profile with close values for the two sexes and for age categories ($1.296/1 - 1.495/1$) ($69.77 - 79.72 \%$). The differences between males and females at all the ages of slaughter, for the average diameter are statistically significant.

Key words: myocytes, profile, superficial pectoral, avian

INTRODUCTION

Among the products obtained from Animal Husbandry, meat occupies a leading position because it has a very high trophic-biological value, being required on the market in quantities that are always increasing. Poultry meat as a raw material or food is also obtained relatively quickly and with low costs, especially since high performance hybrids (chicken, turkey, duck) were created [13]. These include meat type chicken hybrid COBB-500 [13] which was the subject of our study.

It is well known that among the factors that influence meat quality are those related to the histological structure of the muscle composition of carcasses [8]; [9]; [10]. Thus the thickness, profile and density of the muscle fibers or the proportion of the two main tissue

categories from somatic muscles influences all physical, chemical and technological properties of meat, including poultry meat. Although there have been studies of this kind, even on COBB-500, [5]; [6]; [8], the data we have obtained is not sufficient, because we studied so far only chickens slaughtered at the technological age of 42 days. In this context we could say that our research comes to complete and extend its specific knowledge area for other slaughtering age of this meat type chicken hybrid.

MATERIAL AND METHODS

The biological and non-biological materials used in this research were represented by: 30 meat type COBB-500 hybrid chickens (15 males and 15 females), specific anatomical and histological instruments, various devices, reagents and colouring substances.

The chickens were sacrificed at different ages namely: at 35, 42 and 49 days. At this age of slaughter the weight of birds was:

*Corresponding author: vasile.teusan@yahoo.com
The manuscript was received: 24.03.2012
Accepted for publication: 11.05.2012

1406 – 1614 grams; 2168 – 2296 grams and of 2350 – 2378 grams, depending on sex [8].

From the carcasses obtained from the slaughter of 15 males and 15 females (each five for each age) we collected histological samples ($\approx 1 \text{ cm}^3$) of the superficial pectoral muscle (*Pectoralis superficialis*) [1]; [3]; [4]; [14], which were processed by paraffin section technical [2, 14]. In the end we obtained 50 histological blades with middle cross sections of the muscle mentioned above, coloured with eosin and haematoxylin. These histological blades were then studied with a MC3 binocular microscope that was tested, tuned and calibrated in advance. The microscopic field was found, photographed and the myocytes were measured using a micrometer device and three values (15.000 μ , 9.011 μ and 4.441 μ) corresponding to the three associations of oculars and optical lens used (OC10 x OB6; OC10 x OB10; OC10 x OB20). We measured the large and small diameter of the myocytes resulting values that were amplified with the micrometric value of the device (MC3).

The following relations were used:

(1) $LD_{(\mu)} = \text{Nr.Microm.div.} \times \text{M.V.}$, where:
 LD =large diameter (μ);
 Nr.Div.microm. =number of micrometric divisions; V.M. =micrometric value.

(2) $Sm_{(\mu)} = \text{Nr.Microm.div.} \times \text{M.V.}$, where: Sm =small diameter (μ).

The average diameter, the index profile and the format for the muscle myocytes studied were determined by calculation, using the following mathematical relation:

(3) $D\bar{x} = \frac{DM + Dm}{2}$, where:

$D\bar{x}$ = average myocytes diameter (μ).

(4) $Pi = \frac{DM}{Dm}$, where: Pi = profile index ($x/1$).

(5) $Fi = \frac{Dm \times 100}{DM}$, where:

Fi = format index (%).

All data obtained from micrometric measurements of the microscopic field and calculations were arranged in tables and then were statistically processed using the usual

statistics like the mean, standard deviation, variance and the coefficient of variation. Subsequently, to test the statistical significance of the differences between the sexes and the three slaughter ages regarding the studied characters (myocytes thickness and profile) we used the following algorithm: “Single Factor ANOVA” which was included in the Microsoft Excel software package [7].

RESULTS AND DISCUSSIONS

In all species of birds, the pectoral muscles appear to be highly developed in comparison with other segments of the carcass. This is especially evident in avian hybrids bred for meat production. For COBB-500 meat hybrid, the pectoral muscles (two superficial pectoral muscles and two profound pectoral muscles) weighed 203.0 to 254.6 g at the age of 49 days. Compared to the weight of the whole chest (with bone and skin) these pectoral muscles represent 69.68%, 68.26% and 71.15%. From the pectoral muscles total weight, the superficial ones represent 80-85 % [4]; [5]; [8]. Regarding the structure, the superficial pectoral muscles are composed of striated muscle tissue and conjunctive tissue.

