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Characteristics of cured lard of Cinta Senese pig fed acorn and chestnut

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RIASSUNTO – Caratteristiche del lardo stagionato di suini Cinta Senese alimentati con ghianda e castagna. Sono stati utilizzati 30 campioni di lardo stagionato provenienti da altrettanti suini di razza Cinta Senese di cui 10 allevati in recinto all'aperto ed alimentati con miscela commerciale, 10 in bosco di castagna, 10 in bosco di ghianda. I soggetti alimentati a ghianda, rispetto a quelli alimentati a castagna e miscela, hanno fornito lardo più ricco di C18:1 (45,2 vs. 44,2 vs. 42,3%) e di MUFA (48,1 vs. 46,9 vs. 45,0%) e più basso di PUFA n-6 (15,5 vs. 16,5 e 16,9%). Alla prova sensoriale il lardo dei gruppi ghianda e castagna ha fornito valori più elevati per "giallo" (29,9 vs. 26,4 vs. 19,9), per "untuosità" (35,5 vs. 33,4 vs. 26,1) e per "gradimento complessivo" (44,8 e 44,3 vs. 40,6).

Key words: Cinta Senese, cured lard, chestnut, acorn, panel test.

INTRODUCTION – Cured lard is a typical Tuscan dry-cured product, generally obtained from pigs of improved breeds intensively reared. The employment of extensive system in pig rearing could represent a concrete possibility to increase the added value of lard, as well as of the other cured products. Moreover, the general belief of a greater quality of products derived from unimproved pigs, particularly when reared outdoors, has been experimentally supported particularly in Iberian (Carrapiso *et al.*, 2003; Cava *et al.*, 2000) and Corsican pig (Coutron-Gambotti *et al.*, 1998). For Cinta Senese, a Tuscan autochthonous breed, investigations have been carried out particularly on in vita performance (Acciaioli *et al.*, 2002), carcass composition (Franci *et al.*, 2003) and fresh meat quality (Franci *et al.*, 2005; Pugliese *et al.*, 2005) but information on seasoned products is lacking. The aim of this work was to evaluate the effect of pasture in acorn and chestnut woods on fatty acid composition and sensory properties of seasoned lard of Cinta Senese pigs.

MATERIAL AND METHODS – Thirty Cinta Senese pigs were employed in the trial: 10 pigs were reared in paddock of 1 ha and fed commercial mixture (3 kg/pig/d), 10 pigs were reared in wood and fed chestnuts, 10 pigs were reared in wood and fed acorn. Each group reared in wood had 8 ha available for pasture and no alimentary integration was provided. The initial live weight of animals was 120 kg, on average. The trial was carried out from November to February corresponding to the fattening period of pigs. In table 1 the characteristics of diets are reported. Pigs were slaughtered at 148 kg of live weight on average. At slaughter backfat was removed and cured according to dry seasoning technique: lard was added with salt and pepper, then was cured for three months in cell at controlled conditions. On seasoned lard the following analyses were carried out: fatty acid profile for inner and outer layer separately, malonaldehyde (MDA) content on the outer layer only. Sensorial analysis was carried out on samples of lard assessed by a trained panel of 10 members and using a descriptive panel. A 100 mm unstructured scale was used, the extremes being "very low" and "very high" and the sample order was randomized. Data of fatty acid profile and MDA content were analysed by GLM proce-

ture (SAS, 1996) following the model: $Y_{ijk} = \mu + D_i + L_j + b(X_{ijk}) + E_{ijk}$ where: μ = mean; D = diet; L = layer; b = regression coefficient on slaughtered weight (X); E = error. Data of panel test were analysed with the same model substituting the effect "layer" with the effect "evaluator".

Table 1. Chemical analysis (% as fed) and fatty acid composition (%) of feeds.

