MEAT QUALITY DETERMINATION OF MANGALITA BREED

DETERMINAREA CALITĂȚII CĂRNII LA RASA MANGALIȚA

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SUMMARY

The limited and decreasing worldwide public funding on animal and meat science and limited private financial of research in this field has left the meat production sector lagging behind other sectors of life science (Garnier et el., 2003). The aim of this study was to establish the quality of Mangalita pork, based on the carcass characteristics and biochemical composition of different tissues. The main parameters were dry matter, intramuscular fat, crude protein and fatty acid level of meat and back fat. The results indicated a good quality of Mangalita meat and fat, having lower level of intramuscular fat and higher level of unsaturated fatty acids.

The Mangalita pig, a typical fat type breed was developed in the 19th century in the Charpathian basine. Red Mangalita derived from the crossing of Salonta pig with Blond Mangalita. The importance of this breed is emphasizing by genetic, social and economic aspects. Because the meat and fat of the Mangalita have extremely low cholesterol, are considered healthier diets for human consumption. The composition of phospholipids influences quality, nutritive value and sensory characteristics of meat. The fat of Mangalita contains 12-16% less saturated fatty acids and 8-10% more unsaturated fatty acids than modern pig breeds (Szabo et al., 2006). Moreover, concentration of copper, iron, zinc and vitamin B were higher in the meat of Mangalita than in hybrid pigs (Lugasi et al., 2006).

1. MATERIALS AND METHODS

Red Mangalita pigs kept in indoor rearing system at Suinprod Roman farm were used in this study for meat and fat quality determination. To each one of 20 castrated male pigs was established the live weights and hot carcass after slaughtered. We also calculated the weights of fat by adding the weight of back fat and lard of each carcass and determinate the back fat thickness measured on the 11th thoracic rib.

For the biochemical analysis the samples of muscle tissues were taken from Boston butt, loin side, spareribs and ham, while for the fat tissues were taken from back fat and lard. The standard methods were used for biochemical analysis. In samples of muscle and fat tissue the percentage of dry matter (drying method at temperature of 105°C to constant mass), protein (total proteins per Kjeldahl) and lipid (extraction with ether per Soxlhet) were determined.

For the fatty acid determination the samples of ham, back fat and lard were analyzed by gas chromatography. Peak areas of identified fatty acids were used to determine the relative percentage fatty acid composition of the total fatty acids. The percentage of saturated fatty acids (SFA - C12:0, C14:0, C16:0, C18:0 and C20:0) and unsaturated fatty acids (UFA - C16:1, C18:1, C18:2, C18:3, C20:4, C20:5 and C22:6) were calculated.

The results were statistically analyzed using ANOVA with one way. When ANOVA presented considerable differences, we used Tukey-Kramer Multiple Comparisons Test. All statistic analyses were made by using GraphPad InStat.

2. RESULTS AND DISCUSSIONS

Live and carcass weights and some technologies characteristics of carcass of Mangalita pig breed are shown in table 1. In comparison with the results of Petrovic et al. (2007) these results indicated that slaughter at smaller weight (under 100 kg) reduced the fat weight per carcass and the thickness of back fat.

Table 1

Carcass quality properties of Mangalita

Carcass traits	Mean ± sem
Live weight, kg	96.00 ± 1.38
Carcass weight, kg	76.95 ± 1.29
Fat weight, kg	15.09 ± 0.21
Back fat, mm	42.80 ± 1.87
Lard weight, kg	2.40 ± 0.13

The results of biochemical analysis showed higher value of dry matter on the different meat products of Mangalita than in the case of other breeds: *Belgium Landrace* 25.87% (Ender et al., 2002); *Large White/Landrace* and *Pietrain* crosses 26.30% (Segula et al., 2007). In comparison with the results obtained by other Mangalita breed researchers, our values are similar with those (for example 26.06 – 26.80% at *musculus semimemranousus* (Hollo et al., 2003)).

