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Effect of ageing time on pH, color and consumer acceptability of foal meat (#465)

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Introduction

Foal meat is not very popular but its consumption is slowly increasing in several countries due to its recognized nutritional value mainly related to grazing systems (Belaunzaran *et al.*, 2015). However, research is still scarce and needs to be extended to other factors and parameters related to meat quality. Meat ageing, for example, to reach the optimum palatability of meat, is a common practice in beef but it is not well documented in horse meat although it can simultaneously affect other parameters such as appearance and flavor. The objective of this work was to study quality related parameters and consumer acceptability of foal meat aged over 0, 7 14 and 21 days (d).

Methods

Extensively reared (suckling and grazing) 10 Hispano-Breton foals (5 males and 5 females) were concentrate-finished at 11-13 months of age for 120d until slaughter (mean carcass weight of 246 ± 14.0kg). Two foals were slaughtered per week over 5 consecutive weeks. Forty-eight hours *post mortem*, both loins of each animal were transported to the laboratory where the *Longissimus thoraracis et lumborum* was excised and cut into 1.5cm thick steaks. Each steak was vacuum packaged and assigned to one ageing day (0, 7, 14 and 21d). At each time point (after 1h of blooming) pH (portable HI99163, HANNA Instruments, USA) and color ($L*$, $a*$, $b*$; Minolta® CR-200, Konica-Minolta Sensing, Germany) were measured, and a photograph of each steak was taken for visual acceptability (VA) evaluation. Then, samples were frozen (-80ºC) for the in-mouth acceptability (IMA) evaluation. IMA and VA were evaluated by 120 consumers divided in 10 sessions. Steaks were thawed over 24h (4ºC) and grilled to an internal temperature of 70ºC . Meat cuboids (2x1.5x2cm) wrapped in aluminium foil were presented to consumers. Each animal was evaluated by 6 consumers answering to "how much do you like this steak?" question in a 10cm continuous scale ranging from "extreme dislike" to "like very much" and with an extra cm in both ends. For visual acceptability (VA), photo compositions of 4 representative raw steaks for each ageing time were evaluated **(Figure 1)** using the same scale and question as for IMA. For data analysis, the General Lineal Model (GLM) of ANOVA and Tukey test for multiple comparisons, were performed (α=0.05). The following GLM models were used for pH/color, IMA and VA, respectively:

Y= μ+AT+AS+D+CS+CW+ε
Y= μ+AT+AS+AT*AS+C(A(AS))+A(AS)+ε
Y= μ+AT+C(S)+ε

μ=intercept. *Fixed factors*: AT: ageing time; AS: animal sex; D: slaughter day; CS: carcass side; A: animal; S: session. *Covariable*: CW: carcass weight. *Random factor*: C: consumer.

Results

In terms of pH and color evolution, initial pH was similar to that previously described for 15 month Galician Moutain foals (Gomez & Lorenzo, 2012). Then, it decreased significantly after 7d and maintained stable until the end of the experiment (**Table 1**). The color parameter $L*$ increased during ageing as described for vacuum packaged meats (Fernandez-Lopez et al., 2008) although no differences were observed between 7 and 14d. The values for $a*$ increased over time until 14d and, then, significantly decreased. Also, $b*$ value increased significantly over time and the highest values were obtained at 14 and 21d. These changes, plus the significant decrease of $C*$ values at 21d, would indicate that meat started to turn brown (**Table 1**) (Kress-Rogers & Brimelow, 2001).

Regarding consumer study, both IMA and VA were significantly affected by ageing (**Table 1**). Meat aged for 7d had a better IMA than unaged meat, but showed no statistical difference with meat aged over 14 and 21d. Moreover, meats aged for 7 and 14d obtained the best acceptability scores for VA whereas meat aged for 21d the worst ones. This is consistent with the results obtained for color parameters, as brownish meat was negatively appreciated by consumers.

Conclusion

Ageing time significantly affected all the studied parameters. Foal meat aged for 7d obtained the best scores while meat aged for 21d was discouraged by consumers. These results reaffirm the importance of the ageing process in the final quality of meat.

Acknowledgements

References

Belaunzaran, X. *et al*. 2015. Meat Sci. 108: 74-8.
Gomez, M. & Lorenzo, J.M. 2012. Meat Sci. 91: 513-520.
Fernandez-Lopez, J. *et al*. 2008. Meat Sci. 78: 143-152.
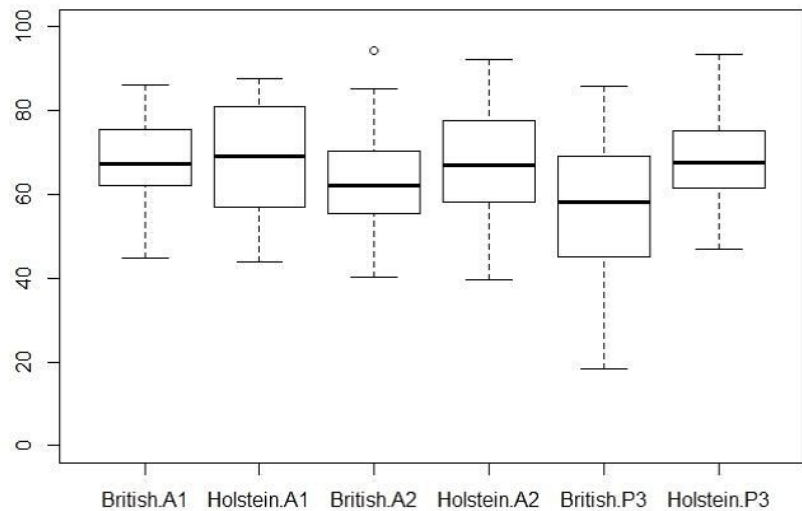Kress-Rogers, E. & Brimelow, J.B.C. 2001. Cambridge, UK.

Notes

Figure 2.4:
Comparative distribution of MQ4 scores by breed and position of the striploin.