

PE1.68 Carcass Measurement and Meat Quality of Araucana Lambs Raised in Southern Chile 426.00

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Abstract- The aim of this study was to evaluate the meat quality characteristics of Araucana sheep, a Creole breed raised in south of Chile. 13 Araucana lambs reared in traditional systems were slaughtered at 7 months of age with of 35 kg liveweight. Analyses of carcass and meat quality parameters were carried out. The lambs yield carcass was 51,14%, and the muscle/fat ratios and muscle/bone ratio were $3,79 \pm 0,67$ and $2,67 \pm 0,23$ respectively. Other parameters were evaluated: pH, colour, water holding capacity, cooking loss, and Warner-Bratzler shear-force. According to the result of this study, the Araucana lamb presents a high carcass yield; good proportion of more valuable commercial cuts and lower level fatty covering.

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Index term - Carcass measurements, meat quality, lambs, Araucana creole sheep.

I. INTRODUCTION

International agreements of Chile with the European Union have opened markets for sheep meat exports to that continent. The past year were exported to the EU around 5000 tons. sheep meat, mainly lamb for 5 to 8 months of age with average carcass weights of 13 kilograms. Most of these lambs are meat and dual-purpose breed (Merino, Suffolk, Romney Marsh, Corridale). Most Latin American countries have large populations of sheep "creole," which corresponds to genotypes adapted to the conditions of each region and are used for consumption of own livestock and sales in local markets. In southern Chile (38 ° - 40 ° LS) there is a

local breed sheep called Araucana, this sheep are raised for small holders farmers mainly of indigenous origin (Mapuche). The total population of Araucana sheep is estimated in 300,000 head. In recent years we have developed morphological, genetic and productive studies to characterize the local genotype considered today as an alternative to be used as a maternal breed. The aim of this study was to determine the parameters of growth and fattening, slaughter and carcass characteristics and meat quality of lambs reared in extensive systems based on grassland.

II. MATERIALS AND METHODS

The study was carry out at Maquehue Experimental Station and in the Laboratory of meat Technology, located in Araucanía Region, Chile. 13 male lambs were selectionated from a flock (122 ewes and lambs). All the lambs were raised with the dam and weaning at 120 days. After this the lambs were maintained in a pasture (rye grass/white clover) during 45 days.

The slaughter of animals was conducted at the slaughterhouse and after 16 hours waiting with access to water, we proceeded with the slaughter of animals. Lambs were slaughtered after electrical stunning al the local abattoir. After slaughter the hot carcass was weighed, dressing percentage was calculated.

A. Carcass characteristics

In the cold carcass (24 h at 4°C) of lambs was determined the conformation objective using morphological measures as the length of the carcass, length of the leg, length of the inner carcass, buttock width, chest depth and thickness of back fat. With this information we calculated the index of performance and compactness of the carcass. The dorsal fat thickness was determined by the depth of tissue on the 13th at rib at 4 cm from the midline, using a gauge. Subsequently, the carcass was cut along the backbone, resulting in two equal halves. The left carcass is weighed and the cutting was done according to the Commercial

Chilean Norm NCh 1595. Of2000 (INN, 2003) produces leg, chops, ribs and forequarter, cuts were weighed and vacuum packed. Then proceeded to remove the forequarter (Colomer-Rocher *et al.*, 1987) were weighed and vacuum packaged and frozen at -20°C, and then a week was defrosted at room temperature for 24 h, proceed to the dissection of the back: total weight of the back, total fat, total meat and bone. With this information we calculated the percentage of meat, bone and fat from the back and the muscle / fat and muscle / bone.

B. Instrumental meat quality analyses

Instrumental meat quality characteristics investigated in the current study were pH, water holding capacity (%), cooking loss (%), Warner Bratzler shear force (kg) and meat colour. The pH was measured at 24 h post- slaughter using a digital pH meter equipped with electrode measurement was performed directly on *M. longissimus dorsi* between 12th and 13th thoracic vertebrae.

The *M. longissimus dorsi* was removed from right side of the carcass at 24 h post-mortem. *Longissimus thoracis* muscle between 6th and 13th ribs was used for cooking loss and Warner Bratzler shear force determination, while samples from the *Longissimus lumborum* muscle was used for meat colour and drip loss measurements. These samples were packaged and kept at 4°C for 48 h.

Meat colour was measured immediately after cutting the carcass at 24 h post-mortem directly on *M. longissimus lumborum* fat free. During the storage period, the muscles were kept at 4°C in plastics bags. Three colour measurements were performed from each sample and colour coordinate value was determined by calculated the average of these three measurements. The colour was evaluated using the Color Reader CR-10 Konica Minolta.

The water holding capacity was measured through the method of fluid released by applying external pressure, applying pressure on filter paper. 72 h post-mortem samples of 25 g of *M. longissimus dorsi* at the level of the 6th vertebra, and connective and fat-free tissue, will bite in a food blender and then take 5 g of the sample, which is weighed and placed between 2 filter paper and 2 sheets of glass, and then it puts on a weight of 2,25 kg over 5

minutes, after the time the sample is weighed again and determined the loss of water.

