ASSESSMENT OF PHYSICAL FEATURES OF REDUCED SODIUM RAW HAM

Letelier R.[1], Gonzalez F.[3], Melín P.[2] and Gädicke P.[1*]

[1] Departamento de Ciencia Animal, Facultad de Ciencias Veterinarias, Universidad de Concepción, Chile;

[2] Departamento de Agroindustrias, Facultad de Ingeniería Agrícola, Universidad de Concepción, Chile;

[3] Departamento de Patología y Medicina Preventiva, Facultad de Ciencias Veterinarias, Universidad de Concepción, Chile.

*Corresponding author email: pgadicke@udec.cl

I. INTRODUCTION

Microorganisms can find veritable ecosystems in food, formed by different inherent intrinsic factors, such as pH, water activity (a_w), and nutrients; and external factors, such as temperature, environmental gases and other bacteria [1]. Fresh meat has an a_w level of 0.99 in the lean meat of the muscle and a water content of 74 to 80% [2]. On the other hand, Iberian ham, the final product, can have an a_w value of 0.85 or even lower [3, 4]. Traditional Spanish Iberian ham, according to Arnau *et al*. [5], has, at the end of its process, a pH of 5.9 to 6.4 and an a_w level ranging from 0.7 to 0.72. The a_w has a direct relationship with NaCl, because by reducing the available water, improves the microbiological quality and sensory of the ham. The aim of this study was to assess and compare the physical features in raw materials (pork), commercial ham and raw ham produced with 100% NaCl and ham produced with a mixture of 75% NaCl and 25% KCl. To be of paramount importance to reduce the percentage of sodium in foods, meat products, helping to combat one of the main enemies of obesity.

II. MATERIALS AND METHODS

Texture assessment was carried out with a Kramer® press in an INSTRON® universal testing machine on test specimens of a controlled area and width in duplicates for each determination for the control, raw materials, treatment A and treatment B. For color assessment, 3 mm ham slices were analyzed with a Hunter Lab Color QUEST® reflection spectrophotometer colorimeter. Illuminant B at a 45° angle was used on a 2.54 cm diameter visor. 3 repetitions were made for the control, raw materials, treatment A and treatment B. For humidity analysis, one repetition was made for the control, raw materials, treatment A and treatment B. For the a_w level, 3mm wide ham slices were analyzed on a deposit with a Novasina a_w meter at 20°C, with one repetition for each determination for the control, raw materials, treatment A and treatment B.

III. RESULTS AND DISCUSSION

For texture assessment during the analysis of the slope, the interaction between treatment A ham, treatment B ham and commercial ham were non-significant ($p<0.05$). On the other hand, while comparing traditional ham and industrial ham with pork, there is a marked statistical difference ($p=0.007$ for all 3 hams, see Table 1).

Color assessment shows the behavior that the different hams analyzed in this study have at the end of the manufacturing process (Figure 1). The graph clearly shows that treatment A ham, treatment B ham and commercial ham follow the same trend, as opposed to the control group, in which the trajectory changes in the blue range. Such change in color in the control relates to the fact that the pigments of the muscle are unstable [6].

Table 1 Average slope and SD of treatment A and treatment B traditional hams, commercial ham and pork

	Slope (N mm-1)
Treatment A	311.011± 111.78
Treatment B	304.841± 74.202
Commercial ham	412.03± 178.163
Pork	152.161±49.135

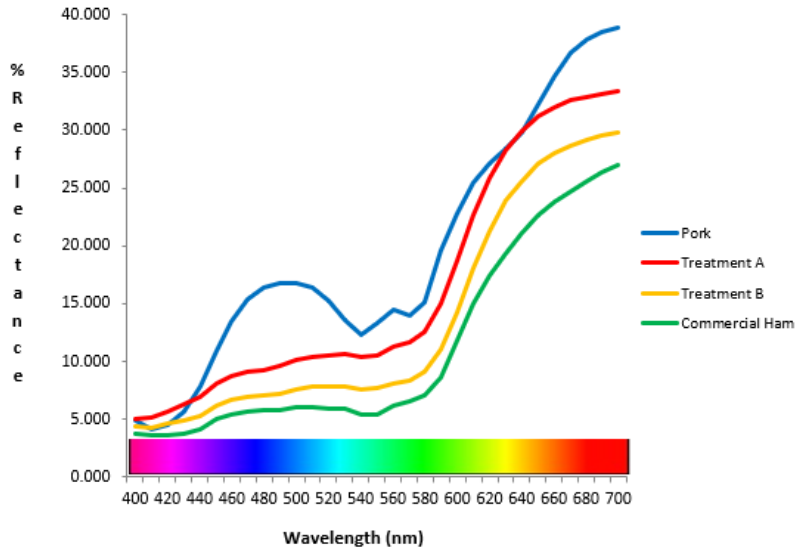

Figure 1 Reflectance level (%) and wavelength (nm) of treatment A ham and treatment B ham, commercial ham and pork

While assessing humidity, the average value (%) for treatment A ham was 42.65±4.31%, 40.35±4.02% for treatment B ham, 38.21±0.43% for commercial ham and 68.08±1.61% for the control. There is no difference ($p<0.5$) in the humidity level for all hams. Said level is higher, between 18 and 20%, in the pork when compared to all hams.

In the a_w level assessment, the values for treatment A ham was 0.723±0.0379, 0.6866±0.0357 for treatment B ham, 0.725±0.0095 for commercial ham and 0.9206±0.0117 for the pork. Additionally, it can be seen that treatment B ham's a_w level is slightly lower than treatment A ham and commercial ham. Such value for the pork was higher when compared to all hams. There was no significant difference between the treatments ($p<0.05$).

IV. CONCLUSION

It is possible to manufacture reduced sodium raw ham without altering the physical features of the final product.

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