

## RESEARCH ON THE CHEMICAL CHARACTERIZATION OF TURKEY MEAT

Casiana-Agatha Apetroaei (Petrescu)<sup>1\*</sup>, Roxana Lazăr<sup>1</sup>,  
M.M. Ciobanu<sup>1</sup>, P.C. Boișteanu<sup>1</sup>

<sup>1</sup> University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

### Abstract

The purpose of the present study was to highlight the importance of the chemical composition of turkey meat on the human alimentation. The biological material used was represented by the principal muscular regions B.U.T. Big 6 hybrid groups. The objective pursued in the study was represented by: determination of protein, fat, water and collagen percent from the major muscular of the turkey carcasses. The main chemical components were determined using the automatic analyzer Food Check. The tests carried out have revealed the following results: in what concerns the average percent of water, 69.8% was determined in the breast, 71.94% in the superior thigh, 70.58% in the inferior thigh, 70.76% in the wings while the dry substance has registered average values of 30.2% in the breast, 28.06% and 30.43% in the superior thigh, respectively the inferior one and 33.23% in the wings. These investigations are part of a larger study whose primary goal is to characterize the chemical properties of the meat obtained from turkey hybrids destined for meat production.

**Key words:** turkey, chemical composition, meat

### INTRODUCTION

One of the most current issues of human nutrition, discussed and studied in wide circles of contemporary society is that of protein nutrition and in particular the current deficiency in provision of body protein.

According to Crawford in 1990, the entire industrial world turkeys rely heavily on two major operations performed in North America and certain wild turkey hybridization and selection for the development of pectoral muscles [2].

Currently, meat from turkeys and various products obtained by processing the types of meats are frequently found in countries with strong economic development, but also those in developing [1].

Turkey meat has nutritional and sensorial properties which make it almost ideal material for rational and curative nutrition [4]. The chemical composition of poultry meat varies depending on the species, breed, line, hybrid, muscular type, etc.; by example, meat for chicken and turkey meat breast have

highly protein amount than the other parts from carcass with large fat deposits.

In general terms, poultry meat is composed, mainly, of water and dry matter, which is represented by protein, extractive substances, lipids, vitamins, minerals, enzymes, hormones, pigments, etc [3].

### MATERIAL AND METHODS

Biological material was represented by five B.U.T. Big 6 turkey hybrid. The main followed parameters were represented by: water content, dry matter, protein, collagen and fats. The parameters were determined from the targeted regions, namely: breast, wings, upper and lower leg. In order to establish the value of the followed parameters the Food Check analyzer was used, according to spectrophotometer's standard manual. Resulting data were statistically processed in Excel using ANOVA unifactorial dispersion analysis.

### RESULTS AND DISCUSSIONS

The average water percentage was 71.94 for the upper thigh, 70.58 for the lower thigh, 70.76 for the wings and 69.80 for proper chest. The value of this parameter ranged from a minimum of 68.70% for samples

---

\*Corresponding author: casianapetroaei@gmail.com  
The manuscript was received: 04.04.2012  
Accepted for publication: 20.04.2012

taken from the chest and a maximum of 73.10 for the upper thighs. The studied character's homogeneity was very good according to the 1.5% variation coefficient.

Between batch averages values there were no differences with statistical significance, except P1 vs. P4, where the distinct differences were significant (Table 1).

Table 1 Statistic estimators regarding water percentage in studied turkey meat

Specification	Cut portions	n	$\bar{X} \pm s_{\bar{X}}$	V%	Min. %	Max. %
WATER %	P1	5	71.94±0.445	1.38	70.50	73.1
	P2	5	70.58±0.469	1.49	69.40	72.0
	P3	5	70.76±0.479	1.51	69.5	72.3
	P4	5	69.80±0.387	1.25	68.7	70.8
	Statistical significance of differences between the sample average values		P1 vs. P2 = n.s.; $\hat{F}$ (4.4143) < $F_{\alpha}$ (5.3176) pt. 1:8 GL P1 vs. P3 = n.s.; $\hat{F}$ (3.2517) < $F_{\alpha}$ (5.3176) pt. 1:8 GL P1 vs. P4 = ***; $\hat{F}$ (13.0621) < $F_{\alpha}$ (25.4147) pt. 1:8 GL P2 vs. P3 = n.s.; $\hat{F}$ (0.0720) < $F_{\alpha}$ (5.3176) pt. 1:8 GL P2 vs. P4 = n.s.; $\hat{F}$ (1.6337) < $F_{\alpha}$ (5.3176) pt. 1:8 GL P3 vs. P4 = n.s.; $\hat{F}$ (2.4150) < $F_{\alpha}$ (5.3176) pt. 1:8 GL			

Note: P1 – upper thigh; P2 – lower thigh; P3 – wing; P4 – breast muscles

Protein measurement showed average values that ranged from a minimum value of  $17.90 \pm 0.10$  in the lower thigh and a maximum at  $21.18 \pm 0.18$  pointed pectoral muscles (Table 2).

close limit of variation; minimum value recorded was 17.60% and maximum of 21.70%. Statistically significant differences were recorded between batches, except P1 vs. P3 analysis between differences of collagen percentage, revealed

In this case, the analyzed character was very homogeneous (V%=1.24 to 2.62) due to

