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Effect of Carcass Management on Horse Meat Quality

M. M. Rahman*, B. Walker, B. C. Roy, L. McMullen, and H. L. Bruce

Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Canada

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Objectives

Canada is one of the largest exporters of horse meat. To remain competitive, it is necessary to ensure the highest quality of horse meat. Hence, the objective of the current study was to characterize the meat quality of horse meat aged under vacuum for up to 90 d to ensure the highest quality of horse meat.

Materials and Methods

Twelve *Semimembranosus* (*SM*) muscles were collected over 4 consecutive visits from an Alberta abattoir, with 3 muscles collected at each visit. Visits were performed over a 3 wk interval. At each visit, at 17 h post mortem the *SM* muscles were separated from the right side of 3 randomly selected carcasses. The collected *SM* muscles were cut into 5 equal portions, with each portion consisting of 2 steaks. Portions were randomly distributed to either 3, 30, 60, and 90 d ageing (at 0 ± 0.5°C) with the exception of the third and middle portion, which was frozen and stored at –18°C on d 3 for intramuscular connective tissue analysis. The steaks within the remaining portions were packaged individually under vacuum for ageing. After each ageing period, 1 steak within each portion was assessed for purge loss, cooking loss, Warner Bratzler Shear force (WBSF) while the other steak was cubed and freeze dried for proximate (protein, fat, moisture) analysis. Prior to these analyses, the color (L^*, a^*, b^*; Commission Internationale ĹEclairage) and pH were measured in both steaks at 3 different places in each steak. Data were analyzed by R (version 3.3.1) using the package nlme as a mixed model, where ageing was a fixed effect, visit a random effect, and carcass weight a covariate. Differences between least square means ($p < 0.05$) were determined by Tukey's multiple comparison and Pearson correlations were used to identify significant linear relationships.

Results

There was no effect of ageing on horse meat cooking loss and intramuscular fat (IMF) content. However, the meat color as indicated by L^* and b^* changed ($p < 0.05$) throughout the ageing period. The L^* gradually decreased as ageing time increased, with mean L^* value highest and lowest on d 3 and d 60 post mortem, respectively. The highest value of b^*, however, was observed on d 30 and the lowest value at d 3 post mortem. Muscle pH increased with length of ageing, with the mean pH value for d 3 being less than that at d 30 and 60. Similarly, mean purge loss gradually increased with length of ageing, with the highest purge losses observed at d 60 and the lowest at d 3. WBSF decreased with length of ageing period, with the highest and lowest mean WBSF values observed at d 3 and 60, respectively. Besides ageing period, WBSF at d 3 appeared influenced by muscle pH and IMF content, as there was a positive correlation between muscle pH and WBSF ($r = 0.69$, $p = 0.013$) and a negative correlation between WBSF and IMF content ($r = –0.64$, $p = 0.025$).

Conclusion

These preliminary results suggested that meat color and WBSF did not differ between d 30 and d 60; therefore, horse meat quality appeared to be optimal at d 30 post mortem as it exhibited minimum purge loss while still having the best technological quality.