Striated muscle tissue morph-functional unit is the myocyte, also known as the rabdocit. These striate muscle cells have a cylindroids aspect, ovoid ends and lengths of the order of centimetres and the thickness seems to be influenced by sex and age. Thus, male chicken slaughtered at the age of 35 days have a large diameter of the superficial pectoral muscle myocytes of $33.418 \pm 0.82 \mu$ and a small diameter of $22.988 \pm 0.54 \mu$ ($v = 21.09 - 21.84$) (table 1). The average thickness of striated muscle fibers was $28.253 \pm 0.59 \mu$ ($v = 18.67\%$). The cylindroids appearance of these myocytes is shown by the two average values of the profile index ($Ip = 1.484 \pm 0.04/1$) and of the format index ($If = 70.73 \pm 1.72 \%$) ($v = 21.77 - 22.89\%$) (table 1).

At the female chickens slaughtered at 35 days, the PS muscle myocytes had a large diameter of $28.0 \pm 0.62 \mu$; a small diameter of $21.050 \pm 0.535 \mu$ and a average diameter of $24.525 \pm 0.53 \mu$ ($v = 19.89\%$, 22.74% and 19.26%) (table 1). These muscle fibers are also cylindrical, even more than the ones from males, that is evidenced by the values of the two indices: profile index ($Pi = 1,371/1$) and

format index ($Fi=75.10\%$) (table 1). At the male chickens, slaughtered at the technological age of 42 days, the large diameter of PS muscle myocytes had a average value of $39.469\pm 0.77\mu$ ($v=17.49\%$). The small diameter of these muscular cells was $30.010\pm 0.68\mu$ ($v=20.28\%$), and their mean diameter was $34.745\pm 0.64\mu$ ($v=16.38\%$) (table 1). The profile index for these muscle myocytes has an average value

of $1.355\pm 0.03/1$, with limits of 1/1 and 2.375/1 ($v=20.23\%$). The small diameter of these muscular fibers has a mean of $76.08\pm 1.64\%$ from their large diameter (table 1). At the female chickens, slaughtered at the technological age of 42 days, the PS muscle myocytes had a large diameter of $32.73\pm 0.616\mu$, a small diameter of $25.93\pm 0.63\mu$ and an average diameter of $29.335\pm 0.555\mu$ ($v=16.83\%$; 21.72% ; 16.93%) (table 1).

Table 1 Statistical indicators for the muscular fibers profile and thickness from superficial pectoral muscle of COBB-500 avian meat hybrid

