FATTY ACID COMPOSITION OF MEAT FROM MIRANDESA BREED

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Abstract – Health professionals world-wide recommend a reduction in the overall consumption of saturated fatty acid (SFA), *trans* fatty acids and cholesterol, while emphasizing the need to increase intake of n-3 polyunsaturated fats. In addition, the components of technological meat quality influenced by fatty acids are fat tissue firmness, shelf life (lipid and pigment oxidation) and flavor. Twenty animals of Mirandesa breed and slaughtered at eleven months were used to evaluate the fatty acid profile of intramuscular fat. The most abundant fatty acids were SFA (43.8%) followed by monounsaturated fatty (38.3%) and polyunsaturated fatty (16.4%) acids. According to the nutritional recommendations, the quality of the intramuscular fat was within an acceptable range, responding to the demand required by the current meat consumers.

Key Words – calves, nutritional quality, Protected Designation Origin

I. INTRODUCTION

Meat quality is essential to define the production systems and the commercialization of meat products in order to guarantee quality and price. Production factors such as breed, age, gender, feed and *pre*-mortem conditions have a great influence on sensory properties, colour, tenderness, juiciness, flavor, and on nutritional aspects related with the content and quality of fat and fatty acid profile. These parameters are consider important quality indicators and have a great influence on consumer acceptability [1], especially nowadays as consumers are increasingly concern about health and the relationship between meat consumption and saturated fatty acids [2]. Mirandesa is a native breed of NE Portugal, classified as an endangered cattle breed. Since 1995 has the quality mark Protected Designation Origin (PDO) which has allowed the conservation of the breed and its production systems. The production of PDO meat has a greater acceptance due to the growing interest of consumer for natural products, produced under traditional systems and respectful with the environment [3]. Scarce information about nutritional meat quality of the Mirandesa breed have been reported until now, therefore this study allowed to assess the fatty acid profile and known more information for the correct characterization of this breed and its products.

II. MATERIALS AND METHODS

The study was carried out with twenty males of Mirandesa breed slaughtered at eleven months. The animals were reared in an extensive production system and finished after weaning for 120 days. During the finishing period, animals were fed *ad libitum* with hay, oats and a flour mixture. Animals were slaughtered at a commercial abattoir and carcass was cut and the muscle *longissimus thoracis* (LT) was extracted from the left half of each carcass, between the fifth and the tenth rib. The fat extraction for the determination of fatty acid composition was performance following the method proposed by Bligh and Dyer [4]. The transesterification, identification and quantification of fatty acid methyl esters took place using gas chromatography techniques according to the chromatographic conditions described by Domínguez *et al.* [5]. Results were expressed as percentage of total FAMES. ANOVA of one way using SPSS package (SPSS 19.0, USA) was performed and LSM were separated using Duncan's t-test ($P<0.05$).

III. RESULTS AND DISCUSSION

The fatty acid composition of LT muscle is shown in Table 1. Accordingly with the values found by other authors in Mirandesa veal [6-7], and in other Portuguese breeds such as Barrosã [6] and Mertolenga [8], the most abundant

fatty acids were saturated fatty acids (SFA), with values that ranged between 37.42% and 47.73%. These contents were similar to the values found by the aforementioned authors [7-8]. Palmitic and stearic acids were the more abundant SFA, with mean percentages of 22.97% and 16.24%, respectively. Followed in importance was monounsaturated fatty acids (MUFA), where oleic acid was the most abundant (approximately 86% of total MUFA). Furthermore, it was also the most abundant on fatty acid profile, which represented around 33% of the total FAMES. Regarding polyunsaturated fatty acids (PUFA), linoleic acid had the highest contents, with mean values of 10.17%.

Table 1 Main fatty acid profile (more than 1% of FAME) of *longissimus thoracis* (LT) muscle from Mirandesa calves

	MEAN	**MAX**	**MIN**	**SD**
C14:0	1.80	2.54	0.92	0.46
C16:0	22.97	26.81	20.26	1.77
C17:0	1.18	1.50	0.97	0.13
C18:0	16.24	18.84	5.57	4.26
∑SFA	43.84	47.73	37.42	3.11
C16:1	1.54	2.38	0.38	0.52
C18:1n9c	33.01	39.41	28.13	3.13
C18:1n7t	1.68	2.06	0.22	0.38
∑MUFA	38.30	47.53	30.43	4.07
C18:2n6c	10.17	16.13	7.44	2.03
C20:4n6	4.00	7.75	2.27	1.16
∑PUFA	16.44	27.22	11.91	3.39
PUFA/SFA	0.88	1.27	0.75	0.15

To assess the nutritional properties of IMF, the ratio PUFA/SFA were determined (Table 1). The mean values obtained were near to the FAO recommendations for human diet (0.85) [9]. These values were higher than those found in other Portuguese breeds [6-8] and in crosses of Rubia Gallega with Holstein-Friesian [10].

IV. CONCLUSION

The results of fatty acid profile allowed to know nutritional quality of the IMF of Mirandesa, especially from a human nutrition perspective. The obtained values were very close to the recommended values for the human diet. This study was useful for the research community and final consumers who are increasingly demanding healthy and high quality food products.

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