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Effects of Wet and Dry Aging Processes Combination on Physical, Chemical and Sensory Attributes of Beef Rib Cuts

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Objectives

This study aimed to compare the effects of dry and/or wet aging for 28 d on physical, chemical, and sensory attributes of beef rib cuts.

Materials and Methods

A total of 16 beef bone-in rib cuts (NAMP 107), from 0.75 or higher British (Angus and Hereford) crossbred steer carcasses, were used. At 4 d post mortem each cut was split in 2 equal parts to be assigned to the following treatments: 28 d of wet aging (Wet), 28 d of dry aging (Dry), 14 d of wet aging + 14 d of dry aging (Wet + Dry) and 14 d of dry aging + 14 d of wet aging (Dry + Wet). The aging chamber was set at 2°C and the average relative humidity during process was 73 ± 5%. One steak, from each rib, was used to evaluate quality of Non-aged beef. Aging loss (drip + evaporation, trimming and total), pH, instrumental color (L*, a*, b*), cooking loss (CL), shear force (WBSF), free amino acids profile (µmol/g), and sensory profile by quantitative descriptive analysis (QDA) were determined. The statistical analysis were performed using a one-way ANOVA (4 aging methods), and means (± SEM) were tested by Tukey test.

Results

Higher ($P < 0.01$) drip + evaporation loss in Dry samples (7.6 ± 0.2%) was observed, however no difference ($P > 0.05$) was found between Wet + Dry (5.2 ± 0.3%) and Dry + Wet (3.9 ± 0.3), and Wet (2.6 ± 0.5) had lower loss than Wet + Dry. Trimming loss was not measured in Wet samples. No difference in trimming loss ($P > 0.05$) between Dry (9.1 ± 0.2%), Wet + Dry (7.5 ± 0.5%) and Dry + Wet (7.7 ± 0.5%) were detected. The total loss was greater ($P < 0.01$) in Dry samples (16.7 ± 0.7%), followed by Wet + Dry (12.7 ± 0.4%) and Dry + Wet (11.6 ± 0.6%), and both had higher losses than Wet (2.6 ± 0.5%) treatments. Analysis of pH, CL, WBSF and instrumental color were conducted in Non-aged samples and in all aging treatments. It was found a lower ($P < 0.01$) pH in Non-aged (5.5 ± 0.02) when compared with aged samples (5.7 ± 0.01). CL (using a George Foreman Grill) did not differ among treatments (16.2 ± 0.5%). Steaks had lower (3.3 ± 0.1kg; $P < 0.01$) WBSF after all aging treatments, when compared to unaged steaks (4.7 ± 0.5kg). There was a slight increase in a* and b* values after aging, with no difference ($P > 0.05$) between aging treatments. Free amino acids profile were analyzed in Non-aged, Wet and Dry treatments. Almost all free amino acids increased after aging, except Pro and Cys. Dry aged samples had greater content of Tyr. All of other amino acids had greater contents in Wet aged samples (Asp, Glu, Ser, Gly, His, Thr, Val, Met, Ile, Leu, Phe, Lys, and Trp). The total free amino acids was higher ($P < 0.01$) in Wet (32.01 ± 1.1µmol/g), followed by Dry (26.4 ± 1.3µmol/g) and Non-aged samples (15.0 ± 0.9µmol/g). The sensory panel described twelve attributes in the QDA analysis. However, when comparing Wet, Dry, Wet + Dry and Dry + Wet, a difference was found ($P < 0.01$) only in off aroma, with greater values in Wet (0.43 ± 0.1) when compared with Dry samples (0.11 ± 0.03). Wet + Dry and Dry + Wet did not differ (0.24 ± 0.07; $P > 0.05$).

Conclusion

It can be concluded that starting the aging process with one aging type (wet or dry) and finish with the other does not improve chemical and sensory attributes, only reduce aging losses when compared with an entirely dry process. In this study, free amino acids profile increased during aging, but did not affect sensory traits.