| Slaughter age | Specification | | MU | N | Statistical indicators | | | Variation limits | |
|---------------|---------------|--------------------|-------|----|--------------------------|---------|-------|------------------|---------|
| | Sex | Studied parameters | | | $\bar{X}\pm s_{\bar{X}}$ | s | V(%) | Min. | Max. |
| 35 days | Male | Large diameter | μ | 80 | 33.418 ± 0.82 | 7.300 | 21.84 | 13.323 | 44.410 |
| | | Small diameter | μ | 80 | 22.988 ± 0.54 | 4.848 | 21.09 | 13.323 | 35.528 |
| | | Average diameter | μ | 80 | 28.253 ± 0.59 | 5.275 | 18.67 | 13.323 | 38.858 |
| | | Profile index | $x/1$ | 80 | $1.484\pm 0.04/1$ | 0.3397 | 22.89 | 1.000/1 | 2.667/1 |
| | | Shape index | % | 80 | 70.73 ± 1.72 | 15.3987 | 21.77 | 37.50 | 100.00 |
| | Female | Large diameter | μ | 80 | 28.000 ± 0.62 | 5.5692 | 19.89 | 13.323 | 37.748 |
| | | Small diameter | μ | 80 | 21.050 ± 0.535 | 4.7876 | 22.74 | 8.882 | 31.087 |
| | | Average diameter | μ | 80 | 24.525 ± 0.53 | 4.7231 | 19.26 | 11.102 | 33.307 |
| | | Profile index | $x/1$ | 80 | $1.371\pm 0.026/1$ | 0.2370 | 17.29 | 1.000/1 | 2.000/1 |
| | | Shape index | % | 80 | 75.10 ± 1.46 | 13.1017 | 17.45 | 49.67 | 100.00 |
| 42 days | Male | Large diameter | μ | 80 | 39.469 ± 0.77 | 6.9047 | 17.49 | 22.205 | 48.851 |
| | | Small diameter | μ | 80 | 30.010 ± 0.68 | 6.0862 | 20.28 | 16.876 | 44.410 |
| | | Average diameter | μ | 80 | 34.745 ± 0.64 | 5.6917 | 16.38 | 21.317 | 45.520 |
| | | Profile index | $x/1$ | 80 | $1.355\pm 0.031/1$ | 0.2742 | 20.23 | 1.000/1 | 2.375/1 |
| | | Shape index | % | 80 | 76.08 ± 1.64 | 14.6756 | 19.29 | 31.90 | 100.00 |
| | Female | Large diameter | μ | 80 | 32.730 ± 0.616 | 5.5086 | 16.83 | 17.764 | 43.522 |
| | | Small diameter | μ | 80 | 25.930 ± 0.63 | 5.6319 | 21.72 | 13.323 | 37.748 |
| | | Average diameter | μ | 80 | 29.335 ± 0.555 | 4.9664 | 16.93 | 15.543 | 37.748 |
| | | Profile index | $x/1$ | 80 | $1.296\pm 0.028/1$ | 0.2520 | 19.44 | 1.000/1 | 2.250/1 |
| | | Shape index | % | 80 | 79.72 ± 1.55 | 13.8117 | 17.33 | 44.44 | 100.00 |
| 49 days | Male | Large diameter | μ | 80 | 43.983 ± 0.931 | 8.3283 | 18.94 | 26.646 | 66.610 |
| | | Small diameter | μ | 80 | 30.293 ± 0.761 | 6.8042 | 22.46 | 17.760 | 48.850 |
| | | Average diameter | μ | 80 | 37.138 ± 0.737 | 6.5910 | 17.75 | 23.315 | 52.180 |
| | | Profile index | $x/1$ | 80 | $1.495\pm 0.035/1$ | 0.3142 | 21.01 | 1.000/1 | 2.500/1 |
| | | Shape index | % | 80 | 69.77 ± 1.60 | 14.2936 | 20.49 | 40.00 | 100.00 |
| | Female | Large diameter | μ | 80 | 37.027 ± 0.831 | 7.4344 | 20.08 | 17.764 | 53.292 |
| | | Small diameter | μ | 80 | 28.428 ± 0.777 | 6.9477 | 24.44 | 15.543 | 42.189 |
| | | Average diameter | μ | 80 | 32.727 ± 0.746 | 6.6750 | 20.40 | 17.764 | 45.520 |
| | | Profile index | $x/1$ | 80 | $1.345\pm 0.03/1$ | 0.2548 | 18.95 | 1.000/1 | 2.250/1 |
| | | Shape index | % | 80 | 76.75 ± 1.47 | 13.1229 | 17.10 | 44.44 | 100.00 |

The profile index for these striated muscular cells had an average value of $1.296\pm 0.028/1$, which shows an almost cylindroids aspect. This fact is proved by the high value of format index: $79.72\pm 1.55\%$ ($v=17.33$) (Table 1).

When the slaughter was done at a older age (49 days), the muscular fibers thickness from PS muscle was also higher. Thus, the males miocytes had a large diameter of 43.983 ± 0.931 ($v=18.94\%$); a small diameter of $30.293\pm 0.761\mu$ ($v=22.46\%$) and an average diameter of $37.138\pm 0.737\mu$ ($v=17.75\%$) (table 1). On transversal section, these fibers have an

ovoid aspect and a cylindroids form when viewed three dimensional ($Pi=1.495/1$) ($Fi=69.77\%$) (table 1).

At female chickens, the superficial pectoral muscles (PS) have a large diameter of $37.027\pm 0.831\mu$ ($v=20.08\%$); a small diameter of $28.428\pm 0.777\mu$ ($v=24.44\%$) and an average diameter of $32.727\pm 0.746\mu$ ($v=20.4\%$). These myocytes are cylindrical ($Pi=1.345/1$; $Fi=76.75\%$) (Table 1).

If we compare the characters of the two sexes and of the three slaughter ages (35, 42 and 49 days), there are notable differences.

