STUDY OF PANSALT® OR KOMBU SEAWEED AS SALT ALTERNATIVES ON THE COMPOSITION AND PHYSICOCHEMICAL PARAMETERS OF EQUINE CECINA

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I. INTRODUCTION

Cecina is a salted, smoked, and dry-cured ready-to-eat meat product belonging to the Spanish food heritage [1]. Nowadays, meat and meat products represent one of the main sources of sodium intake in most European countries. In this sense, an immoderate consumption of this type of products could have negative health effects. Therefore, meat industry is looking for salt alternatives to obtain a healthier meat product without altering its quality. Thus, this work aimed to assess the effect of a commercial salt mixture, Pansalt®, or Kombu seaweed on the proximate composition and physicochemical parameters of equine cecina.

II. MATERIALS AND METHODS

Forty-eight knuckles from Jaca Navarra foals were randomly divided into three batches and salted in a saturated brine: control (CON) – salted with NaCl (100% NaCl); Treatment 1 (T1) - salted with Pansalt® (Oriola Finland Oy, Espoo, Finland) (57% NaCl, 28% KCl, 12% $MgSO_4$, 2% lysine hydrochloride, 1% SiO_2 and 0.0036% KI) and Treatment 2 (T2) – salted with 50% NaCl and 50% of *Laminaria ochroleuca* (Kombu) seaweed powder (Porto Muiños, S.L., Cerceda, España). All cecinas were salted for 0.3 day/kg at 2-5 °C with a relative humidity (RH) range between 85-90%. Then, they were transferred into a post-salting room (2-5 °C and 85-90% RH) for 60 days. Successively, samples were smoked with oak wood for 2 h (25 °C). Lastly, the pieces were moved to a dry chamber at 8-10 °C and 75-80% RH for 15 days, at 12-14 °C and 70-75% RH for other 45 days and at 65-70% RH for additional 45 days. The cecina manufacture was repeated in three different months. The chemical composition and physicochemical parameters were determined according to Cittadini et al. [1]. The data were examined using a one-way ANOVA.

III. RESULTS AND DISCUSSION

The salt reformulations produced a significant ($P < 0.001$) reduction of moisture values (T2 < T1 < CON), probably related to the different diffusion of salt into the product [2]. Moreover, protein contents (dry matter) increased ($P < 0.001$) in T2 samples, which could be due to the protein content of Kombu alga. Whereas, fat contents (dry matter) resulted unaffected ($P > 0.05$). As expected, and considering the brine formulations, salt replacement decreased ($P < 0.001$) the ash values (dry matter), where T2 batch reported the lowest percentages, followed by T1 and CON samples. As regards color parameters, any significant ($P > 0.05$) differences were detected for L* and b* among batches, while a* presented lower values in T2 samples, probably due to the characteristic brown color of kombu seaweed. Salt reformulation did not affect pH and texture values, except for springiness, which

recorded lower ($P < 0.05$) values in T2 samples, although in line with those reported in the literature for dry-cured foal cecina [1,3].

Table 1. Chemical composition and physicochemical parameters of dry-cured foal cecinas.

Parameters	Treatments			SEM	*p*-Value
	CON	T1	T2		
Chemical composition					
Moisture (g/100 g)	37.7[c]	36.2[b]	34.4[a]	0.307	0.001
Fat (dry matter) (g/100 g)	6.16	6.04	6.19	0.238	0.968
Protein (dry matter) (g/100 g)	73.8[a]	73.9[a]	77.3[b]	0.437	0.001
Ash (dry matter) (g/100 g)	18.8[c]	17.9[b]	13.2[a]	0.378	0.001
Physicochemical parameters					
L*	25.1	25.1	25.6	0.164	0.373
a*	5.13[b]	4.86[b]	4.09[a]	0.156	0.015
b*	2.97	3.03	3.01	0.125	0.980
pH	5.93	5.97	5.96	0.014	0.507
Hardness (N)	201	225	213	4.574	0.118
Springiness (mm)	0.57[b]	0.54[ab]	0.52[a]	0.008	0.017
Cohesiveness	0.48	0.47	0.46	0.007	0.378
Gumminess (N)	95.4	106.1	94.1	2.732	0.145
Chewiness (N·mm)	50.5	54.3	50.8	1.066	0.281

[a-c] Mean values in the same row (corresponding to the same parameter) with different letter differ significantly ($P < 0.05$; Duncan test); SEM: Standard error of the mean;Treatments: CON - 100% NaCl; T1 - 100% Pansalt®; T2 - 50% NaCl and 50% Kombu seaweed.

IV. CONCLUSION

Data indicated that T1 and T2 could be promising approaches for salt reduction in foal cecinas. Salt reformulation affected the chemical composition, although without altering the color and texture of the final product, especially in the batch using the Pansalt® mixture.

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