Table 2 Statistical estimators regarding protein content in studied turkey meat

Specification	Cut portions	n	$\bar{X} \pm s_{\bar{X}}$	V%	Min. %	Max. %
PROTEIN %	P1	5	18.9±0.141	1.673	18.5	19.3
	P2	5	17.9±0.1	1.249	17.6	18.2
	P3	5	19.48±0.228	2.627	18.9	20.1
	P4	5	21.18±0.185	1.958	20.6	21.7
	Statistical significance of differences between the sample average values		P1 vs. P2 = ***; $\hat{F}$ (33.333) > $F_{\alpha}$ (25.415) pt. 1:8 GL P1 vs. P3 = n.s.; $\hat{F}$ (4.646) < $F_{\alpha}$ (5.3176) pt. 1:8 GL P1 vs. P4 = ***; $\hat{F}$ (95.558) > $F_{\alpha}$ (25.415) pt. 1:8 GL P2 vs. P3 = ***; $\hat{F}$ (40.006) > $F_{\alpha}$ (25.415) pt. 1:8 GL P2 vs. P4 = ***; $\hat{F}$ (242.306) > $F_{\alpha}$ (25.415) pt. 1:8 GL P3 vs. P4 = ***; $\hat{F}$ (33.294) > $F_{\alpha}$ (25.415) pt. 1:8 GL			

Note: P1 – upper thigh; P2 – lower thigh; P3 – wing; P4 – breast muscles

Collagen percentage revealed a minimum average of  $18.16 \pm 0.09$  in the lower thigh, and a maximum of  $20.06 \pm 0.16$  for the pectoral muscles. Statistically significant differences between P1, P2 and P3 batches, very significant differences between P1 and P4, P2 vs. P3 batches and insignificant

differences between P3 and P4. Variability values between 1.14 and 2.64 highlights the studied character's homogeneity (Table 3).

Fat level was close between batches, the maximum value being found in the lower thigh and the minimum one in the pectoral muscles. This led to lack of statistically significant

differences between batch average values. The studied character was homogeneous for P2 and P3, and less homogeneous for P1 and P4 batches.

Table 3 Statistical estimators regarding collagen percentage in studied turkey meat

Specification	Cut portions	n	$\bar{X} \pm s_{\bar{X}}$	V%	Min. %	Max. %
COLLAGEN %	P1	5	18.82±0.188	2.235	18.2	19.3
	P2	5	18.16±0.092	1.141	17.9	18.4
	P3	5	19.74±0.233	2.646	18.9	20.2
	P4	5	20.06±0.163	1.818	19.6	20.5
	Statistical significance of differences between the sample average values	P1 vs. P2 = **; $\hat{F}$ (9.9) < Fa (11.258) pt. 1:8 GL P1 vs. P3 = **; $\hat{F}$ (9.404) < Fa (11.258) pt. 1:8 GL P1 vs. P4 = ***; $\hat{F}$ (24.8) < Fa (25.414) pt. 1:8 GL P2 vs. P3 = ***; $\hat{F}$ (39.5) > Fa (25.414) pt. 1:8 GL P2 vs. P4 = ***; $\hat{F}$ (102.556) > Fa (25.414) pt. 1:8 GL P3 vs. P4 = n.s.; $\hat{F}$ (1.261) < Fa (5.3176) pt. 1:8 GL				

Note: P1 – upper thigh; P2 – lower thigh; P3 – wing; P4 – breast muscles

Table 4 Statistical estimators regarding fat percentage in studied turkey meat

Specification	Cut portions	n	$\bar{X} \pm s_{\bar{X}}$	V%	Min. %	Max. %
FAT %	P1	5	8.76±0.522	13.327	7.0	10.2
	P2	5	8.82±0.333	8.461	7.5	9.3
	P3	5	8.80±0.337	8.579	7.9	9.6
	P4	5	8.66±0.522	13.481	7.1	10.3
	Statistical significance of differences between the sample average values	P1 vs. P2 = n.s.; $\hat{F}$ (0.009) < Fa (5.3176) pt. 1:8 GL P1 vs. P3 = n.s.; $\hat{F}$ (0.004) < Fa (5.3176) pt. 1:8 GL P1 vs. P4 = n.s.; $\hat{F}$ (0.018) < Fa (5.3176) pt. 1:8 GL P2 vs. P3 = n.s.; $\hat{F}$ (0.001) < Fa (5.3176) pt. 1:8 GL P2 vs. P4 = n.s.; $\hat{F}$ (0.066) < Fa (5.3176) pt. 1:8 GL P3 vs. P4 = n.s.; $\hat{F}$ (0.050) < Fa (5.3176) pt. 1:8 GL				

Note: P1 – upper thigh; P2 – lower thigh; P3 – wing; P4 – breast muscles

## CONCLUSIONS

Performed analysis and interpretation of results allowed us to develop a set of conclusions as follows:

- water percentage value regarding the analyzed samples was within the limits provided by the literature, ranging between 69.80 for proper chest and 71.94 for upper thigh;

- determined protein average values ranged from a minimum value of 17.90 ± 0.10 in the lower thigh and 21.18 ± 0.18 pointed in pectoral muscles;

- determined collagen the values were: 18.82 ± 0.18 for upper thigh, 18.16 ± 0.09 for the lower thigh, 19.74 ± 0.23 for wings and 20.06 ± 0.16 for proper breast;

- average fat percentage did not significantly vary, the maximum value being found in the lower thigh and the maximum in the pectoral muscles.

## REFERENCES

- [1] Bolla, G., 2001 – *Raising turkeys*. Agfact A5.0.9, third edition, April 2001.
- [2] Crawford, R.D. 1990 - *Poultry genetic resources: evolution, diversity, and conservation*. Poultry Breeding and Genetics, ed. Crawford, R.D., Amsterdam, Elsevier Science Publishers, 27±52.
- [3] Vacaru-Opriș I., Usturoi G., Apostol L., Apostol T., Movileanu G., 2005 – *Sisteme și tehnologii de creștere a puiilor de carne*, Editura Ceres, București.
- [4] \*\*\* Central Poultry Development Organization available by <http://www.cpdosrbng.kar.nic.in>