The cooking loss was determined at 72 h post-mortem. Samples were taken from *M. longissimus dorsi* of 2,5 cm thick, cut perpendicularly to the axis of the muscle at the 6th vertebra, which were weighed. Then each sample was foil wrapped and placed in a grill. Each sample is placed thermo dome that is connected to a Datalogger CPI, device to determine the internal temperature of meat when it is cooking. Samples are withdrawn from the grill when their internal temperature is 70° C, and let cool for about 30 minutes. Cooking losses were expressed as the percentage of weight lost with respect to initial weight of the sample.

Shear force was determined using a QTS Texture Analyser Brookfield (Model QTS 25), equipped with Warner Bratzler (WB) shear force apparatus and an average of six samples was accepted to be WB.

C. Statistic analysis

Was used an analysis descriptive, mean, standard deviation (SD) and variation coefficient (CV) for Carcass meat measurements and instrumental meat quality characteristics using SPSS 11.0 statistical package.

III. RESULTS AND DISCUSSION

Tables 1 and 2 display means, standard deviation and coefficient of variation of the carcass and meat quality measurements, respectively.

The coefficients of variation were lower than 5% for leg length, internal carcass length, yield carcass, forequarter (composition left carcass), meat (composition back) while were other measurements for which coefficient of variation were higher than 30%, like dorsal fat thickness. In relation of meat quality parameters, the pH 24 h displayed a coefficients variation lower than 5%, and there was no coefficient of variation greater than 30% (Table I).

Araucana lambs with 32 kg of liveweight presented a yield of carcass of 51.1±2.5%, 16.3 kg of hot carcass weight and carcass compactness index 0.27±0.02; superiors values to those obtained during 2008 in Chile, where 760,000 lambs slaughters with 35 Kg of weight live, the average of hot carcass was 16.4 Kg and 46.8% of yield of the

carcass. According to those the carcasses obtained from Araucana lambs corresponding to a weighed category of carcass (Ruiz de Huidobro *et al.*, 2000)

The results obtained regarding the composition of the carcass, in relation to chop and forquarter, are similar to those presented by Parilo *et al.*, (2007) in Suffolk lambs also in south of Chile, slaughter to the 35 kgs of weight lives. In comparison to the same study the Araucana lambs presented in the back composition tissue, a bigger meat percentage (3,39%) and bone (4,06%), and 8,55% less than fat.

It is necessary to highlight that in this study, chop and leg (where the cuts of more value butcher are located) they represent 45,8% of the carcass, what corresponds to 4,53% less than the value presented in lamb of meat breed.

Table II present instrumental quality characteristics of the lamb meat. Similar results were described in others breed (Cañeque *et al.*, 2004)

When comparing the results obtained regarding water holding capacity with heavy lambs of the breed Corridale that the Araucana lambs present a similar percentage, however, regarding texture the values are similar with those presented in light lambs of the breed Corridale (Bianchi *et al.*, 2006).

Table 1. Mean, standard deviation (SD) and coefficient of variation (CV) of the carcass quality measurements

	Mean	SD	CV
Age (days)	221,15	15,02	6,79
Live weight (kg)	32,05	1,97	6,14
Hot carcass weight (kg)	16,38	1,12	6,81
Cold carcass weight (kg)	15,88	1,12	7,07
Carcass length (cm)	77,08	5,51	7,15
Leg length (cm)	27,16	0,91	3,34
Internal carcass length (cm)	58,88	1,26	2,14
Buttocks width(cm)	14,65	1,28	8,74
Thoracic depth (cm)	24,92	1,04	4,16
Dorsal fat thickness (mm)	1,83	0,96	52,50
Yield carcass (%)	51,14	2,49	4,87
Carcass compactness index (kg/cm)	0,27	0,02	6,30
Left carcass weight (kg)	7,67	0,94	12,29
Back weight (kg)	1,28	0,08	6,25
Composition left carcass (%)			
Leg	28,88	4,93	17,06
Rib	14,68	1,90	12,91
Chop	16,92	4,22	24,93
Forequarter	38,86	1,75	4,51
Composition back (%)			
Meat	60,39	1,96	3,24
Bone	22,73	1,57	6,92
Fat	16,28	2,22	13,65
Muscle/fat ratio	3,79	0,67	17,70
Muscle/bone ratio	2,67	0,23	8,57

Table 2. Mean, standard deviation (SD) and coefficient of variation (CV) of the meat quality measurements

	Mean	SD	CV
pH 24 h <i>m. longissimus dorsi</i>	5,79	0,17	2,94
Colour a* 24 h	16,30	1,29	7,90
Colour b* 24 h	7,03	1,31	18,62
Lightness 24 h	39,55	3,81	9,63
Chromaticity 24 h	17,80	1,42	7,97
Hue 24 h	23,34	4,04	17,32
Water holding capacity (%)	14,54	2,07	14,22
Cooking loss (%)	17,45	4,19	24,01
WB shear force (kg)	4,56	1,15	25,26

IV. CONCLUSION

All the variables evaluated study presently for carcass measurement and meat quality presented low variation coefficients to exception of the thickness of dorsal fat, what shows the grade of homogeneity of the studied variables.

The lamb Araucana raised under the conditions described previously present a high carcass yield, good proportion of the cuts commercial more

valuable and lower level covering regarding lambs Suffolk and Corriedale present in the south of Chile.

In conclusion the present study provides data on the carcass yield and meat quality of lambs from local sheep breed. Araucana lambs meat appears to be a attractive local genetic resource in relation to carcass production and meat quality for internal and external markers.

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