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Effect of Aging Temperature on the Physicochemical Quality of Dry- And Wet-Aged Beef

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Objectives

The aim of this study was to evaluate the effects of 2 aging temperatures (2 or 7°C) and 2 aging times (21 or 42 d) on the physicochemical characteristics of Dry and Wet aged beef.

Materials and Methods

A total of 16 striploins (8 pairs), from Nellore intact males, were collected directly from the slaughterhouse and sent to the meat lab. Each pair was cut in 8 equal parts and assignedto one of each treatment combination (2 aging temperatures: 2 or 7°C; 2 aging times: 21 or 42 d; wet or dry). The aging chamber was set at 2°C or 7°C and the relative humidity was set at 75%. Samples designed for Wet aging were deboned and vacuum packed, while samples for Dry aging were boned. Dry samples were weighted and position within the aging chamber was rotated every 3 d. Aging loss (drip, evaporation and trimming), pH, moisture content, surface water activity, cooking loss and shear force were determined. The statistical analyses were performed using a factorial ANOVA, and means (± SEM) were tested by Tukey test at 5% significance.

Results

Greater weight loss occurred by evaporation for Dry-aged samples at 7 than 2°C, from 3 to 42 d. At 42 d Dry-aged samples aged at 7°C lost 22.5% while samples at 2°C lost 20.8% of water. There was no effect of aging temperature on drip loss of Wet-aged samples. Samples aged 21 d had a lower drip (1.8 ± 0.12%) than samples aged for 42 d (3.5 ± 0.27%). The trimming loss (crust removal only for Dry-aged samples) was not affected by aging temperature. However, samples aged for 42 d had greater (8.1 ± 0.24%) trimming loss than samples aged 21 d (5.0 ± 0.34%). The pH was not affected by temperature, time or type of aging. There was an interaction between aging time and type of aging for moisture content (inner) and water activity (outer). Increasing the aging time from 21 to 42 d increased water activity of Wet-aged samples (0.989 ± 0.001 to 0.994 ± 0.001), and decreased water activity for the Dry-aged samples (0.934 ± 0.002 to 0.922 ± 0.003). The moisture of Wet-aged samples was not affected by aging time. However, Dry-aged samples aged 42 d had lower (71.61 ± 0.52%) moisture content than samples aged 21 d (72.61 ± 0.54%). At 21 d of aging there was no difference in moisture from Dry and Wet samples. However, at 42 d, Dry-aged samples had lower (71.61 ± 0.52%) moisture content than Wet-aged samples (72.96 ± 0.22%). There was no effect of temperature, time and type of aging on instrumental tenderness. An interaction was found between temperature and aging type, and between time and aging type, for cooking loss. Dry samples aged at 7°C had lower (19.61 ± 0.63%) cooking loss than Wet samples (21.55 ± 0.64%) for the same aging temperature. The same pattern was seen for Dry samples aged 42 d, which had lower cooking loss (19.81 ± 0.69%) than Wet samples (22.11 ± 0.57%) for the same aging time. No difference was detected at 2°C or 21 d for cooking loss between aging types. However, Wet samples aged 42 d had higher cooking loss (22.11 ± 0.57%) than Wet samples aged 21 d (20.08 ± 0.51%).

Conclusion

The higher aging temperature and time decreased the yield of Dry-aged samples, while the yield of Wet-aged samples was just decreased by time. The aging conditions did not affect instrumental tenderness, however the moisture content, water activity and cooking loss decreased in the Dry aging process, which could affect the perception of juiciness.