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The weight loss in the production of non-fermented salami "*capocollo*", *"fiocco"* and dry cured ham from *"casertana"* pig ancient autochthonous genetic type (AAGT). Further contribution

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Abstract. The study was carried out to monitor the weight loss of three unfermented local products (LP), "capocollo Sannita", "fiocco Sannita" and dry cured ham, obtained from males (castrated not less than 40 days before slaughter) and entire females belonging to the "Casertana" pig AAGT, reared at the experimental farm of ConSDABI Sub NFP.I.-FAO. The results, valid within the observation field, showed that for all three products the weight loss during the seasoning, in the same conditions, was statistically greater (P<0.001) in castrated male than that obtained from the entire female and, in particular: (i) the capocollo Sannita [54 (♂♂) and 62 ♀♀] has decreased by 25% *vs* 20% at 1 month, 39% *vs* 33% at 3 months and 45% *vs* 42% at 6 months; (ii) the fiocco Sannita [51 (♂♂) and 41♀♀] has decreased by 22% *vs* 17% at 1 month and 43% *vs* 39% at 12 months; (iii) the dry cured ham [34 (♂♂) and 42 ♀♀] has decreased by 9% *vs* 7% at 1 month, 18% *vs* 14% at 3 months reaching the highest value at 24 months (33% *vs* 27%).

Keywords. Ancient autochthonous genetic type (AAGT) – Capocollo Sannita – Fiocco Sannita – Dry cured ham – Local Products (LP).

Diminution de poids lors de la production de "capocollo", "fiocco" et "prosciutto" issus du type génétique autochtone ancien (TGAA) "Casertana". Des contributions supplémentaires

Resumé. *L'étude a été menée pour surveiller la diminution de poids pendant la maturation de trois produits locaux (PL) non fermentés : "capocollo Sannita", "fiocco Sannita" et "prosciutto Sannita", obtenus à partir de mâles (castrés au moins 40 jours avant l'abattage) et femelles non castrées du TGAA "Casertana" (CT) élevés chez le ConSDABI SUB NFP.I.- FAO. Les résultats, valables dans le champ d'observation, ont montré que pour les trois produits la perte de poids pendant la maturation, en conditions égales, s'est avérée plus élevée pour le mâle castré par rapport à la femelle non castrée et, en particulier: (i) le "capocollo Sannita" [54 (♂♂) et 62 ♀♀] a diminué de 25%* vs *20% à 1 mois, de 39%* vs *33% à 3 mois et de 45% vs 42% à 6 mois ; (ii) le 'fiocco Sannita' [51 (♂♂) et 41♀♀] a diminué en moyenne de 22% vs 17% après 1 mois, et de 43% vs 39 après 12 mois de maturation ; (iii) le "prosciutto Sannita" [34 (♂♂) et 42 ♀♀] a diminué en moyenne de 9% vs 7% après 1 mois, de 18% vs 14% après 3 mois et de 33% vs 27% après 24 mois.*

Mots-clés. *Type génétique autochtone ancien (TGAA) – Capocollo Sannita – Fiocco Sannita – Prosciuto Sannita – Produits locaux.*

I – Introduction

Casertana (CT) pig, also called "pelatella", for the absence of bristles, or "napoletana" for its

place of origin, is one of the best Italian autochthonous pig population so that Höesch (first half of 10th century) defined it as "pig Italian pride". During the centuries this population underwent alternate events. It contributed, in the past (half of 19th century) to the development of the Yorkshire and Berkshire English breeds, while at the end of 80's years its population size decreased so that it became a genetic type at risk of extinction. Currently, CT pig is reared in Campania, Lazio, Molise and Umbria regions, with a growing population size. Not fermented products, economically more important, obtained from this AAGT are without any doubt "ham" and "fiocco". The aim of this research was to furnish a further contribution to the knowledge of the influence of gender factor on the weight loss during the seasoning of Local product (LP) obtained from meat of CT pig.

II – Materials and methods

The study involved unfermented local products (LP): "capocollo Sannita", "fiocco Sannita" and dry cured ham obtained from males (castrated less than 40 days before slaughter) and entire females of the Casertana pig AAGT. The animals, reared in multiple boxes at experimental Farm of ConSDABI Sub NFP.I. - FAO, were fed with commercial feed. Net live weights of pigs at the slaughter were 168.8 kg and 163.6 kg respectively for castrated male and entire female. Scheme 1 reports the number of the products analyzed and the period in which the weight variation (weight loss) was registered for each 'LP'.