Thus, when the slaughter was performed on 35 day chickens (at pre-technological ages), the mean myocytes thickness in PS

muscles was with 13.20 % lower in females than in males (table 2).

Table 2 The thickness and profile of superficial pectoral muscle myocytes of COBB-500 avian meat hybrid, regarding the sex and slaughtering age

| Studied muscle | Fiber parameters studied | MU | Slaughter age and sex | | | | | | | | |
|--|--------------------------|-----|-----------------------|------------|------------|----------|------------|--------|----------|------------|--------|
| | | | 35 days | | | 42 days | | | 49 days | | |
| | | | Male (M) | Female (F) | ±%F/M* | Male (M) | Female (F) | ±%F/M* | Male (M) | Female (F) | ±%F/M* |
| Superficial pectoral muscle (Pectoralis superficialis) | Large diameter | μ | 33.418 | 28.000 | -16.21 | 39.469 | 32.730 | -17.07 | 43.983 | 37.027 | -15.82 |
| | Small diameter | μ | 22.988 | 21.050 | -8.43 | 30.010 | 25.930 | -13.60 | 30.293 | 28.428 | -6.16 |
| | Average diameter | μ | 28.253 | 24.525 | -13.20 | 34.745 | 29.335 | -15.57 | 37.138 | 32.727 | -11.88 |
| | Profile index | x/1 | 1.484/1 | 1.371 | -7.61 | 1.355/1 | 1.296/1 | -4.35 | 1.495/1 | 1.345/1 | -10.03 |
| | Shape index | % | 70.73 | 75.10 | +4.37 pp** | 76.08 | 79.72 | +3.64 | 69.77 | 76.75 | +6.98 |

*Percentage comparison between females and males; **pp=percentage points

When the slaughter was performed on 42 days chickens, the difference between males and females was pronounced, being of 17.07% for the large diameter, of 13.60 % for the small diameter and of 15.57 % for the mean diameter (table 2).

In the end, when the slaughter was made at a post-technological age of 49 days, the PS muscle myocytes mean thickness was with 11.88 % lower, in comparison with the male myocytes (table 2). These differences found between the two sexes, were tested under their statistical significance, revealing a very significant difference ($\hat{F} > F\alpha$) ($D > W_{0,01}$) for the large and average diameter, at all slaughter ages (table 4). For the small diameter, the differences were insignificant, at the age of 35 and 49 days and very significant at the age of 42 days. For the profile and format indices, the differences between males and females were insignificant for the 35 and 42 day of age and very significant for the age of 49 (table 4).

When the comparison was made between the three slaughter ages (the 42 days technological ages taking as standard), the mean of the two sexes was calculated and notable differences were found (table 3).

Thus, the mean of the two sexes for the average diameter of PS muscle myocytes was 26.389 μ, for the 35 days age, this value being with 17.63 % lower than the sexes mean for the same character but at the 42 days age, i.e. 32.040 μ (table 3).

At the age of 49 days, the mean of the two sexes, for the PS muscle myocytes average diameter, was of 34.932 μ, this value being with 9.03 % higher than the one found at the age of 35 days (table 3). Similar differences were found also for the other studied characters (large diameter, small diameter, myocytes profile), between the three slaughter ages (table 3). These differences were statistically tested, both in female and in male sexes (table 5).

Thus, in males, the differences for the profile index and format index, between the three slaughter ages ($V_1=35$ days; $V_2=42$ days; $V_3=49$ days) were statistically insignificant. Also insignificant were the differences found between the small and medium diameter (at V_2 and V_3) (Table 5) ($\hat{F} < F\alpha=0.001$). All the other differences found (for the small, large and medium diameter) were very significant statistically (table 5) ($\hat{F} > F\alpha=0.001$). These differences were also tested for the female sex, the situation being similar. The differences between the three slaughter ages ($V_1; V_2; V_3$), regarding the muscular fibers large and medium diameter were statistically very significant ($\hat{F} > F\alpha=0.001$). Also for the small diameter of the myocytes, the differences were very significant statistically (between V_1 and $V_2; V_1$ and V_3) (table 5). The other differences for the other slaughter ages and studied characters (myocytes profile) were statistically insignificant (table 5).

