Carcass characteristics of two different rooster breeds (Mos and Sasso T-44) slaughtered at 10 months

R. Montes[1], D. Franco[1], C.J. Rivero[2], M. Fernández[1], L. Purriños[1] and J.M. Lorenzo[1]

[1] Meat Technology Centre of Galicia, Rúa Galicia Nº4-Parque Tecnolóxico de Galicia, San Cibrao das Viñas, 32900 Ourense, Spain.
[2] Federación de Razas Autóctonas de Galicia (BOAGA). Fontefiz. 32152 Coles (Ourense). Spain.
E-mail: jmlorenzo@ceteca.net

Introduction

In ancient times, Mos chicken breed was very used in Galicia (North-West of Spain) for the production of meat and eggs. From the sixties decade, due to the arrival of new genetic varieties more adapted to the industrial production, Mos breed was falling into disuse raising the extinction. Clearly, this variety could not compete, in terms neither growth potential nor economic yield with commercial strains, whose has been genetically selected to obtain the maximum profit in intensive production (Rivero *et al.*, 2007) and this constituted the main reason of the diminution in Mos chickens population. Nowadays, consumers are concerned about meat quality and demand meat products linked to natural feeding and breeding. Recently the Spanish government has launched initiatives to promote the production and commercialization of this breed.

In this work, the morphological characteristics of Mos breed carcasses were evaluated and compared with those corresponding to Sasso T-44 animals (a typical variety use in intensive breeding).

Materials and Methods

Experimental design, animal management and sample collection

A total of 40 roosters (25 Mos and 15 Sasso T-44) were used. Birds were fed with a standard compound feed (ME: 13.19 MJ/kg, CP: 230 g/kg as fed basis), provided by Piensos Biona (Lalin, Spain). Additives of fodder were: vitamine A (UI/kg) 10000, vitamine D3 (UI/kg) 2500, vitamine E((UI/kg) 9, Fe (60 ppm), Zn (50 ppm), Cu (5 ppm), Mn (60 ppm), Co (0.05 ppm), Se (0.20 ppm), Iodine (0.40 ppm) and Fe (425 ppm), methionine (0.33%), lisyne

(0.85%) and P (0.59%). The last month prior to slaughter, birds were fed with corn. Table 1 shows the chemical composition and fatty acid profile of commercial fodder and corn.

Carcass dissection

The animals, at 10 months, were place in crates and transported to a slaughter plant, a journey time of approximately 2 h. The birds were weighed, hung on shackles on a slaughter line, a killed by electrical stunning in a water bath followed by immediate manual section of the blood supply to the head. After bleed out, the dead hens were suspended in a warn water bath and defeathered. The carcasses were eviscerated on line. The carcasses were chilled in a 4 ºC cool room for 24 h. The day after, the carcasses were weighed and the left side of the carcass was quartered according to the World´s Poultry Science Association recommendations (Jense, 1983). Carcass portions were obtained as follows: the breast muscle were dissected from the carcass and weighed. The legs were disarticulated at the hip and knee joints and the drum and thigh portions were weighed. The head, neck and feet were also obtained and weighed. The drumstick was dissected into skin, muscle and bone and the parts of all 3 portions were individually weighed.

Statistical analysis

Mean as well as standard deviation and standard error were calculated for all quantified variables. For the statistical analysis of the results of carcass parts a one-way analysis of variance was performed, using the breed. The least squares means (LSM) were separated using Duncan's range test. All statistical tests of LSM were performed for a significance level $P<0.05$. All the statistical analyses were carried out using the SPSS 19.0 for Windows (SPSS, Chicago, IL, USA) software package.

Results and discussion

Table 2 shows data obtained for both Mos and SassoT-44 breeds. Both live and carcass weights were higher for Sasso T-44 breed ($P<0.001$), being differences in carcass yield not statistically different and similar to those reported by Sanchez *et al.* (2005) for both breeds slaughtered at 9 months. Sasso T-44 chickens presented a higher head growth ($P<0.001$) than Mos ones, measured values were 0.17 g and 0.11 g, respectively. The same behaviour was observed for neck and feet. Found values for Mos chickens head and neck percentages were

in accordance which those obtained by Santos *et al.* (2005), for a Brazilian autochthonous strain *(Paraíso Pedrés)*.

