

OXIDATIVE STATE IN LOINS FROM MANGALICA AND COMMERCIAL HYBRIDS PIGS

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I. INTRODUCTION

Among the autochthonous European pig breeds that risked extinction a few decades ago, there are Mangalica pigs, a hardy breed originating in the Carpathian basin [1]. Thanks to this renewed interest in native breeds, a study was conducted to evaluate the meat quality of Mangalica pigs (M), reared outdoor (MO), compared to commercial hybrids reared indoor (HI) and outdoor (HO). In this short communication, our focus is on the oxidative process in the loins over time, indeed, lipid oxidation involves multiple mechanisms with very complex reactions that can affect the quality of meat. Malondialdehyde (MDA) is the major marker of lipid oxidation and the main technique to quantify its content in tissues is the thiobarbituric acid test (TBARs, thiobarbituric acid reactive substances) [2].

II. MATERIALS AND METHODS

Three pig groups were selected at their commercial maturity (from 11 to 21 months): HO: 12 commercial hybrids, female line Landrace x Large White and male line Italian Duroc x Talent Topigs, reared outdoor, five castrated (C) and seven female (F); HI: 12 commercial hybrids of the same genotype, reared inside, five C and seven F; MO: 13 Mangalica pigs, reared outdoor (MO), nine C and four F. All animals were slaughtered in the same abattoir, during a two months period, in mixed batches of 6 to 10 subjects comprising the three experimental groups and both sexes. A double loin sample was collected from each animal: the first sample was frozen (-20°C), under vacuum, 24h after slaughtering, while the second sample was kept in the fridge (4°C) for five days before being vacuum packed and frozen for chemical determinations. On loins samples, TBARs analysis was performed following the method proposed by Siu et al. [3] with some modifications.

A repeated measures design (SPSS package) was adopted in order to evaluate the effects of the time after slaughter, within subjects' factor, and of the sex and the experimental group, between subjects' factors, on MDA content of pig loin. The effects of the experimental groups were analysed by the orthogonal contrasts: MO vs. (HO, HI), genotype effect; and HO vs. HI, rearing system effect.

III. RESULTS AND DISCUSSION

Results regarding the oxidative state in loins, measured as MDA content, are presented in table 1 and figure 1. The three experimental groups show significant differences in MDA content while sex did not (table 1); Mangalica pigs had a lesser MDA content ($P < 0.01$) than commercial hybrids reared outside. Within commercial hybrids, those reared outdoor showed a lesser level of oxidation ($P < 0.05$).

Table 1: Effect of sex (S) and experimental group (G) on the oxidative state of loin.

	Sex		Experimental group			SEM	P-value		
	F	C	MO	HO	HI		S	G	S×G
MDA content mg/kg	0.357	0.328	0.283 ^{Aa}	0.349 ^{Bb}	0.396 ^{Bc}	0.016	0.128	<0.001	0.997

^{A,B}: $P < 0.01$; ^{a,b,c}: $P < 0.05$

The oxidative state increased passing from 24 hours to five days (Fig. 1). The second and third level interactions of the within subject factor, time, with the between factors (sex, and experimental group) were not significant. However, the oxidation difference between the two time points after slaughter (i.e., MDA at 5d - MDA at 24h) showed a numerical increasing trend from MO to HO and HI (0.053 vs. 0.056 vs. 0.072 mg/kg, respectively).

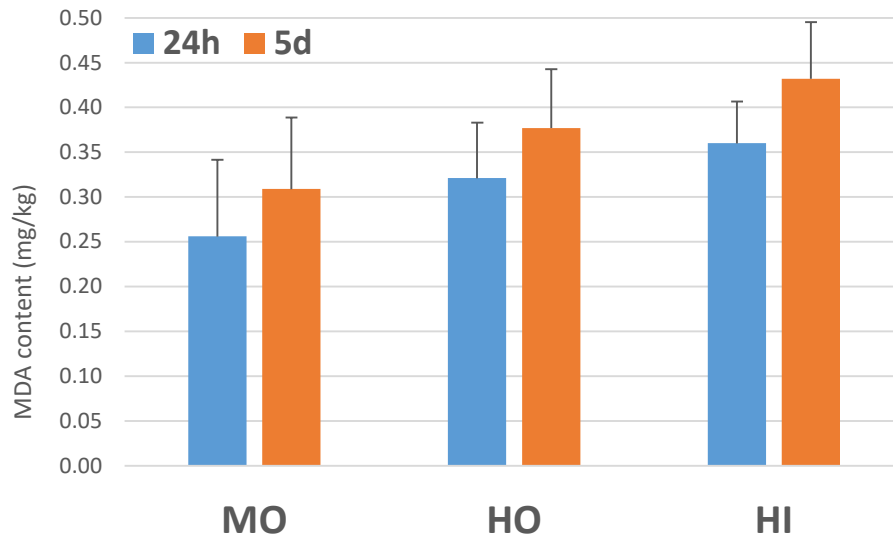


Figure 1. Oxidative state of loin at two time points after slaughter (mean value and standard deviation).

MDA values resulted below the sensory perceptible level: the recognition threshold of rancid is attested to be around 0.5-1 mg MDA/kg [4,5], while according to Arowolo et al.[6] the limit rises to 2 mg MDA/kg.

IV. CONCLUSION

Mangalica pigs show a better meat quality than commercial hybrids: the MDA content is lower in their loins, without significant delay in the oxidative process during the first few days after slaughter. These results can be explained by the genetic characteristics of the breed and the outdoor rearing conditions.

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