Table 3 The thickness and profile of superficial pectoral muscle myocytes of COBB-500 meat-type hybrid, regarding the slaughtering ages

| Studied muscle | Studied parameters | Chicken slaughter age and sex | | | | | | | | | | | | | | | | | |
|---|----------------------|-------------------------------|----------------------|---------|----------------------|-------------------|----------------------|----------|-------|---------|-------|-------------------|------|---------|----------------------|---------|----------------------|-------------------|----------------------|
| | | 35 days | | | | | | 42 days* | | | | | | 49 days | | | | | |
| | | Male | | Female | | Sex average value | | Male | | Female | | Sex average value | | Male | | Female | | Sex average value | |
| | | A.v.** | R.v.*** | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. | A.v. | R.v. |
| Superficial pectoral muscle (Pectoralis superficialis) | Large diameter (μ) | 33.418 | 84.67 -15.33 | 28.000 | 85.55 -14.45 | 30.709 | 85.07 -14.93 | 39.469 | 100 | 32.730 | 100 | 36.099 | 100 | 43.983 | 111.44 +11.44 | 37.027 | 113.13 +13.13 | 40.505 | 112.21 +12.21 |
| | Small diameter (μ) | 22.988 | 76.60 -23.40 | 21.050 | 81.18 -18.82 | 22.019 | 78.73 -21.28 | 30.010 | 100 | 25.930 | 100 | 27.970 | 100 | 30.293 | 100.94 +0.94 | 28.428 | 109.63 +9.63 | 29.360 | 104.97 +4.97 |
| | Average diameter (μ) | 28.253 | 81.32 -18.68 | 24.525 | 83.60 -16.40 | 26.389 | 82.36 -17.64 | 34.745 | 100 | 29.335 | 100 | 32.040 | 100 | 37.138 | 106.89 +6.89 | 32.727 | 111.56 +11.56 | 34.932 | 109.03 +9.03 |
| | Profile index (x/1) | 1.484/1 | 109.52 -9.52 | 1.371/1 | 105.79 +5.79 | 1.427/1 | 107.70 +7.70 | 1.355/1 | 100 | 1.296/1 | 100 | 1.325/1 | 100 | 1.495/1 | 110.33 +10.33 | 1.345/1 | 103.78 +3.78 | 1.420/1 | 107.17 +7.17 |
| | Shape index (%) | - | 70.73 -5.35 pp | - | 75.10 -4.62 pp | - | 72.91 -4.99 pp | - | 76.08 | - | 79.72 | - | 77.9 | - | 69.77 -6.31 pp | - | 76.75 -2.97 pp | - | 73.26 -4.64 pp |

*technological slaughter age of this type of meat hybrid; **A.v.=absolute values; ***R.v.=relative values; pp=percentage points.

Table 4 Statistical semnification of differences between the two sexes, regarding the myocytes thickness and profile from the pectoral muscle of COBB-500 hybrid

| Slaughter age | Studied parameters of muscular fibers | Differences between compared sexes average values | Tukey values (w=0.01) | Statistical signification | At 1; 158 GL. for: | | | |
|---------------|---------------------------------------|---|-----------------------|---------------------------|--------------------|----------|----------|-----------|
| | | | | | P | p ≤ 0.05 | p ≤ 0.01 | p ≤ 0.001 |
| | | | | | Fα | 3.84 | 6.64 | 10.83 |
| 35 days | Large diameter (μ) | M-F*=5.418 | 2.642 | *** | Ĥ | 27.857 | | |
| | Small diameter (μ) | M-F=1.938 | 1.961 | n.s. | Ĥ | 6.468 | | |
| | Average diameter (μ) | M-F=3.728 | 2.037 | *** | Ĥ | 22.176 | | |
| | Profile index (x/1) | M-F=0.113 | 0.1192 | n.s. | Ĥ | 5.933 | | |
| | Shape index (%) | M-F=4.370 | 5.818 | n.s. | Ĥ | 3.744 | | |
| 42 days | Large diameter (μ) | M-F=6.739 | 2.542 | *** | Ĥ | 46.570 | | |
| | Small diameter (μ) | M-F=4.080 | 2.386 | *** | Ĥ | 19.374 | | |
| | Average diameter (μ) | M-F=5.410 | 2.174 | *** | Ĥ | 41.031 | | |
| | Profile index (x/1) | M-F=0.059 | 0.107 | n.s. | Ĥ | 1.991 | | |
| | Shape index (%) | M-F=3.640 | 5.799 | n.s. | Ĥ | 2.617 | | |
| 49 days | Large diameter (μ) | M-F=6.956 | 3.213 | *** | Ĥ | 31.057 | | |
| | Small diameter (μ) | M-F=1.865 | 2.798 | n.s. | Ĥ | 2.944 | | |
| | Average diameter (μ) | M-F=4.411 | 2.699 | *** | Ĥ | 17.687 | | |
| | Profile index (x/1) | M-F=0.150 | 0.116 | *** | Ĥ | 10.987 | | |
| | Shape index (%) | M-F=6.980 | 5.584 | *** | Ĥ | 10.350 | | |