Wing and breast weights were slightly higher for Sasso T-44 animals ($P<0.05$), breast value was around 0.28 g for Mos chickens against 0.32g found for Sasso T-44 ones. Drumstick weight values remained the same for both breeds, 0.28 g ($P>0.05$).

The lean:bone ratio was calculated to determine the edible fraction, and was higher for Mos breed ($P<0.01$). Found value was around 3.71 which represented nearly triple than reported by other authors for non-selected breeds (Jaturashita *et al.* 2008).

In recent years, the quartering results have acquiring relevance because of the trend of commercializing chickens in pieces. Thus, the most appreciate parts are breast and drumstick, and their percentages over total carcass are good markers of the animal economic value. Therefore, the breast yield was calculated referring breast weight to carcass weight and multiplying by 100. Found value, 15.22 %, was slightly higher for Mos chickens ($P<0.01$) and remained in the same order than values found by Quentin *et al.* (2003) for a commercial French "label" type and by *Berry et al.* (2001) for a genetically selected broilers strain. Similar results were observed by Jaturashita *et al.* (2008), for an indigenous Thai variety, who reported values around 15.5% for breast yield. With regard to drumstick yield, values for Mos and Sasso T-44 were 15.2 and 12.9 respectively, as observed in Table 2, higher ($P<0.001$) for Mos breed. Mos value was similar to obtained by Santos *et al.* (2005) who studied and autochthonous Brazilian breed and those reported by Castellini *et al.* (2002) who studied Ross variety.

According to these results, it has been demonstrated that Mos breed provided similar or even higher economic interest than Sasso T-44 breed. Although full carcass weight of Mos variety was lower, yield for most appreciated parts, breast and drumstick, remained higher, which is an important issue from an economical and productive point of view.

Acknowledgments

Authors are grateful to Xunta de Galicia (the Regional Government) for its financial support (PGIDIT09MRU001CT). Special thanks to Centro de Recursos Zooxeneticos de Galicia (CRZG, Fontefiz, Ourense) for samples supplied for this research.

Abstract

Mos breed is a Galician autochthonous chicken variety whereas Sasso-T44 is a well-known commercial one. The aim of this study was to evaluate the morphological characteristics of two different rooster breeds (Mos and Sasso-T44) slaughtered at 10 months. Animals were fed with a corn-based diet during all period.

After slaughter, the carcasses were weighted and the left side of carcass was quartered (wing, breast, thigh and drumstick) and the drumstick was dissected into skin, muscle and bone. Both live weight and carcass weight were higher for commercial breed ($P<0.001$), they also presented a higher enlargement of head and neck. For consumers most appreciated parts are drumstick and breast, the relation between these pieces and total carcass weight is an important parameter to determine carcass economic valorization. Ratio drumstick/carcass was 7.53±0.56 for Mos rooster breed against 6.42±0.57 obtained for Sasso-T44 ones. Besides, the dissection of the drumstick allowed estimating in a precise way, the proportion of meat, bone and skin of the whole carcass. Relation lean/bone was 3.71±0.62 for Mos rooster breed, a higher value than 2.89±0.38 found for Sasso-T44 rooster ($p<0.01$). Data showed that Mos rearing could be more interesting from an economical point of view.

Keywords: Mos rooster breed, carcass characteristics, carcass yield

References

BERRY, C., WACRENIER, N., MILLET, N. and LE BIHAN-DUVAL, E. (2001) Effect of selection for improved body composition on muscle and meat characteristics of broilers from experimental and commercial lines. Poultry Science **80**, 833-838

CASTELLINI, C., MUGNAI, C. and DAL BOSCO, A. (2002) Effect of organic production system on broiler carcass and meat quality. Meat Science **60**, 219-225

JATURASHITA, S., SRIKANCHAI, T., KREUZER, M. and WICKE, M. (2008) Differences in carcass and meat characteristics between chicken indigenous to northern Thailand (black-boned and thai native) and imported extensive breeds (bresse and rhode island red). Poultry Science **87**, 160-169

JENSEN, J. (1983) Method of dissection of broiler carcasses and description of parts. Papworth´s Pendragon Press. Cambridge

