MINERALS, HEME IRON AND LIPID OXIDATION IN FRESH AND AGED CORRIEDALE LAMB MEAT FROM PASTURE BASED PRODUCTION SYSTEM IN URUGUAY

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Abstract – The aim of this paper was characterize the meat from Corriedale lambs from pastoral system by trace minerals content, and lipid oxidation and heme iron in the fresh and aged muscle *Longissimus dorsi*. Ten lambs aged of 13 months were used and mineral content as Zn, Se, and Cu were measured in fresh meat and lipid oxidation, iron and heme iron content were measured at 0 and 14 days *post mortem*. This preliminary work shows that Corriedale meat is a good source of Fe, Cu and Zn for human nutrition and 100 g/day contributes with 25, 48 and 80 % and 1/6, 18 and 25 % of infants and elderly RDA respectively. Meat selenium is 100% of AI for infants and 70% of elderly RDA. Also, TBARS do not change with ageing but iron and heme iron decrease with ageing. In conclusion, this lamb meat contains interesting levels of trace minerals for health but some of them, particularly iron change during ageing.

Key Words – TBARS, nutritional value of lamb meat, Corriedale lambs.

I. INTRODUCTION

In Uruguay, Corriedale is the most important breed for wool and lamb meat purposes [1], and finished male lambs for meat is a product that add value to the production system. Lambs with 13 month of age and 40 kg of LW finished only on pasture is a commercial product well appreciate by the market. Previous reports has focused in fatty acid composition [2] but other important nutrients has not included before. In this sense a study focusing on nutritional characteristics of lamb meat on pasture system is carrying on to improve the sheep chain value. In this paper we show preliminary data from the characterization of the meat from Corriedale lambs raised on pastures, by minerals content and change in oxidative parameters and heme iron during the ageing of meat.

II. MATERIALS AND METHODS

Ten Corriedale lambs were used. Lambs were raised and finished on a field with a white clover predominant pasture until 13 months of age and weighting 42,04 ± 2.34 kg of LW. After slaughtering in a commercial slaughterhouse, carcasses weighting 22.3 ± 1.22 kg were obtained and muscle *Longissimus dorsi* removed. For the oxidation of lipids and heme iron determination, samples of muscle *Longissimus dorsi* were vacuum packaged at -80°C until analysis (fresh meat) or were vacuum packaged and kept at 1-2°C for 14 days and then frozen at -80°C until determinations (aged meat). Lipid oxidation was determined by TBARS method [3] with some modifications [4]. The results were given as mg of MDA/kg of fresh meat. Heme iron was determined by the Hornsey method [5] adapted by Ramos et al. [6]. Iron, selenium, copper and zinc content were measured according to Cabrera et al. [7] by atomic absorption spectrophotometry with graphite furnace (Analyst 300,Perkin Elmer, USA).

III. RESULTS AND DISCUSSION

In this preliminary work, meat from Corriedale lambs raised on pasture to 13 months of age, shows interesting levels of minerals content as zinc, selenium and copper and the contribution for children and elderly is high, as shows in Table 1. For iron, the contribution of 100 g of this meat is particularly important in infants of 7 - 12 months and premenopausal women and it is estimated to be 1/4 and 1/6 of the RDA respectively. Lipid oxidation values expressed as TBARS in aged meat was not changed by process, but we observed that iron and heme iron content suffered a decrease at 14 days of ageing of muscle *Longissimus dorsi* respect to not aged meat (Table 2).

Table 1 Mineral content in Corriedale meat from pasture system and the contribution of 100 g/day of meat to infants and elderly RDA (zinc and copper) or AI (selenium).

Item	*Longissimus dorsi*	Contribution of 100 g/day of meat to the RDA or AI, (%)	
	mg/kg fresh meat	Infants (7 – 12 months)	Elderly (>70 years)
Zinc	24.30 ± 2.20	80	25
Selenium	0.39 ± 0.09	100 *	70
Copper	1.62 ± 0.20	48	18

Data are mean ± SEM. RDA, Recommended Dietary Allowance. Elderly= average men and women. * Refers to AI, Adequate Intake

Table 2 Iron, heme iron and lipid oxidation (TBARS, expressed as mg MDA by kg of meat) in fresh and aged m. *Longissimus dorsi* of Corriedale lambs.

Item	*Longissimus dorsi*		
	fresh	aged	P
Iron, mg/kg	26.20 ± 1.90 a	21.1 ± 1.71 b	0.05
Heme iron, mg/kg	16.58 ± 0.39 a	12.54 ± 0.65 b	0.001
MDA, mg/kg	0.58 ± 0.04	0.51 ± 0.04	ns

Data are mean ± SEM. a,b, means significant differences between fresh and aged by one way-ANOVA and post hoc Tukey test (P<0.05).

IV. CONCLUSION

Meat from Corriedale lambs raising in Uruguay in pastoral system present interesting nutritional attributes for human nutrition and commercial objectives with added value. Ageing has an effect on the iron and heme iron content and this is an aspect to be considered. This preliminary study contributes to characterization of lamb meat from pastoral systems and provides new data on the oxidative stability and mineral composition.

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