

# EFFECT OF A LONG FASTING PERIOD ON THE COMPOSITION AND STABILITY OF DRY-CURED LOIN SLICES FROM FREE-RANGE IBERIAN PIGS

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## I. INTRODUCTION

Iberian pig production is based on a traditional feeding system in the Mediterranean forest consisting of acorns and pasture during the fattening period, resulting in high-quality dry-cured meat products that reach high prices in markets [1]. This free-range system is characterized by a high consumption of antioxidants such as tocopherols [2] and oleic acid [1]. The Iberian breed is also characterized by having high intramuscular fat content and high feed consumption and some metabolic differences have been described compared to other breeds [3]. Although the type of feed is the main reason for the high quality of Iberian pig products, some factors before slaughter such as the amount of feed consumed and the duration of feed deprivation before slaughter may also affect quality. However, there is little information on their possible effects on the quality of dry-cured products from Iberian pigs. The objectives of the present research were to study the effect of long-term fasting on some quality parameters (humidity losses, colour changes, stability and antioxidant profile) of dry-cured loins from pigs fed in extensive conditions.

## II. MATERIALS AND METHODS

The study was carried out in Huelva (Huerta Ramirez estate; Huelva, Spain). Iberian pigs were fed in extensive conditions with acorns and grass from 167±12 kg to 187±15 kg in weight. Before slaughter, one group of pigs was fasted for 18 hours (control) whereas feed was withdrawn for 36 hours from the other group (Long-fasting). *Longissimus dorsi* muscles from the right side (3.5 ±1.1 kg) were cured according to a traditional process in the presence of a mixture of salt, nitrites, olive oil and spices (*Capsicum annuum*, L., *Origanum vulgare*, L. and *Allium sativum*, L.) for 90 days. Slices of approximately 2 mm were taken and placed on trays, wrapped in PVC and stored at 4°C under fluorescent light. TBARS were determined according to Salih *et al.* [4] on days 0, 4, 8, 10 and 14. Colour changes were also measured during refrigerated storage. Samples for weight loss determination were stored in a laboratory cabinet and weighed on days 1, 2, 3, 4, 7, 8, 9, 10 and 15. Tocopherol content was determined as described by Rey *et al.* [2]. Data were analysed using the GLM procedure available in SAS (v. 9.3).

## III. RESULTS AND DISCUSSION

The effect of a long fasting period before slaughter on the chemical composition of dry-cured loin is presented in Table 1. Total humidity or intramuscular fat were not statistically affected by fasting time. Long-fasting neither modified the tocopherol or TBARS contents. There is little information on tocopherols content with fasting time in the literature. Young *et al.* [5] described a higher increase in the oxidative status due to pre-slaughter stress. However, loins from the present study did not seem to have a higher oxidative status, or there was a balance between antioxidants and prooxidants. Moreover, the redness of slices, which correlates with the tocopherol content as previously described [2] was not affected by fasting in the present study. On the other hand, luminosity (L\*) and intensity of the colour (chroma) increased in loins from long-fasted pigs, whereas these values decreased with storage time. The effect of fasting time on colour parameters is not very clear [6] and additionally, there is little information of the effect of fasting on processed products. However, according to the results of the present study, a long-fasting period may produce a higher colour intensity, which could be related to higher acceptability by consumers.

Table 1 Chemical composition (% humidity and intramuscular fat,  $\mu\text{g}$  tocopherols/g) and stability (mg MDA/kg and colour changes) of dry-cured loin slices with the storage time depending on fasting time before slaughter.

	Total humidity	Intramuscular fat	$\alpha$ -tocopherol	$\gamma$ -tocopherol	TBARS	L*	a*	Croma
<b>Control</b>	34,121	11,995	4,038	1,247	0,634	27,50 <sup>b</sup>	6,03	7,36 <sup>b</sup>
<b>Long-fasting</b>	38,121	11,618	4,246	1,195	0,640	28,89 <sup>a</sup>	6,15	7,80 <sup>a</sup>
<b>day 0</b>			4,794 <sup>a</sup>	1,357 <sup>a</sup>	0,451 <sup>d</sup>	29,76 <sup>a</sup>	11,26 <sup>a</sup>	12,43 <sup>a</sup>
<b>day 4</b>			4,338 <sup>a</sup>	1,121 <sup>b</sup>	0,562 <sup>c</sup>	28,01 <sup>b</sup>	5,62 <sup>e</sup>	7,17 <sup>d</sup>
<b>day 8</b>					0,656 <sup>b</sup>	28,06 <sup>b</sup>	4,63 <sup>f</sup>	6,20 <sup>e</sup>
<b>day 10</b>					0,750 <sup>a</sup>	28,04 <sup>b</sup>	4,28 <sup>g</sup>	5,91 <sup>e</sup>
<b>day 14</b>			3,352 <sup>b</sup>	1,161 <sup>b</sup>	0,766 <sup>a</sup>	27,62 <sup>b</sup>	3,76 <sup>h</sup>	5,16 <sup>f</sup>
<b>RMSE<sup>1</sup></b>	2,062	1,164	0,736	0,217	0,085	1,393	0,717	0,830
<b>RMSE time</b>			0,724	0,212	0,084	1,577	0,716	0,879
<b>P fasting<sup>2</sup></b>	0,1883	0,5876	0,3759	0,4877	0,7666	0,0001	0,3226	0,0012
<b>P time</b>			0,0001	0,0136	0,0001	0,0013	0,0001	0,0001
<b>P fastingxtime</b>			0,7223	0,7764	0,6610	0,1985	0,4582	0,0565

<sup>1</sup>RMSE: Root of the main square error of treatment effect

<sup>2</sup>Means with different superscripts were statistically different (P<0.05)

The loss of humidity in loin slices with storage time was also positively affected by a long-fasting period (Figure 1). Fasting may accelerate a release of lysosomal enzymes that then increase proteolytic activity [7], which has been associated with higher water retention [8].

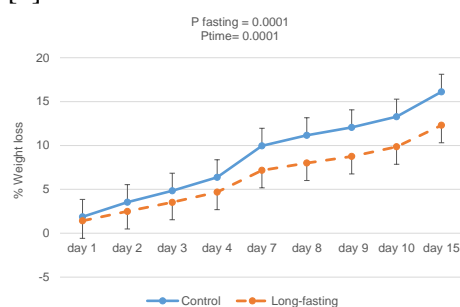


Figure 1. Weight losses of dry-cured loin slices with storage time depending on fasting time before slaughter.

#### IV. CONCLUSION

Long fasting period preserves the juiciness of dry-cured loin slices with storage time without changes to their stability.

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