EFFECT OF "CHORIZO" FORMULATION (CLEAN LABEL VS. TRADITIONAL) ON THE CHEMICAL COMPOSITION, COLOR AND LIPID STABILITY DURING THE STORAGE PERIOD

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I. INTRODUCTION

The current trend in the meat industry is the development of differentiated high-quality products. In this regard, the Celta breed presents differentiated characteristics and is highly appreciated by the consumer. However, consumers are increasingly concerned about the diet-health relationship, prefer to consume more "natural" products, and reject products with synthetic additives. Thus, the meat industry has to take a radical turn and adapt to the demands of the market. Therefore, this study aimed to develop a 100% Celta pig chorizo (clean label) and to evaluate the reformulation effect on the composition, color, and oxidative characteristics over 6 months of self-life.

II. MATERIALS AND METHODS

Two batches of chorizo were made, the control batch with additives (ascorbic acid, sodium phosphate, potassium nitrate, sodium nitrite, lactose, and soy protein), and the clean label samples with a commercial preparation based on natural extracts (Ligavi Sine ST) provided by ANVISA (Madrid, Spain; www.anvisa.com). Both were made with the same traditional recipe. The meat mass was composed of shoulder (55%), lean (25%), and bacon (20%), and the seasonings were: sweet paprika (18 g/kg), garlic (10 g/kg), hot paprika (3 g/kg) and oregano (0.5 g/kg). After stuffing, the chorizos were smoked and cured at 14 °C and 75% HR for 21 days. After this period, they were vacuum packed in Pa/Pe film (90 µm; oxygen permeability <60 cm³/(m²*24h*atm) and kept refrigerated (2°C) under dark conditions. Chemical composition (after curing), color evolution, and oxidative stability during the self-life (0, 2, 4, and 6 months of storage) were evaluated. Moisture, ash, and proteins were determined following international ISO procedures, and fat was calculated following the AOCS procedure. Color parameters were measured using a portable colorimeter (CR-600d, Minolta Co. Ltd., Osaka, Japan), while lipid oxidation was determined by measuring the TBARs index using the Vyncke [1] procedure. The statistical analysis of the data (ANOVA) was carried out using SPSS software (version 25).

III. RESULTS AND DISCUSSION

The composition parameters (Table 1) showed that the moisture (20.6 g/100 g), fat (~50 g/100 g), and protein (23.5 g/100 g) were not influenced by the reformulation. However, Control samples had the highest ash content (p<0.001) (3.09 vs. 2.72 g/100 g), which could be due to the preparations used in the formulation of both types of chorizos. Our results agree with previous studies carried out in Celta Pig chorizo [2]. In meat products, color is a vital factor, since it will determine the consumer's purchase intention. This is why any reformulation must maintain the typical color of the traditional product since it affects its acceptability. The values of L* (~43), a* (~20) and b* (~18) after curing showed no differences due to the reformulation, and coincided with those previously described in chorizos [3,4]. Color parameters did not show significant differences (except slight changes in L*) between batches during the 6-month shelf-life.

Concerning oxidative stability (Figure 1), the TBARs value was significantly higher in the clean label chorizos after curing (0.47 *vs.* 0.38 mg MDA/kg), a value that was equal to the control chorizos in the second month of storage, and it was even lower in months 4 and 6 of storage. The

values varied between 0.27 and 0.38 mg MDA/kg in the control chorizos and between 0.25 and 0.47 mg MDA/kg in the clean label ones. Similar oxidation values were described by other authors in chorizo [2,4].

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	Control	Clean label	<i>p</i> -Value
Composition (g/100 g)			
Moisture	20.8±1.14	20.4±1.90	0.718
Fat	50.0±1.29	49.6±2.21	0.739
Protein	22.7±1.11	24,0±0.87	0.087
Ash	3.09±0.10	2.72±0.08	<0.001
Color parameters			
L*	45.1±2.94	43.2±1.07	0.205
a*	19.5±3.54	21.4±1.16	0.268
b*	17.4±3.76	19.4±2.51	0.352

Table 1 – Chemical composition and color parameters of chorizo after curing

The decrease in TBARs during the shelf life is due to the absence of oxygen in the packaging and the presence of antioxidants in the sausages, which cause the free radicals to be neutralized, promoting the decrease or stabilization of oxidation when packaging products under vacuum. In any case, the TBARs values observed in this study, in both the control and clean label chorizos, are well below the limits of the sensory perception threshold of rancid odors or flavors.



Figure 1. Evolution of lipid oxidation in chorizo over the 6 months of shelf-life (2°C vacuum packed). *P<0.05.

IV. CONCLUSION

The reformulation strategy proposed in this study demonstrates that the production of a clean label chorizo is viable, without negatively affecting either the composition or the evolution of their quality during shelf-life. Furthermore, the development and production of these differentiated products with great acceptance by the consumer is crucial to improving the competitiveness of producers.

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