*M. F = male, female

Table 5 Statistical semnification of differences between the three slaughtering ages, regarding myocytes thickness and profile from superficial pectoral muscle of COBB-500 hybrid

| Sex | Studied parameters of muscular fibers | Differences between compared slaughter age* average values | Tukey values (w=0.01) | Statistical signification | At 2; 237 GL. from: | | | |
|-----------------|---------------------------------------|--|-----------------------|---------------------------|---------------------|----------|----------|-----------|
| | | | | | P | p ≤ 0.05 | p ≤ 0.01 | p ≤ 0.001 |
| | | | | | Fα | 2.99 | 4.60 | 6.91 |
| MALE | Large diameter (μ) | V ₁ -V ₂ =6.051 | 3.471 | *** | Ĥ | 39.591 | | |
| | | V ₂ -V ₃ =10.565 | | *** | | | | |
| | | V ₂ -V ₃ =4.514 | | *** | | | | |
| | Small diameter (μ) | V ₁ -V ₂ =7.022 | 2.749 | *** | Ĥ | 38.474 | | |
| | | V ₂ -V ₃ =7.305 | | *** | | | | |
| | | V ₂ -V ₃ =0.283 | | n.s. | | | | |
| | Average diameter (μ) | V ₁ -V ₂ =6.492 | 2.708 | *** | Ĥ | 48.935 | | |
| | | V ₂ -V ₃ =8.885 | | *** | | | | |
| | | V ₂ -V ₃ =2.393 | | n.s. | | | | |
| | Profile index (x/1) | V ₁ -V ₂ =0.129 | 0.143 | n.s. | Ĥ | 5.014 | | |
| | | V ₂ -V ₃ =0.011 | | n.s. | | | | |
| | | V ₂ -V ₃ =0.140 | | n.s. | | | | |
| Shape index (%) | V ₁ -V ₂ =5.35 | 6.82 | n.s. | Ĥ | 4.223 | | | |
| | V ₂ -V ₃ =0.96 | | n.s. | | | | | |
| | V ₂ -V ₃ =6.31 | | n.s. | | | | | |
| FEMALE | Large diameter (μ) | V ₁ -V ₂ =4.730 | 2.872 | *** | Ĥ | 41.947 | | |
| | | V ₂ -V ₃ =9.027 | | *** | | | | |
| | | V ₂ -V ₃ =4.297 | | *** | | | | |
| | Small diameter (μ) | V ₁ -V ₂ =4.880 | 2.698 | *** | Ĥ | 32.836 | | |
| | | V ₂ -V ₃ =7.378 | | *** | | | | |
| | | V ₂ -V ₃ =2.498 | | n.s. | | | | |
| | Average diameter (μ) | V ₁ -V ₂ =4.810 | 2.544 | *** | Ĥ | 44.538 | | |
| | | V ₂ -V ₃ =8.202 | | *** | | | | |
| | | V ₂ -V ₃ =3.392 | | *** | | | | |
| | Profile index (x/1) | V ₁ -V ₂ =0.075 | 0.114 | n.s. | Ĥ | 1.869 | | |
| | | V ₂ -V ₃ =0.026 | | n.s. | | | | |
| | | V ₂ -V ₃ =0.049 | | n.s. | | | | |
| Shape index (%) | V ₁ -V ₂ =4.62 | 6.15 | n.s. | Ĥ | 2.464 | | | |
| | V ₂ -V ₃ =1.65 | | n.s. | | | | | |
| | V ₂ -V ₃ =2.97 | | n.s. | | | | | |

*The slaughter age studied were: V₁=35 days; V₂=42 days; V₃=49 days.

CONCLUSIONS

1. At the age of 35 days, the mean thickness of the superficial pectoral muscle myocytes was 28.253 μ , for males; of 24.525 μ , for females and of 26.389 μ , average of both sexes.

2. At the age of 35 days, the mean thickness of the superficial pectoral muscle myocytes was 34.745 μ , for males; of 29.335 μ , for females and of 32.040 μ , average of both sexes.

