



Instrumental Texture Analysis of Poultry Deli Loaves Prepared with Broiler Breast Fillets Exhibiting Woody Breast Characteristics

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Objectives

Potential applications of chicken meat with woody breast (WB) condition in further processing products could provide processors alternatives to face this meat quality problem. The objective of this study was to evaluate the effect of the use of broiler breast fillets at varying degrees of WB severity on instrumental texture characteristics of deli loaves.

Materials and Methods

A total of 270 breast fillets were collected from birds processed according to commercial practices and classified based on a scoring system for degree of hardness using tactile evaluation in three WB categories (0 or 0.5 as normal-NOR; 1 or 1.5 as mild-MIL, and 2, 2.5 or 3 as severe-SEV). Instrumental compression analysis was performed to validate subjective scores. Nine treatments with three replicates of deli loaves were prepared: 100% NOR (T1), 66.67% NOR + 33.33% MIL (T2), 66.67% NOR + 33.33% SEV (T3), 33.33% NOR + 66.67% MIL (T4), 33.33% NOR + 66.67% SEV (T5), 100% MIL (T6), 66.67% MIL + 33.33% SEV (T7), 33.33% MIL + 66.67% SEV (T8), and 100% SEV (T9). Chicken breast muscles (cranial region) separately by treatment were trimmed, cut, tumble marinated [20% (wt/wt) marinade pickup target; final product concentration of 1.25% sodium chloride and 0.45% sodium tripolyphosphate], stored, stuffed (diameter: 100 mm, length: 290 mm; 2.3 kg), and cooked (core temperature reached 75°C). Texture profile analysis (TPA: hardness, cohesiveness, springiness, and chewiness) was performed using a texture analyzer (TA.XT Plus, Texture Technologies Corp.). Additionally, cook loss, color (L^* , a^* and b^*), and reduction in diameter and length were evaluated in cooked deli loaves. Data were analyzed using a one-way ANOVA with treatment factor fit as fixed effect.

Results

With exception to T1 through T4 treatments, the hardness of chicken loaves increased ($P < 0.05$), whereas the cohesiveness decreased ($P < 0.05$) as WB severity increased in the meat added to the product formulation. Furthermore, the cook loss significantly increased ($P < 0.05$) as WB increased in the meat incorporated into the product. The use of affected meat with WB condition at SEV levels (T9) or meat combinations at MIL and SEV levels (T7 and T8) yielded non-uniform deli loaves with higher levels of cook loss ($> 13\%$, $P < 0.05$), different color parameters and higher levels of reduction in diameter ($> 8\%$, $P < 0.05$) and length ($> 5\%$, $P < 0.05$) in comparison with NOR samples. However, the mixture of non-affected meat with WB meat at MIL (up to 67%) and SEV (up to 33%) levels did not show a significant difference compared to NOR samples in terms of hardness, cook loss, color, and reduction in dimensions.

Conclusion

These data indicate that there is an important effect of the use of broiler breast fillets with WB characteristics on the texture profile of deli loaves. There is evidence of the poor functionality associated with the inclusion of WB meat in deli loaves in terms of water holding capacity, color, and texture. Although additional research is needed, the combination of breast fillets of regular quality (NOR) with those presenting WB condition at MIL (up to 67%) or SEV (up to 33%) levels could be considered by processors as an alternative in commercial chicken deli loaf formulations due to the inclusion of WB meat at higher levels can result in reduced product quality.