A higher percent of intramuscular fat was observed in Boston butt, side and spareribs, while in loin and ham was under the 5% but with a better content of crude protein. Anyway, a higher content of intramuscular fat and a good dispersion lead to improve the flavour, juiciness and tenderness. The values obtained were significant from statistically point of view

(table 2). In comparison with the results obtained by other researchers, our values are lower both on intramuscular fat (9.9 - 10.3% (Lugasi, 2006), and crude protein (21.9% - 23.87% (Csapo et al., 1999)). In the case of comparison the date of Mangalita meat quality from the literature, the differences are due to different feeding systems on one hand and the other hand to slaughter age (weight).

Table 2

Biochemical composition of different meat products of Mangalita

	Constituent, % (Mean ± SEM)		
	Dry matter	**Intramuscular fat**	**Crude protein**
Boston Butt	28.36 ± 0.36^{a}	8.33 ± 0.35^{a}	17.74 ± 0.32^{a}
Loin (LD)*	28.97 ± 0.25^{ab}	4.73 ± 0.38^{b}	19.12 ± 0.28^{b}
Side	28.81 ± 0.34^{a}	6.58 ± 0.35^{c}	18.71 ± 0.27^{ab}
Spareribs	28.82 ± 0.23^{a}	6.92 ± 0.42^{c}	17.85 ± 0.28^{a}
Ham (SM)*	29.94 ± 0.19^{b}	4.19 ± 0.27^{b}	20.27 ± 0.22^{c}

* LD – *Longissimus dorsi;* SM - *Semimembranosus*

The quality of meat and fat are influenced both by intramuscular fat percentage and the fatty acid composition. From this point of view, the proportions of saturated and unsaturated fatty acids are very important. In our study we established the fatty acids compositions of back fat, lard and ham (fig. 1). Our results indicated similar distribution with that reported by Szabo and Farkas (2005) at back fat of Red Mangalita (UFA: 61.33% vs. 63.01%). The value observed by these researchers was the highest from the seven purebreds and three crossbreds.

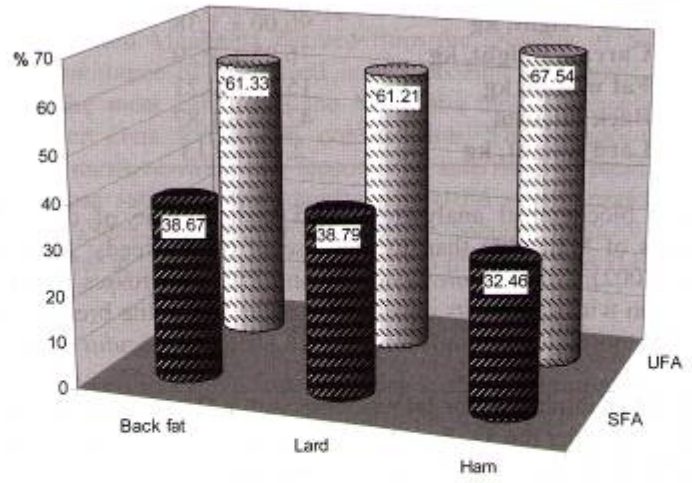

Fig. 1. Fatty acid composition on Mangalita carcass

In the case of meat quality, in this study we found a higher level of UFA in ham than that found by Fernandez et al. (2007) in five varieties of Spanish ham (57.41 - 59.06% in Serrano and Teruel hams and 64.60 - 65.01% in Iberian hams). Otherwise, percentage of UFA was similar with that found by Hollo et al. (2003) at *semimembranosus* muscle of Mangalita (67.58%). The results also indicate a significant difference between the level of UFA in ham in comparison with back fat and lard from statistic point of view.

3. CONCLUSIONS

These results indicated that slaughtering Mangalita at 96 kg leads to a good quality of carcass (with thickness of back fat) and meat (lower percentage of intramuscular fat). The meat and fat also contain higher level of UFA which is considered healthier diets for human consumption.

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