

CONSUMER EVALUATION OF DRY-CURED LOIN FROM FOAL

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Abstract – The objective of this study was to evaluate the acceptability by consumers of a new dry-cured product from foal *longissimus dorsi*. After an elaboration process, dry-cured foal loins were subjected to consumer evaluation (88 untrained subjects; 45 men and 43 women, from 30 to 65-years-old). There were only significant differences between men and women for mould odour, saltiness, pastiness, dryness and flavour intensity. When results of sensorial attributes were compared to dry-cured loin from pork, apart from some exceptions with similar results (juiciness, flavour intensity and rancid flavour), the scores that resulted were higher for the foal product (odour intensity, mould odour, saltiness, sweetness, hardness, dryness and cured flavour). Only marbling received inferior values due to the very low fat content of foal meat.

Key Words – Horse meat, Sensory properties, Meat product

I. INTRODUCTION

Horse meat production in Spain has increased in recent years, with Spain being the fourth largest producer of horse meat in the E.U. in 2009 with a quantity of 6400 tonnes [1], but consumption in Spain is limited, a high percentage is exported to other countries, mainly to Italy [2]. Previous studies have revealed that foal meat is highly nutritious due to the fact it is high in protein, low in fat and cholesterol, high in bioavailable iron and vitamin B and has a suitable fatty acid profile with a greater proportion of omega-3 unsaturated fatty acids [3, 4, 5].

Spanish dry-cured loin is a highly appreciated meat product, manufactured traditionally with the whole pork loin, mixed with different seasonings and stuffed in a natural or synthetic case [6]. Foal meat represents a good alternative for the elaboration of this product. Consumers are increasingly interested in products from natural sources and lower input systems including foal

meat [7]. Modern consumers are willing to purchase new and exciting experiences and this is where meat and meat products from alternative species can feature [8].

The aim of this study was to evaluate the consumer acceptability of a new dry-cured product elaborated with *longissimus dorsi* from foal.

II. MATERIALS AND METHODS

II.1. Animals and loin processing

For this study, twelve foals from the Galician Mountain (GM) were used. The animals were obtained from the experimental herd of the Agricultural Research Centre of Mabegondo (Marco da Curra, A Coruña, Spain). Foals were fed during the finishing period (4 months) with 3 Kg of fodder/foal-day and pasture. These animals were slaughtered at the age of fifteen months. They were transported to the abattoir the day before slaughter and an attempt was made to minimize the stress of the animals. The animals were stunned with a captive bolt and slaughtered and dressed in an accredited abattoir. Carcasses were chilled for 24 h in a conventional room with a temperature of 2°C (relative humidity: 98%). At this point, the *longissimus dorsi* muscle was extracted from the right half of each carcass, between the fifth and the tenth rib. Loins were seasoned with a mixture of salt, nitrite and spices. Loins were kept at 4°C for 3 days to allow the seasoning mixture to penetrate. Then, loins were stuffed into collagen casings and held at 4°C at a relative humidity of 80% for 30 days. Finally, they were ripened at 12°C and 70% relative humidity for 60 days. Loins were cut into 2 mm thick slices, perpendicular to the muscle fibre direction, with a slicing machine.

II.2. Consumer evaluation

Dry cured loins were subjected to consumer evaluation: 88 untrained subjects, (45 men and 43 women, from 30 to 65-years-old), used to eating pig dry-cured loins. They were asked to evaluate the different parameters on a 0-9 scale (0 = the lowest intensity and 9 = the higher intensity of the parameter). The attributes studied were: colour homogeneity, red colour intensity and marbling for appearance; intensity, cured and mould for odour; saltiness, and sweet for taste; hardness, juiciness, pastiness and dryness for texture; intensity, cured and rancid for flavour and finally the overall acceptability.



Figure 1. Dry-cured foal loin

II.3. Statistical analysis

For the analysis of the results an analysis of variance (ANOVA) of one way using SPSS package (SPSS 19.0, Chicago, IL, USA) was performed for all variables considered.

