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Effect of Relative Humidity on Water Loss of Strip Loins Dry-Aged in a Highly Moisture Permeable Bag

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Objectives

The aim of this study was to evaluate the effects of 2 relative humidity RH (65% or 85%) and 2 aging times (21 or 42 d) on water loss of dry-aged strip loins unpackaged or packaged in a highly moisture permeable bag.

Materials and Methods

A total of 16 beef loins (8 pairs), from Nellore intact males, were collected at a commercial plant and sent to the meat lab. Each pair was cut in 8 equal parts and used to one of each treatment combination (2 RH: 65% or 85%; 2 aging times: 21 or 42 d; unpackaged and packaged). The aging chambers were set to the desired RH and the temperature was set at 2°C. Samples were deboned and packaged samples were put in dry aging bags (Tublin 10, TUB-EX ApS, Denmark) using vacuum to seal the bags to get contact between the bag and the meat. Samples were weighed and position within the aging chamber was rotated every 3 d. Aging loss (evaporation and trimming), moisture content and surface water activity, were determined. The statistical analysis was performed using a factorial ANOVA, and means (\pm SEM) were tested by Tukey test at 5% significance.

Results

At 21 d of aging it was verified the presence of a bad smell and slime on samples aged without bag at 85% of RH. These samples were analyzed, however the same treatment (unpackaged), assigned to 42 d, were discarded. At 65% of RH, a greater evaporation loss ($P < 0.05$) was found for samples aged without bag compared with packaged samples. At 21 d 85% RH there was no effect on evaporation loss for samples aged with or without

bag ($P > 0.05$). Evaporation loss of packaged samples at 42 d/85% RH was $19.2 \pm 0.4\%$. At 21 d, evaporation loss of samples at 85% RH was lower ($P < 0.05$) than at 65% RH, in both packaged and unpackaged. There was an interaction ($P < 0.05$) between aging type and relative humidity for trimming loss (crust removal). Trimming was not affected ($P > 0.05$) by type or time of aging of samples aged at 65% RH. On the other hand, at 21 d/85% RH, non-packaged samples had higher ($P < 0.05$) trimming than samples in a bag, mainly due to the presence of slime that was removed. The moisture content was lower ($P < 0.05$) on samples aged in a bag for 42 d at 65% RH than at 85% RH and on samples aged without bag for 21 d at 65% RH than 85% RH. The increase in aging time decreased ($P < 0.05$) moisture content of samples aged at 65% RH with or without bag, with no effect ($P > 0.05$) on packaged samples aged at 85% RH. A lower surface water activity was verified for samples aged at 65% RH, independent of time or type of aging, when compared with samples aged at 85% RH ($P < 0.05$). At 65% RH, non-packaged samples had lower ($P < 0.05$) water activity than packaged samples, at 21 and 42 d. At 21 d/85% RH, water activity was not affected by the type of aging ($P > 0.05$). The increase of aging time decreased water activity of samples aged at 65% RH without bag, as well as for samples aged at 85% RH with bag ($P < 0.05$), with no effect ($P > 0.05$) on packaged samples aged at 65% RH.

Conclusion

The higher relative humidity used in this experiment (85%) was unable to produce a viable dry aged beef, mainly without the use of a permeable bag. The use of an aging bag can increase yield, however the surface water activity is higher, so the microbiological growth needs to be studied.