EFFECTS OF DIFFERENT MANAGEMENT AND DIETARY TREATMENTS OF PIGS ON PHYSICAL AND SENSORY ATTRIBUTES OF PDO VENETO DRY-CURED HAM

Diego Bottegal[1*], Stefano Schiavon[2], Paolo Carnier[3] and Luigi Gallo[2]

[1]Animal Science Department, University of Lleida, Spain

[2]Department of Agronomy, Food, Natural Resources, Animals and Environment (DAFNAE), University of Padova, Italy

[3]Department of Biomedicina Comparata e Alimentazione (BCA), University of Padova, Italy

*Corresponding author email: diego.bottegal@udl.cat

I. INTRODUCTION

Many antemortem factors such as pigs' feeding management (FM), age (SA) or slaughter weight (SW), may affect the green ham quality and, consequently, the dry-cured ham attributes [1]. Like in other typical Italian dry-cured hams [2], the Veneto PDO regulation provides a minimum of 9 months of age and 160±16 kg of SW, assuming a relationship of these factors with the final quality of hams. However, the product specifications are currently under revision, prospecting a further increase of SW admitted. Therefore, this study aimed to evaluate the effects of FM that allow obtaining pigs with different SA and/or SW, on the qualitative attributes of PDO dry-cured hams.

II. MATERIALS AND METHODS

The study involved 60 dry-cured hams from gilts and barrows from the pure C21 Goland genetic line. On-farm, pigs were randomly distributed into four fattening FM groups: two groups received feed restrictively, with a target SW of 170 kg and SA of 9 months (control group, C, representative of the traditional FM used to produce Veneto PDO cured hams) or a target SA of 10 months (Older Age group, OA); the other two groups received *ad-libitum* feed, with a target SW of 170 kg irrespective of age (Younger Age group, YA, average SA of 8 months) or with a target SA of 9 months irrespective of weight (Greater Weight group, GW, average SW of 193 kg). After 20 months of seasoning, dry-cured hams (15 per FM group) were deboned and sliced to perform physical (meat colour and texture) and sensory assessments. To this purpose, 11 assessors were trained for 6 weeks on Italian hams to become familiar with the 14 sensory descriptors and the measuring scale used (range 0-10). Throughout 8 sensory sessions distributed over a month, all hams were evaluated (7-8 hams/session). One ham at a time was assessed starting from the appearance followed by the odour, taste and finally texture attributes. All data were processed through linear mixed models using the MIXED procedure of SAS (SAS Inst. Inc., Cary, NC). A multivariate analysis (PCA) was performed to detect an association between the sensory attributes and the FM employed to produce four PDO hams.

III. RESULTS AND DISCUSSION

The physical traits investigated were not affected by the pigs' sex ($P>0.05$). The FM did not affect ($P>0.05$) the ham colour and the most texture parameters, with the only exception of hardness, which was lower in both OA and GW than C ($P<0.001$, Table 1), possibly because of a higher intramuscular fat in the ham of those groups. As expected, all physical attributes were affected ($P<0.001$) by the muscle assessed. According to the sensory panel, no differences were detected ($P>0.05$) between C-hams and the other FM on most attributes, only colour uniformity was lower ($P=0.023$) in the hams from GW compared with those of the C-group (data not shown). A multivariate analysis was also performed to associate the hams from the different FM to the 14 attributes tested. In Figure 1, the two principal components (PC1 and PC2) explained 83.5% of the total variance. The GW hams were more related to attributes associated with a greater fat deposition. Conversely, the OA group was associated

with the texture parameters (hardness and fibrousness), while YA was related to a more rancid and cured flavour.

Table 1. Feeding management (C, control; OA, older age; YA, younger age; GW, greater weight) and muscles (BP, *biceps*; QP, *quadriceps*; SM, *semimembranosus*; ST, *semitendinosus*) effects on cured-ham texture and colour parameters.

