

DESCRIPTIVE ANALYSIS OF TEXTURE FOR TRADITIONAL AND LIGHT

MORTADELLA

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Abstract –The diet is an important modifiable factor that influences the development of chronic diseases. There are a lot of evidences about the important effects of diet modifications, positives or negatives, on consumers’ health during their lives. However, the consumers demand low fat products without any loss of their texture quality. In this research, Descriptive Analysis of Texture was used to study the influence of two fat level mortadella on sensory texture. Two samples of mortadella of a Brazilian commercial brand, traditional and light, were evaluated by 11 trained panelists. The trained sensory panel rated the light mortadella as harder than the traditional mortadella. Further, studies should be performed to study consumer's perception of meat products with known differences in their formulation and to compare consumer and trained panelist texture perception of these products.

Key Words – Sensory characterization, texture, emulsion product, low fat.

I. INTRODUCTION

Meat products are fundamental elements in the diet of several populations, providing essential nutrients such as protein, vitamins and minerals. However, these products are among the major contributors to saturated fat intake, which has been associated with several health problems. For this reason, there is an increasing interest in reducing the content of saturated fat of these products, while preserving their sensory quality (WHO, 2003).

For these reasons, it has been widely studied the reformulation of food products reducing and substituting the fat content in its formulations. However, fat reduction not only modifies their composition and structure, but also the interactions between their components, causing alterations in sensory properties, such as appearance, flavor and especially in the texture (Bayarri, Chuliá, & Costell, 2010).

II. MATERIALS AND METHODS

The panelists were composed by graduate students, researchers and professors of the Departamento de Agroindústria, Alimentos e Nutrição, Escola Superior de Agricultura “Luiz de Queiroz”, Universidade de São Paulo (ESALQ/USP).

1.1. Samples

Two types of Brazilian commercial brand mortadella provided by industrial plant (São Paulo - Brazil) were used in this study, which had 11% (light) and 18% (traditional) of fat content (according to manufacturer). The study was performed in accordance with Stone & Sidel (2004) and Dar & Light, (2014).

1.2. Descriptive Analysis of Texture

The terms selection was performed using the Kelly’s Repertory Grid Method. In an open discussion with the panel leader, panelists agreed on the best descriptors to describe the samples. According to the panelists, the best descriptors for describing mortadellas texture were: Oiliness, wetness, roughness, hardness, springiness, chewiness, grittiness, particles in palate and particles on the teeth.

Panelists were trained in quantification of the selected descriptors using commercial products with different texture characteristics using the 10-cm unstructured scale anchored with the intensity terms at the endings, for example, “low or none” at the left and “very” at the right. After training. Texture attributes of mortadellas were evaluated in two replications of each sample. The panelists were selected using four criteria (discrimination, reproducibility, agreement and use of the scale). To the final assessment, a balanced complete block experimental design was used in two sessions to evaluate the samples. Nine attributes of texture of the two samples were evaluated in each session. The intensities of the attributes were scored on 10-cm unstructured line scales. The samples were randomly selected from each cooking batch and served in random order. Each sample was put on a plastic tray identifying with a three-digit code. The global performance of the trained panel was evaluated using the following mixed linear analysis of variance (ANOVA) model: Descriptor Grade ~ Product + Panelist + Session + Product : Panelist + Product : Session + Panelist : Session. In this model, the errors are assumed to be normally distributed with mean zero and constant variance (Worch, Lê, & Punter, 2010). The most important effects are: the product effect that expresses the discriminative capacity of the panel, the effect of the interaction “product by panelist” that expresses the consensus of the panel, and the effect of the interaction “product by session” that expresses the reproducibility of the panel (Ares, Bruzzone, & Giménez, 2011). A 5% significance level was considered in the analyses. All statistical analyses were performed in the software R, using the package SensoMineR (Le & Husson, 2008) and agricolae (de Mendiburu, 2014).

III. RESULTS AND DISCUSSION

To Panel performance, the “product effect” was significant for one out of the nine evaluated texture attributes, suggesting that panelists were not able to detect differences in eight texture characteristics and have texture characteristics similar. The reproducibility of the panel was of the 100 %, suggesting that the average scores of

all the products and the individual product scores did not change over sessions and thus it was stable in terms of their evaluations from one session to the others. The agreement of the panel was not significant for eight out of the nine evaluated texture attributes, indicating a good consensus among the panelists.

Once the average data of the panel trained was reliable for the evaluation samples, are shown in Figure 1 scores of the evaluated samples. This study suggested that the traditional mortadella was perceived as oiliness, wetness very oily and very wet compared to the light mortadella. This happens probably because the fat and the water of the mortadella cover the surface of it, interfering with the roughness perception. so, the roughness cited by the trained panel was only significantly different for this attribute.

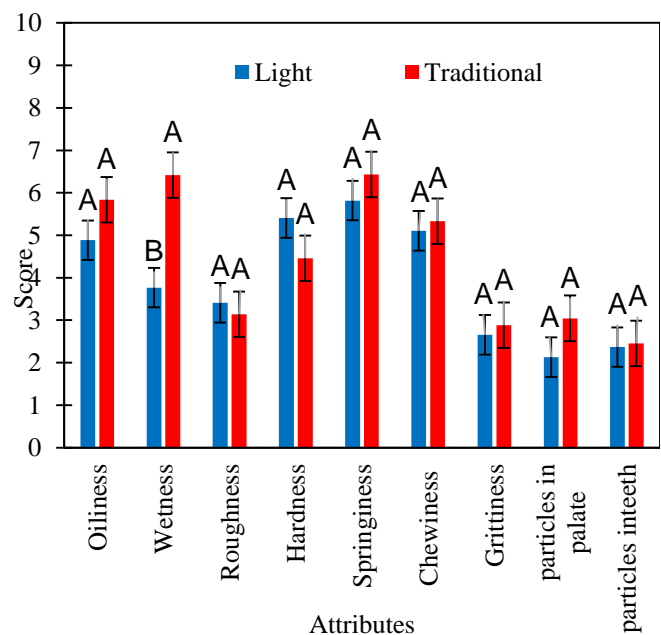


Figure 1. Average (n = 2) descriptive sensory scores for mortadellas.

^{A,B} Different letters indicate significant differences by sample for attribute, according to Tukey's HSD test (p<0.05).

IV. CONCLUSION

In this study, the panel was quite efficient. Panelists agreed on the way of assessing for the

main descriptors regarding the panel performance.

Sensory wetness of mortadella changed significantly according to fat content (light and traditional), increasing the wetness with higher fat content in the mortadella composition.

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