# THE INFLUENCE OF PACKAGING TYPE AND ANTIOXIDANTS (NATURAL VS. SYNTHETIC) ON THE TEXTURE AND COOKING PROPERTIES OF CHICKEN BURGER

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## I. INTRODUCTION

Chicken burgers are popular and affordable products, but their high unsaturated lipid content makes them prone to lipid oxidation. To control this process, vacuum packaging and antioxidant additives are commonly used, extending the product's shelf life. However, with increasing demand for clean-label products, synthetic antioxidants are being replaced by natural substances with antioxidant properties. Pink pepper (*Schinus terebinthifolius* Raddi) has been recognized for its bioactive compounds and antioxidant activity [1]. Our previous findings [2] showed that pink pepper extract has antioxidant potential to delay lipid oxidation in chicken burgers. To complement this work, this study aimed to assess the influence of packaging and antioxidants (pink pepper extract and butylhydroxytoluene - BHT) on chicken burgers' texture and cooking properties for 7 days at 4 °C.

## II. MATERIALS AND METHODS

Pink pepper extract (PPE) was prepared according to the described by Menegali et al. [2]. Three burger formulations were produced [2]: a control without antioxidants (C), one with the synthetic antioxidant BHT (90 mg BHT/kg meat), and one with natural antioxidant (PPE) (volume of PPE equivalent to 90 mg gallic acid equivalent/kg meat). These three samples were packaged in both aerobic (A) and vacuum (V) packaging, resulting in six treatments. Burgers were evaluated in triplicate after 1 and 7 days at 4 °C for texture profile analysis (TPA) and cooking properties (cooking loss and diameter reduction). Additionally, their composition (moisture, fat, protein, and ash) was analyzed [3]. Proximate composition data were analyzed considering treatments as a fixed effect and replicates as a random effect. Texture profile analysis data were analyzed by a factorial design with fixed effects as treatment (3), packaging (2) and storage time (2), and their interaction. Results were evaluated by ANOVA followed by Tukey's test (p<0.05).

## III. RESULTS AND DISCUSSION

No effect of antioxidant was found on moisture and protein. Only lipid and ash contents were significantly affected by the treatments, showing marginal differences among samples (Table 1). Regarding TPA, pink pepper extract significantly reduced springiness (PPE: 0.78) compared to the control (0.82) and BHT (0.81) samples, but had no effect on other TPA parameters. All texture parameters showed a significant interaction (p<0.05) between packaging and storage time. After 7 days of refrigeration, samples had higher hardness, cohesiveness, and chewiness than the initial storage period. The possible occurrence of protein oxidation during storage, which could result in protein cross-linking, may have impacted the structure of muscle protein, increasing hardness [4]. Among these samples, the vacuum-packaged ones were significantly harder and more cohesive than those packaged aerobically (Figure 1), which could be attributed to increased exudation in vacuum-

packaging. Similarly, cooking loss increased after 7 days of refrigeration, with vacuum-packaged samples experiencing the most pronounced effect. This could also be related to exudation. Only storage time significantly impacted diameter reduction, with samples after 7 days of refrigeration showing higher reductions after cooking (13.86%) compared to freshly processed samples (10.90%). Diameter reduction occurs due to meat protein denaturation with water and fat loss. Therefore, it was expected that the burgers would have a smaller diameter after 7 days of refrigeration because of greater cooking loss. Lim and Rosli [5] also reported shrinkage in beef burgers during storage.





Different lowercase letters among treatments and capital letters among days indicate significant differences (p<0.05).

## IV. CONCLUSION

The PPE did not promote relevant changes in the composition of the chicken burgers. Overall, the antioxidants also had no effect on TPA, cooking loss, and diameter reduction, which were influenced by the packaging and storage time of the samples. This study demonstrated that the use of pink pepper extract did not affect important quality parameters of the burgers, suggesting that PPE presents interesting possibilities as an antioxidant in the development of more natural meat products.

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