	Feeding Management (FM)[1]				Muscle[2]				SEM[3]	P-value	
Item	C	OA	YA	GW	BP	QP	SM	ST		FM	Muscle
Hardness (N)	19.4	16.2*	20.6	16.6*	12.3^{d}	20.8^{b}	24.6^{a}	15.3^{c}	0.88	0.019	<0.001
Cohesiveness	0.55	0.55	0.56	0.57$^{\alpha}$	0.57^{b}	0.59^{a}	0.51^{d}	0.56^{c}	0.01	0.069	<0.001
Springiness (mm)	1.42	1.48	1.46	1.52	1.41^{b}	1.17^{c}	1.70^{a}	1.59^{a}	0.08	0.883	<0.001
Adhesiveness	-1.67	-1.27	-1.58	-1.29	-1.11^{a}	-1.31^{a}	-2.21^{b}	-1.19^{a}	0.17	0.402	<0.001
Chewiness (N)	7.69	6.09$^{\alpha}$	8.34	6.58	5.05^{d}	9.42^{a}	8.24^{b}	5.99^{c}	0.44	0.023	<0.001
*L**	37.5	38.1	38.5	38.6	37.9^{b}	36.5^{c}	33.9^{d}	44.3^{a}	0.42	0.412	<0.001
*a**	10.0	10.3	10.2	9.8	10.3^{a}	10.7^{a}	10.5^{a}	8.89^{b}	0.20	0.386	<0.001
*b**	10.3	10.7	10.9	10.6	10.1^{c}	11.1^{b}	9.03^{d}	12.3^{a}	0.23	0.475	<0.001
*C**	14.5	15.0	15.1	14.6	14.4^{b}	15.5^{a}	14.0^{b}	15.3^{a}	0.26	0.344	<0.001
H°	45.6	45.7	46.3	47.1	44.2^{c}	45.9^{b}	40.4^{d}	54.3^{a}	0.64	0.501	<0.001

[1]Significants contrast (α P<0.1;* P<0.05) between Control and the other feeding strategies. [2]Small letters indicate differences (P<0.05) between muscles. [3]SEM= standard error mean.

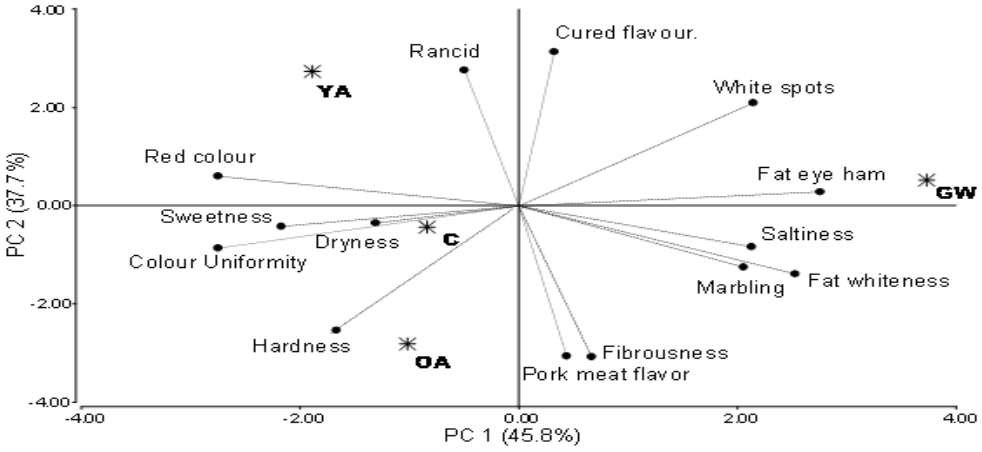

Figure 1. A plot of sensory variables in cured hams and feeding management (C, OA, YA, GW) of pigs in the two-dimensional coordinate system defined by principal components.

IV. CONCLUSION

Different feeding managements with a strong impact on pig' SW and, or SA exerted only minor influences on the physical and the sensory attributes (evaluated by trained assessors) of typical dry-cured hams produced under the Veneto PDO rules.

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