Objectives

Postmortem aging is known to improve WHC of fresh meat through a reduction in shrinkage of muscle fiber and swelling of muscle structure, in general. However, there have been inconsistent results between studies regarding the relationship between postmortem aging and WHC. A possible cause for this disparity may be attributed to inconsistent methods applied for assessing WHC and/or different aging periods among different studies. Therefore, the objective of this study was to re-evaluate the effect of postmortem aging on WHC of beef loins by comparing various reference methods.

Materials and Methods

Paired loins (M. longissimus lumborum) from ten beef carcasses were removed at 7 d postmortem. Each paired-loin was divided into two sections, vacuum-packaged, and randomly assigned to four aging periods (7, 14, 21, and 28 d) at 2°C. Initial and after aging weight were measured to calculate the amount of purge loss (PL). Two cubes (2.5 × 2.5 × 2.5 cm³, approximately 30 g) were cut from each section, and the remaining part was used to determine pH, moisture content (AOAC oven-drying method) and centrifugal drip loss. One cube for cooking loss (CL) was immediately sealed in a bag and cooked in an 80°C water bath (core temperature of 71°C), and another cube was used for the Honikel drip loss assay (DL). The PL, DL and CL were combined to calculate total water loss (PL + DL + CL) and non-thermal water loss (PL + DL). The experimental design was a randomized complete block design, and data were analyzed using general linear model (GLM) procedure of SPSS 18.0 software. Duncan’s multiple range test (P < 0.05) was used to determine differences between means.

Results

The pH of beef loins slightly increased with aging (P < 0.05). An increase in postmortem aging periods significantly decreased moisture content of raw and cooked beef loins, which was likely due to water release as purge during aging. The purge loss of beef loins constantly increased from 3.78% (at 14 d) to 4.98% (at 28 d; P < 0.05). The result of Honikel drip loss assay found a decrease in drip loss with aging (P < 0.05), whereas no aging impact on drip loss was observed based on the centrifugal method. The cook loss was affected by aging until 14 d (P < 0.05), but further aging did not affect the cook loss (P > 0.05). Overall, total moisture loss (PL + DL + CL) decreased with extending aging periods (P < 0.05), while non-thermal water loss (PL + DL) was not affected by aging (P > 0.05).

Conclusion

These results indicated that postmortem aging improved WHC of beef loins when total moisture loss was considered, as the extent of cook loss change during aging had a considerable impact on total water loss. The results from the current study also suggest that the aging impact on WHC could be interpreted in various ways depending on applied methods, so precise yet holistic approaches should be taken into consideration when it comes to analysis of WHC results. Further studies determining underlying biochemical changes during postmortem aging and thermodynamic properties of aged meat against heating would be warranted to further elucidate the impact of postmortem aging on WHC.