UNDERSTANDING THE SENSORY SPOILAGE OF ALHEIRA TREATED WITH HIGH HYDROSTATIC THROUGH A RATE ALL THAT APPLY TEST

Ana. F. Borges[1], Maria J. Fraqueza[1], Luís Patarata[2*]

[1]CIISA - Centre for Interdisciplinary Research in Animal Health, Faculty of Veterinary Medicine, Associate Laboratory for Animal and Veterinary Sciences (AL4AnimalS), University of Lisbon, Lisbon, Portugal

[2]CECAV - Animal and Veterinary Research Center, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal

*Corresponding author email: mjoaofraqueza@fmv.ulisboa.pt

I. INTRODUCTION

Alheira e a meat product made with cooked pork and chicken meat. In traditional producers, the cooked meat is manually shredded and mixed with wheat bread moistened in the cooking meat broth. It is seasoned with several spices, but garlic is always present. The mixture is filled into natural casings and slightly smoked and dried [1]. Once the product is highly manipulated, there is the opportunity to contaminate the mixture. Alheira presents a high fermentative microbiota, composed mainly of LAB, and can have pathogens introduced in the product by contamination after the cooking process. The drying extent of *alheira* usually does not allow it to be stable without refrigeration [2]. High hydrostatic pressure (HHP) has been successfully applied to meat and meat products. It usually improves the microbial profile of the HHP-treated products, but it can negatively impact texture and oxidative stability. We aimed to evaluate the sensory consequences of HHP-treating alheira during the shelf life.

II. MATERIALS AND METHODS

Three independent batches of alheiras were produced, as described by Borges *et al*. [2], and vacuum vacuum-packaged. HPP treatment (600 MPa, 960 s) was performed in an N.C. Hyperbaric, Wave 6,000/135; Spain. Control and HHP-treated samples were stored at 5°C for 5 months. To evaluate the sensory characteristics associated to spoilage, samples were withdrawn every month of storage, making up six sampling moments, freshly prepared included. A reverse design was used. Samples were frozen at the defined storage times, and the sensory tests were made simultaneously. We made a Rate All That Apply (RATA) test 80 with consumers (age 31.7±16.7; 76.8 women). The vocabulary was established with two focus group interviews with the fresh and spoiled alheiras. The selected vocabulary to describe the spoilage was: fermented, alcohol, rancid, spoiled and putrid for the evaluation of aroma, acid taste, and fermented and rancid for the flavour dimension. A yes/no question asking about the consumption intention was used. For each characteristic, the consumers were asked to indicate if it was present and, if it was, to rate its intensity on a five-point scale [3]. Binary logistic regression was used to evaluate, for each treatment, which characteristics influence the consumption intention based on freshness (XlStat, Addinsoft,Paris).

III. RESULTS AND DISCUSSION

Control and HHP-treated alheiras had a reduction in the consumption intention as they had a more extended storage period (Figure 1), but in both cases, that intention was higher than 50% of the consumers, the critical value usually used to define the sensory-based shelf life of foods.

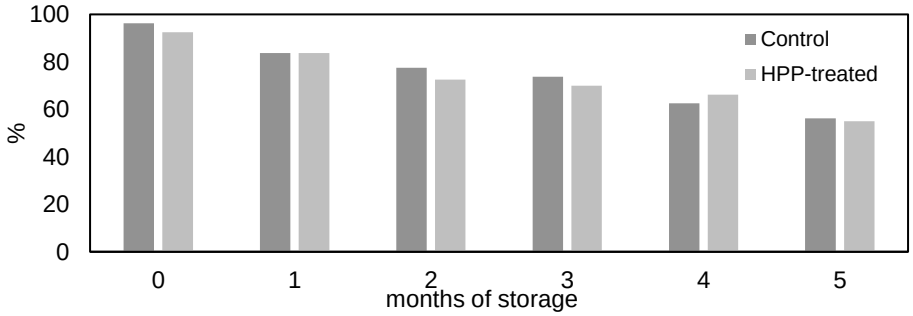

Figure 1. Percentage of consumers indicating the consumption intention at each storage time

Though control and HHP-treated alheiras had a similar consumption intention (χ^2=0.348, p=0.555), the pattern of spoilage detected by consumers, determining their purchasing intention, was slightly different (Table 1). The spoiled aroma was considered in both cases, with similar odds ratios (OR). The acid taste was found to be a specific spoilage indicator on control alheiras (OR=0.762), while in HHP-treated samples, it was the rancid flavour. Once it is expected to have a reduced microbiota in HHP-treated alheiras, namely gram-positive bacteria associated with carbohydrate fermentation, the higher importance of rancidity in these samples might be associated with the reduction of fermentation-specific sensory notes rather than a specific augmentation in lipid oxidation.

Table 1 Logistic regression model for the spoilage sensory attributes of alheira (control and HHP-treated).

Variables	**β**	**Standard error**	**p**	**Odds ratio**	**95% Confidence interval**
Control					
Spoiled aroma	-0.476	0.232	0.040	0.622	0.395-0.978
Acid taste	-0.271	0.098	0.006	0.762	0.629-0.924
HHP-treated					
Spoiled aroma	-0.391	0.174	0.024	0.676	0.481-0.950
Rancid Flavour	-0.504	0.127	<0.0001	0.604	0.471-0.774

IV. CONCLUSION

Alheira is a product that supports five months of storage at 5ºC. HHP treatment does not increase the consumption intention, considering its freshness. However, the sensory attributes determining the reduction in consumption intention are slightly different, with an acid taste and rancid flavour being the most important for control and HHP-treated alheiras, respectively.

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