SENSORY DESCRIPTIVE ANALYSIS OF VIENNA SAUSAGE MANUFACTURED WITH MODIFIED STARCH USING CANONICAL VARIATE ANALYSIS

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I. INTRODUCTION

Starch improves the texture, water retention, gelling and thickening properties of meat products [1]. However, to date there are no reports on the impact of the addition of acetylated starch on the sensory properties of Vienna sausage. The sensory properties of meat products represent a key factor in their quality [2] directly affecting their acceptance and purchase intention. The sensory profile developed by a trained panel is commonly analyzed through the Principal Component Analysis. However, this method does not consider the individual variation of consumers. In this context, the Canonical Variate Analysis (CVA) is a multivariate technique based on the Multivariate Analysis of Variance (MANOVA) that includes the variability of consumers in its model [3]. In addition, it maximizes the discrimination between samples, allowing to identify differences by confidence ellipses projected around each sample [4][5]. The objective of this work was to sensorially characterize Vienna sausages elaborated with the addition of acetylated potato and cassava starch via CVA.

II. MATERIALS AND METHODS

Four treatments of Vienna sausage were elaborated with addition of 1.8% starch (w/w): native cassava (NC), native potato (NP), cassava modified with 8% acetic anhydride (C8) and potato modified with 8% acetic anhydride (P8). In addition, a control treatment with addition of 1.8% of commercial cassava starch was included. The descriptive analysis was conducted with 11 trained judges following the workflow described by Saldaña *et al*.[2], which consists of recruitment, screening, generation of lexicon, training and panel performance (discrimination, consensus and repeatibility), final evaluation and data analysis. In the performance of the sensory panel, it was studied using a three-way analysis of variance with double interactions at 95% confidence. Subsequently, a CVA was applied to multidimensionally represent the samples and sensory attributes. The confidence ellipses projected on the samples indicate significant multivariate difference of the samples. The R software was used for data processing.

III. RESULTS AND DISCUSSION

Samples and sensory attributes were represented in the first two significant dimensions of the CVA (Figure 1). The first two canonical dimensions represented 82.45% of the original variance of the data. Two great groups of samples were identified in the first canonical variable: samples with modified starch and with native starch. The second canonical variable separated the samples added of modified starch. With the help of projected ellipses at 90% confidence around each treatment three groups were identified, the first group was composed of native starches NC, NP and Control (overlapped ellipses) perceived as "dull", "homogeneus", and "sausage flavor ". The second and third groups consisted of sausages with addition of modified starches (P8 and C8). These treatments differed in the second canonical dimension. On one hand, the treatment C8 was correlated with the attribute "bubbles", and on the other hand, the treatment P8 correlated slightly with the attributes "seasoning aroma", "seasoning flavor", "salty taste" and "juicy".

In general, the first canonical dimension shows changes in the appearance of sausages due to the addition of modified starches. Specifically, the addition of modified starches increased the number of "bubbles" on the surface of the sausage, this modification clearly indicates modifications in the structure of the product, which could decrease its acceptance. The second canonical dimension is related to attributes of aroma, flavor and texture. Therefore, the modified starches generated different products in these three sensory modalities. It is important to mention that sausages with addition of acetylated potato starch were characterized by a greater number of sensory attributes. In addition, this treatment was the only one that presented succulence. The results of this paper agree with those of Grossi *et al*.[6], who reported that the use of potato starch improves the sensory characteristics in sausages without affecting the water holding capacity, color and texture.

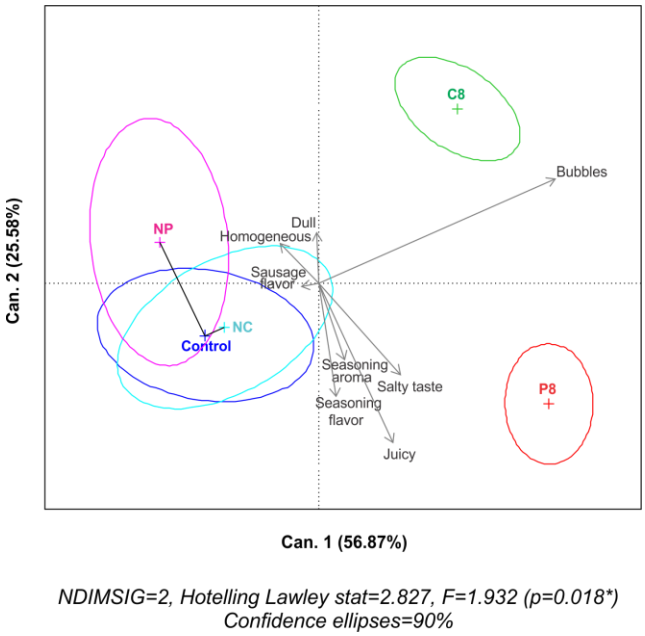

Figure 1. Canonical variate analysis of sausages with or without modified starch

IV. CONCLUSION

The addition of modified starch in the Vienna sausages modified the sensory profile of the products. The trained panel was able to detect differences between samples at the multivariate level. Cassava starch presented a high number of "bubbles". However, potato starch modified with acetic anhydride showed promising results as it increased the succulence of the product.

ACKNOWLEDGEMENTS

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