3. At the age of 49 days the mean thickness of the superficial pectoral muscle myocytes was of 37.138 μ , for males; of 32.727 μ , for females and of 34.932 μ , as an average for the both sexes.

4. The mean thickness of the superficial pectoral muscle myocytes is lower in females than in males with 13.20 %, at the age of 35 days; with 15.57 %, at the age of 42 days and with 11.88 %, at the age of 49 days.

5. At all three studied slaughter ages, these differences between males and female, regarding the mean thickness of superficial pectoral muscle myocytes, are very statistical significant.

6. Superficial pectoral muscle myocytes profile has a cylindroids shape, both in males and females and the differences found between them were statistically insignificant.

7. The mean thickness of superficial pectoral muscle myocytes, in avian meat type hybrid COBB-500, increases with the age, both in male (28.25 – 34.74 – 37.14 μ) and females (24.52 – 29.33 – 32.73 μ) and as an average of the two sexes.

8. This growth of the pectoral superficial muscle myocytes thickness was of 21.41%, at the age of 42 days and of 32.37%, at the age of 49 days, compared with the one from the age of 35 days.

REFERENCES

[1] Coțofan, V. și colab. – 2000 – Anatomia animalelor domestice, vol. I, Editura Orizonturi Universitare, pag. 263-270.
[2] Cotea, C.,V. – 2001 – Biologie celulară; Histologie și Embriologie generală, Editura Tehnpress, Iași.

[3] Gheție, V.; Chițescu, Șt.; Coțofan, V.; Hillebrand, A. – 1976 – Atlas anatomic al păsărilor domestice, Editura Academiei RSR; pg. 89-127.
[4] Nickel, R.; Schummer, R.; Seiferle, E. – 1977 – Anatomy of the domestic birds, Editura Verlag Paul Parey, Berlin, Hamburg.
[5] Radu-Rusu, R.M.; Teușan, V.; Anca Teușan – 2007 - "Comparative research concerning some histometric features of myocytes in somatic musculature of the domestic chicken and waterfowls, Pectoral muscles", Lucr. Științ., U.S.A.M.V. Iași, Seria Zootehnie, vol. 50, p. 115-120.
[6] Radu-Rusu, R.M.; Teușan, V. și colab. – 2008 – "Histometric assesment of the myocytes within some skeletal muscles issued from COBB-500 commercial broilers", Book of proceedings of the 1st Mediteranean Summit of World Poultry Science Association, Chalkidiki, Greece, p. 1033-1039.
[7] Sandu, Gh. – 1995 - "Metode experimentale în Zootehnie", Editura Coral-Sanivet, București.
[8] Teușan, V.; Radu-Rusu, R.M.; Anca Teușan – 2009 – "Investigations on the histological structure of the superficial pectoral muscle in COBB-500 commercial meat-type hybrid hen", Agricultural Research Stations from Moldavia, ISSN 0379-5837, vol. XLII, No. 4 (140), p.75-83.
[9] Teușan, V.; Prelipcean A.,A.; Anca Prelipcean (Teușan) – 2011 – Cercetări privind grosimea și densitatea miocitelor din mușchii gemeni ai gambi, la hibridul comercial de găină pentru carne COBB-500, Agricultural Research Stations from Moldavia, ISSN 0379-5837, vol. XLIV, No. 3 (147)/2011, pg. 89-102.
[10] Teușan, V.; Anca, Prelipcean (Teușan); Prelipcean, A., A. – 2011 - "Investigations on the histological structure of the gastrocnemius muscles in COBB-500, commercial meat-type hybrid hen", Lucr. Științ., U.S.A.M.V. Iași, Seria Medicină Veterinară, vol. 54 (13), ISSN 1454-7406.
[11] Tudor, Despina; Constantinescu, Gh. – 2002 - "Nomina Anatomica Veterinaria", Ediție bilingvă, Editura Vergiliu, București.
[12] Tudor, Despina; Constantinescu, Gh.; Ileana, A., Constantinescu; Cornilă, N. – 2010 - "Nomina Histologica și Embryologica Veterinaria", Ediție bilingvă, Editura Vergiliu, București.
[13] *** - "COBB-500 Broiler Management Guide" – <http://www.cobb-vantress.com>.
[14] *** Tehnica Histopatologică, Editura de Stat – RSR – pentru literatură științifică.