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DYNAMIC SENSORY PROFILE OF BEEF BURGERS ADDING NATURAL ANTIOXIDANTS FROM *PLEUROTUS OSTREATUS*

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I. INTRODUCTION

The growing consumer demand for clean-label and healthier meat products has intensified the search for natural alternatives to synthetic additives [1]. *Pleurotus ostreatus* (PO) mushrooms are known for their remarkable antioxidant properties and rich content of bioactive compounds [2]. However, their incorporation into meat products remains sensorially underexplored.

Traditional static sensory methods often fail to capture the temporal changes in perception that occur during food consumption [3], especially in complex matrices such as beef burgers enriched with natural antioxidants. These products, particularly those rich in polyphenols, exhibit dynamic sensory attributes like bitterness and astringency that evolve throughout mastication and swallowing. Static methods typically provide a single snapshot of sensory perception, potentially overlooking important temporal patterns influencing consumer acceptance. To address these limitations, dynamic sensory methods such as the Temporal Dominance of Sensations (TDS) technique offer a more comprehensive understanding of how different attributes dominate perception over time. This is particularly advantageous when evaluating products formulated with natural extracts rich in polyphenols, where temporal changes in bitterness, astringency, and other complex attributes play a critical role in overall liking.

In this context, this study aimed to assess the effects of natural antioxidant extracts obtained from the stipe and cap of PO, extracted through pressurized liquid extraction (PLE), on the dynamic sensory perception of beef burgers. We hypothesized that burgers enriched with mushroom extracts would exhibit distinct and enhanced dynamic sensory attributes compared to control samples and those containing synthetic antioxidants.

II. MATERIALS AND METHODS

Natural antioxidants were extracted separately from the stipe and cap (edible portion) of PO using PLE. Four burger treatments were formulated: control (no antioxidant), with synthetic antioxidant (sodium erythorbate), with natural antioxidant from the stipe, and with natural antioxidant from the cap. Each treatment was produced in three independent blocks during the burger manufacturing process. Before sensory analysis, burger samples were characterized technologically, chemically, and microbiologically (data not shown). For sensory analysis, the TDS method was applied with 132 habitual consumers. The assessed attributes included: tender, juicy, tasty, fatty, salty, and seasoned. Consumers evaluated burger samples served warm under controlled conditions, and the dominant attributes were recorded over a 100-second period. Data were processed using the dominance rate paradigm over standardized time and displayed as bandplot by dominant attributes [4].

III. RESULTS AND DISCUSSION

The TDS curves revealed differences in the temporal sensory profiles among treatments (Figure 1). The control sample showed a brief dominance of fatty and tender sensations at the beginning and end of the consumption period, respectively, without any attribute sustaining dominance throughout mastication.

Burgers containing the synthetic antioxidant exhibited prolonged dominance of tasty sensation, intermittently accompanied by tender attribute, suggesting a balanced flavor release over time. In contrast, samples with natural antioxidants from the stipe demonstrated sustained dominance of tasty sensation, with tenderness perceived early during consumption and seasoned sensation appearing intermittently. This pattern indicates a positive contribution of the stipe extract to both flavor dominance and textural quality, consistent with previous studies reporting that natural antioxidants enhance juiciness and texture retention [5]. Burgers with the cap extract also maintained tasty dominance throughout consumption, with occasional seasoned perceptions. However, the absence of early tender dominance and shorter seasoned phases, compared to the stipe treatment, suggests different interactions between the cap extract and the meat batter, likely due to variations in bioactive compound composition [6].

Overall, these findings indicate that PO extracts, particularly those derived from the stipe, can positively influence key sensory attributes such as flavor dominance and tenderness, enhancing the overall eating experience. Incorporating natural antioxidants from fungi into meat products offers not only potential health benefits but also significant sensory improvements.

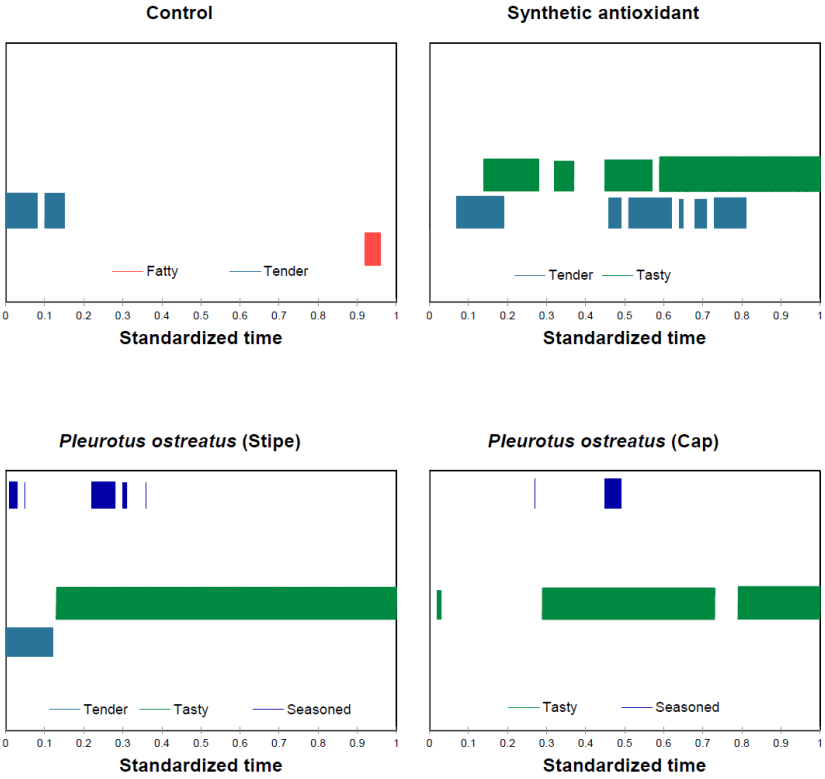


Figure 1. TDS banplot for beef burgers.

IV. CONCLUSION

Natural antioxidants, especially from the stipe of PO, enhanced tenderness, flavor persistence, and seasoning perception in beef burgers. The stipe extract outperformed the synthetic antioxidant and control, maintaining desirable sensory attributes throughout consumption. These results support using mushroom-derived antioxidants as natural alternatives to synthetic additives.

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