	Chestnut	Acorn	Concentrate
Moisture	61.04	43.0	10.60
Protein	3.08	3.12	16.10
Ether Extract	0.84	1.69	3.58
Crude Fibre	1.57	1.96	3.9
C 16:0	13.9	15.0	16.7
C 18:1	37.5	46.8	19.7
C 18:2	42.3	30.2	56.2
C 18:3	3.9	4.0	4.5
MUFA	38.3	48.3	20.3
PUFA-n3	3.9	4.0	4.5
PUFA-n6	42.3	30.2	56.2

RESULTS AND CONCLUSIONS – In Table 2 fatty acid composition and MDA content are reported. Pigs fattened in acorn-wood provided lard with higher content of oleic acid and lower of linoleic acid, consequently they showed higher MUFA and lower PUFA n-6 percentage.

Table 2. Fatty acid composition and MDA content of cured lard.

	Feed			Layer		RSD
	Chestnut	Acorn	Concentrate	outer	inner	
Total Lipid%	79.44	79.27	78.32	78.94	79.08	2.42
C 14:0%	1.19 a	2.45 b	1.19 a	1.82	1.40	1.47
C 16:0%	21.99	22.03	22.49	21.01 b	23.33 a	0.83
C 18:0%	11.38 a	11.26 a	12.40 b	10.08 b	13.28 a	0.74
C 18:1%	44.23 a	45.22 b	42.28 c	45.01 b	42.81 a	1.34
C 18:2%	15.60a	14.69 b	15.98 a	16.70 b	14.11 a	1.31
MUFA%	46.92 a	48.08 b	45.04 c	47.91 b	45.45 a	1.35
PUFA n-3%	1.18 a	1.06 ab	1.02 b	1.20 b	0.97 a	0.12
PUFA n-6%	16.49 a	15.48 b	16.86 a	17.70 b	14.86 a	1.38
PUFA:SFA	0.52	0.49	0.50	0.59 b	0.42 a	0.05
MDA mg/kg lipids	0.66	0.73	0.75			0.23

a, b within criterion means different (P<0.05).

These results can be explained by a ready incorporation into pork fat of dietary fatty acid (Fontanillas *et al.*, 1998), indeed chestnut and acorn in comparison with barley are characterised by an higher content of MUFA (table 1). These results are in contrast with Coutron-Gambotti *et al.* (1998), which found no differences in MUFA content on adipose tissue of ham of Corsican pigs fattened with chestnut in respect to pigs fattened with concentrate diet. Higher percentage of oleic acid and MUFA in animals fed acorn are consistent with those obtained for acorn-fattened Iberian pigs (Carrapiso *et al.*, 2003). As regard differences between layers, outer layer showed higher MUFA and PUFA percentage. All the sensory characteristics (table 3) were significantly affected by the rearing system except for odour intensity. As it regards fat appearance, pinkness and yellow-

ness were greater in lard of acorn diet. For fat texture, pigs pastured on chestnut and acorn provided lard with higher value of oiliness and lower value of hardness, while, for taste characteristics, acorn-fattened pigs showed higher value of saltiness and lower of rancid even if the absolute values of this latter parameter were very low. For texture traits acorn diet showed higher values of fibrousnesses while chestnut diet showed higher values of juiciness. Finally, the lard of chestnut and acorn-fattened pigs was more appreciate by panellists, indeed it showed higher value of global index of pleasure. These results are probably related with fatty acid composition, particularly with oleic acid that seems to be the best predictor of sensorial characteristics of lard. Indeed oleic acid is significantly correlated to the largest number of sensory traits (Carrapiso *et al.*, 2003).

Table 3. Sensory characteristics of cured lard.

	Chestnut	Acorn	Concentrate	RSD
<i>Fat appearance</i>				
Pinkness	28.77a	31.55b	47.60c	10.32
Yellowness	29.94a	26.45b	19.87c	12.44
<i>Fat texture</i>				
Oiliness	35.46a	33.42a	26.10b	12.42
Hardness	40.48a	41.05a	45.87b	12.45
Fibrousness	27.56a	32.39b	25.57a	15.86
Juiciness	45.78a	42.90b	43.09b	12.63
<i>Aroma</i>				
Intensity	42.47	44.85	43.98	13.95
<i>Taste</i>				
Saltiness	27.32a	35.08b	32.30c	12.89
Rancid	6.37a	4.09b	7.97c	7.08
<i>Other</i>				
Global index of pleasure	44.25a	44.81a	40.64b	13.64

a, b means different ($P < 0.05$).

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