QUENTIN, M., BOUVAREL, I., BERRI, C., LE BIHAN-DUVAL, E., BAEZA, E., JEGO, Y. and PICARD, M. (2003) Growth, carcass composition and meat quality response to dietary concentrations in fast-, médium- and slow-growing commercial broilers. Animal Research **52**, 65-77

RIVERO, C.J., ROIS, D., FERNÁNDEZ, M., JUSTO, J.R., ADÁN, S. and LAMA, J. (2007) Study of the increase of weight and index of conversion in a population of Galiña de MOS. Archivos de Zootecnia **56**, 529-534

SANCHEZ, L., DE LA CALLE, B., IGLESIAS, A. and SÁNCHEZ, B. (2005) Use of native ancestries for the production of label chicken. Archivos de Zootecnia **54**, 491-496

SANTOS, A.L., SAKOMURA, N.K., FREITAS, E.R., FORTES, C.L.M.S., CARRILHO, E.N.V.M. and FERNANDES, J.B.K. (2005) Growth, performance, carcass yield and meat quality of three broiler chickens strains. Revista Brasileira de Ciencia Avicola **34**, 1589-1598

Table 1. Chemical composition and fatty acid profile of fodder and corn

	Fodder[a]	Corn[b]
Crude Protein	17.0	n.d.
Crude Fibre	3.0	n.d.
Organic Matter	n.d.	66.5
Neutral Detergent Fiber	n.d.	5.56
Ash	6.60	0.87
Fat	4.10	2.53
Moisture	n.d.	32.62
Oil fatty acid composition		
	Fodder	Corn
C16:0	34.99	14.13
C16:1	0.21	0.11
C18:0	4.33	1.88
C18:1n9c	31.06	28.52
C18:2n6c	26.77	52.38
C20:1	0.18	0.30
C18:3n3	1.39	1.49
C22:0	n.d.	0.23
SFA	40.39	16.88
MUFA	51.45	29.04
PUFA	28.16	54.08

[a]Fodder additives vitamine A (UI/kg) 10000, vitamine D3 (UI/kg) 2500, vitamine E((UI/kg) 9, Fe (60 ppm), Zn (50 ppm), Cu (5 ppm), Mn (60 ppm), Co (0.05 ppm), Se (0.20 ppm), Iodine (0.40 ppm) and Fe (425 ppm), methionine (0.33%), lisyne (0.85%) and P (0.59%)

[b] expressed as percentage of dry matter

n.d.= not determined

SFA = saturated fatty acids (sum of C16:0, C18:0, and C22:0)

MUFA = monounsaturated fatty acids (sum of C16:1, C18:1n9c and C20:1)

PUFA = polyunsaturated fatty acids (total, minus SFA and MUFA)

Table 2. Least squares means (±SE) of carcass weight and yields of carcass cuts from two different breeds (Mos and Sasso T-44)

		Breed		
		MOS (n=25)	Sasso-T (n=15)	Sig.
Live weight		4.46±0.39	5.22±0.33	***
Carcass weight		3.68±0.35	4.32±0.32	***
Killing out		82.58±2.06	82.73±1.77	n.s
Drumstick	Weight	0.28±0.04	0.28±0.03	n.s
	Skin	0.03±0.004	0.03±0.008	**
	Lean	0.20±0.03	0.18±0.02	n.s
	Bone	0.05±0.007	0.06±0.006	***
Thigh		0.35±0.04	0.37±0.03	n.s
Wing		0.17±0.01	0.18±0.01	*
Breast		0.28±0.04	0.32±0.04	*
Head		0.11±0.02	0.17±0.02	***
Neck		0.23±0.03	0.28±0.03	***
Feet		0.15±0.02	0.17±0.02	**
Drumstick/Carcass		7.53±0.56	6.42±0.57	***
Drumstick yield		15.21±1.02	12.96±0.98	***
Breast/Carcass		7.67±0.61	7.36±0.63	n.s
Breast yield		15.22±1.14	14.81±0.91	**
Lean/Bone		3.71±0.62	2.89±0.38	**

Results expressed as kg

Significance: *** ($P<0.001$),* ($P<0.05$), n.s. = $P\geq0.05$