III. RESULTS AND DISCUSSION

Mean scores given by consumers (men and women) for dry-cured foal loins are shown in Table 1. In general, except for mould odour, saltiness, pastiness, dryness and flavour intensity, there were no significant differences between man and women for the studied attributes.

Regarding appearance, this product was evaluated with high scores for colour homogeneity and redness (around 7). Nevertheless, lower values were found for marbling (about 2) comparing with loins from pork [9, 10, 11, 12] and this outcome could be expected by the low intramuscular fat content of foal's *longissimus dorsi*, with values between 0.5 and 3% of fat [5, 13].

Odour intensity and cured odour presented

similar scores (around 6.5), which were higher than those obtained from pig dry-cured loin [10, 11, 12]. Mould odour values were very low; however a higher detection of this attribute was found by men (over 1) than by women (around 0.3).

On the other hand, saltiness results were relatively high (around 6) as compared to various studies about pig dry-cured loin [11, 12], although similar values had been found by some authors [10]. The higher values obtained for sweetness were expected due to the fact that foal meat is one of the few meat types that contains high concentrations of glycogen, providing the reason for its slightly sweet taste [5,14].

Table 1. Sensory scores (mean \pm standard deviation) of dry-cured foal loin

SEM: standard error of mean. Significance: n.s.: not significant,

** (P<0.01), *** (P<0.001)

Attribute	Men	Women	SEM	Significance
Appearance				
Colour homogeneity	6.78 \pm 1.26	7.09 \pm 1.73	0.16	n.s.
Redness	6.76 \pm 1.46	7.00 \pm 1.62	0.16	n.s.
Marbling	2.16 \pm 0.90	2.28 \pm 0.93	0.10	n.s.
Odour				
Intensity	6.47 \pm 1.65	6.37 \pm 2.00	0.19	n.s.
Cured	6.36 \pm 1.37	6.51 \pm 1.45	0.15	n.s.
Mould	1.02 \pm 0.97	0.28 \pm 0.55	0.09	***
Taste				
Saltiness	5.69 \pm 0.90	6.30 \pm 0.94	0.10	**
Sweetness	4.78 \pm 0.95	5.14 \pm 1.06	0.11	n.s.
Texture				
Hardness	5.96 \pm 0.93	5.98 \pm 0.83	0.09	n.s.
Juiciness	5.27 \pm 0.94	4.93 \pm 1.24	0.12	n.s.
Pastiness	4.82 \pm 0.86	3.93 \pm 1.14	0.12	***
Dryness	6.00 \pm 1.58	5.19 \pm 0.88	0.14	**
Flavour				
Intensity	6.11 \pm 0.68	6.86 \pm 0.99	0.10	***
Cured	7.13 \pm 0.66	7.33 \pm 0.99	0.09	n.s.
Rancid	0.91 \pm 0.92	1.16 \pm 1.00	0.10	n.s.
Overall acceptability	6.58 \pm 1.10	6.88 \pm 1.24	0.12	n.s.

Within texture parameters, hardness reached elevated values (near to 6), higher than those found in the pig dry-cured loin [9, 10, 11, 12], nonetheless, the results that showed for juiciness were within the range of values found in the pig product [9, 10, 11, 12]. Women's scores for pastiness were almost 1 point lower than men's scores, but in both cases less than 5, which means a medium pastiness. As occurs for pastiness, dryness values which resulted

were higher for men (around 6) than for women (over 5), and both were higher than results found for pig dry-cured loin [9, 11].

With respect to flavour, the intensity of this attribute (around 6.5) was similar [6] or higher [10, 11, 12] than those found for pig dry-cured loin. Cured flavour measures that resulted were found to be moderately high (over 7) as opposed to the pig product with values below 4.5 [10, 11]. Rancid flavour scores were very low, similar to the product from pork [10, 11]. Finally, overall acceptability by the consumer for this foal product was positive, with mean values over 6.5, which suggests a high acceptance of the new product by potential customers.

IV. CONCLUSION

In general, dry-cured foal loin obtained acceptable sensory scores by consumers and some of the sensorial characteristics studied are similar to the analogous product from pork. The overall acceptability of the meat showed favourable results, providing the possibility of developing and successfully introducing this new product into the market.

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