In particular: (i) the capocollo Sannita was made using neck (starting from atlas-occipital articulation to the 5th thoracic vertebra) after trimming; its seasoning takes about six months; (ii) fiocco Sannita, the noble part of the ham, consisting of three muscles (*Semimembranosus*, *Semitendinosus* and *Biceps femoris*) has a peculiar 'pear' shape (typical of "culatello of Zibello"); its seasoning takes about 12 months; (iii) the dry cured ham was obtained from the leg of pig properly prepared until to give it the typical rounded shape; its seasoning takes about 24 months.

The seasoning was realized in proper places controlled for temperature and humidity. Each product was weighted at the start of the process, at the end of drying time, and then periodically (weekly or monthly) until the end of seasoning time (Table 1). Seasoning weight loss was calculated as: [(initial product weight– product weight during process)/ initial product weight]*100.

No preservatives (nitrite and nitrate) were used.

Table 1. Sequence of monitoring for each product

Product	(♂♂)	♀♀	Seasoning d									
			0	6	15	30	90	180	270	360	540	720
Capocollo	54	62	X	X	X	X	X	X				
Fiocco	51	41	X			X	X	X		X		
Ham	34	42	X			X	X	X	X	X	X	X

The preliminary statistical analyses showed a significant influence of initial weight of product on the trend of weight loss, so the data were processed using the following model of covariance analysis in which initial weight of the product was the covariate and 'gender' was considered as fixed factor (SAS, 1997):

$y_{ijk} = \mu + b_1x_1 + gender_i + e_{ijk}$; where:
μ = constant common to all the observations (general mean);
b_1 = regression coefficients of dependent variable on the weight loss of product (x_1);

$gender_i$ = fixed effect of i^{th} gender (i = 1, 2);
e_{ijK} = random error and/or unknown effects.

The Student's t test was applied to compare the estimated means.

III – Results and discussions

The results, valid within the observation field, showed the significant influence of gender to determinate the variation of weight of all three considered products. Tables 2, 3 and 4 evidenced that the products obtained from meat of entire females had a significantly lower weight loss, in comparison with those obtained from meat of castrated males (P<0.001). In particular, for the capocollo Sannita this difference reached the higher value (5.6%) after 90 days of seasoning, as well as fiocco Sannita (6.3%), while for dry cured ham the highest difference was observed at 360 days (6.7%).

Table 2. Percentage weight loss of "capocollo Sannita" during seasoning period

Seasoning d	Gender		Δ = [(♂♂) - ♀♀]
	(♂♂)	♀♀	
3	5.32	4.55	0.77***
15	16.15	13.41	2.74***
30	24.67	20.17	4.50***
90	38.84	33.26	5.58***
180	45.38	41.59	3.79***

****P<0.001.*

Table 3. Percentage weight loss of "Fiocco Sannita" during seasoning period

Seasoning d	Gender		Δ = [(♂♂) - ♀♀]
	(♂♂)	♀♀	
3	8.75	8.18	0.57**
14	14.47	12.78	1.69***
30	21.58	17.34	4.24***
90	33.80	27.52	6.28***
180	40.30	34.18	6.12***
360	43.04	38.66	4.38***

***P<0.01 ***P<0.001.*

Table 4. Percentage weight loss of dry cured ham during seasoning period

Seasoning d	Gender		Δ = [(♂♂) - ♀♀]
	(♂♂)	♀♀	
30	9.04	6.86	2.18***
90	18.50	13.78	4.72***
180	24.49	18.30	6.19***
270	26.62	20.17	6.45***
360	28.59	21.85	6.74***
540	31.30	24.66	6.64***
720	33.19	27.16	6.03***

****P<0.001.*

At the and of seasoning time, the average weight loss of dry cured ham was 30.18%, lower than Istrian ham (46.31%) (Karolyi *et al*., 2005) or Bayonne ham (from 35% to 39%) (Monin *et al*., 1997) and not more different from Parma ham (about 27%) (Nanni Costa *et al*., 1999).

IV – Conclusions

The results, valid within the observation field, highlighted that for the three local products considered, the castrated male had a significantly greater percentage weight loss than entire female. This trend confirms the results obtained by Castellano *et al*. (2006). These authors report that the difference could be attributed to a different texture of fat tissue or to a higher content in intramuscular fat of entire females (not published data). The relation with qualitative data (rheology and colour) taken on both muscular portion and on covering fat of the dry cured ham and fiocco Sannita will may provide useful indications in order to deep factors that influence these differences.

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