

SENSORY CHARACTERISTICS OF WET AND DRY-BAG AGED BEEF FROM GRAIN AND PASTURE FINISHED STEERS

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I. INTRODUCTION

Meat ageing is one strategy that allows adding value to beef, especially in terms of sensory attributes. The ageing process helps to preserve meat and, it also increases its tenderness [1]. The two main methods most used are wet and dry ageing. In wet ageing, meat is vacuum packaged and refrigerated. In dry ageing, meat is refrigerated without any packaging (dry aged) or packed in moisture permeable bags (in-bag dry aged) [1]. Wet aged cuts have higher weight losses than dry aged cuts due to the dehydration of the surface, affecting the final sealable yield. Regarding sensory characteristics, Li *et al.* [2] reported that wet aged beef had lower butter fried meat odour and higher metallic taste than dry aged beef, in-bag dry aged beef being in between. No significant differences were found in texture attributes. The aging procedure also modifies the flavour of the meat which is also determined by the fat composition of the aged meat [3], which depends on the diet and/or production system of the animals. Considering all the above, the aim of this study was to characterize wet and dry-bag aged beef from two different production systems (grain and pasture) after a 40-days ageing period.

II. MATERIALS AND METHODS

Loins from the left half carcass of British breed steers were obtained, 15 finished on pasture-fed and 15 on grain-fed. Two cuts were obtained and aged at $2\pm 0.5^{\circ}\text{C}$ and $85\pm 5\%$ humidity for 40 d, one (16 cm-length) packaged in dry ageing bags (DAb) and the other (14 cm-length) vacuum packaged (WA). Then, the aged beef was cut in steaks (2.5 cm width), individually vacuum packed and stored at -20°C for 2 months.

A trained panel with 9 members assessed the samples in 15 sessions, 4 samples/session, one of each combination of productive system and ageing type. The day before the sensory analysis meat was thawed at 4°C , then cooked in a sandwich grill heated at 200°C until reaching 63°C of core temperature. After that, 10 portions of each cut were obtained, placed in a heater to keep them warm until being evaluated by each panellist. The order of evaluation for each one was designed to avoid the first sample and carry over effect. Panellists evaluated 6 odour attributes, 6 texture attributes and finally, 6 flavour attributes on a 10-point scale from 0 (no perception) to 10 (extremely intense perception). The GLM procedure of SAS software (v. 9.4, SAS Institute Inc., Cary, NC, US) was applied to the averaged standardized scores considering productive system and ageing type as fixed effects and session as covariate. The interaction was not included since it was not significant.

III. RESULTS AND DISCUSSION

Results are presented in Fig. 1. It is possible to see that there were significant ($P < 0.05$) differences in most of the traits evaluated when ageing type is compared. In this sense, dry-bag aged beef had higher beef and ageing odour intensity and lower liver and herbs odour intensity. In contrast Li *et al.* [2] did not find differences in any odour and texture attributes between dry and wet ageing and they found that dry aged beef in bag had higher umami, butter fried, and fatty taste than beef wet aged. In-bag dry aged beef was harder, less juicy and with more fibrosity and its flavour had higher aged

intensity and lower dairy, metallic and liver intensities. The fact that the in-bag dry aged pieces were small could contribute to excessive dehydration at least during the first 4 weeks due to high the ratio surface-volume [4].

Aged beef from grain fed steers had higher liver and lower herbs and abnormal odour intensity ($P < 0.05$) than pasture fed animals. They also had lower dairy and higher metallic flavour intensities. However, there were not significant differences in any texture attribute between aged beef from grain-fed and pasture-fed production systems. In beef wet aged for 20 days, Resconi *et al.* [5] reported higher beef odour and flavour intensity, acid intensity and tenderness in pasture-fed beef than concentrated-fed beef.

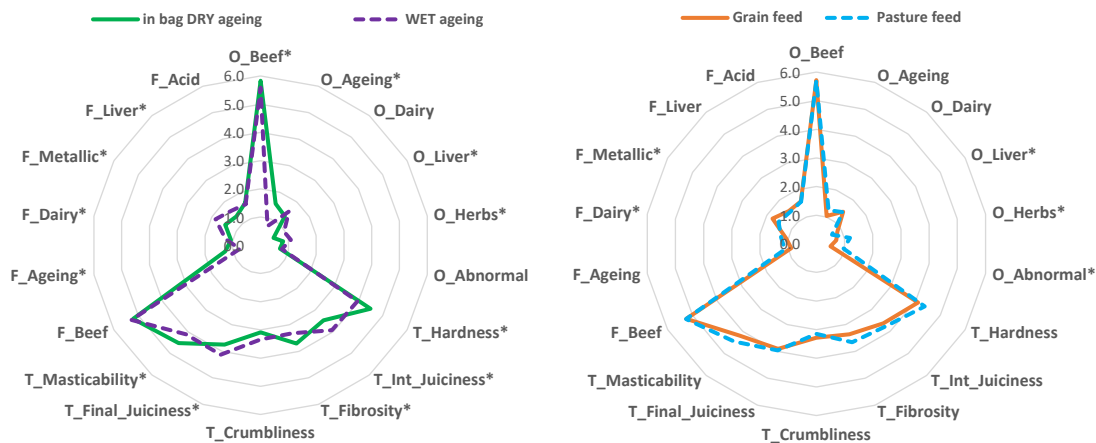


Figure 1. Sensory characterization of aged beef depending on the type of ageing (left) and the productive system (right). Attributes that start with O, T and F are for Odour, Texture and Flavour traits, respectively. Attributes with a * are significantly ($P < 0.05$) different between treatments.

IV. CONCLUSION

In the conditions of the present experiment, it is possible to conclude that differences in the sensory characteristics were more important when wet or dry ageing are applied than when aged beef comes from steers fed grain or pasture. Moreover, even though In-bag dry aged meat was harder and less juicy than wet aged meat, it had higher aged flavour and odour.

ACKNOWLEDGEMENTS

Lab Technicians G.de Souza, S. Mello, S. Alvarez from INIA Tacuarembó, the technician M.J. Bautista and all the trained panellists are acknowledged. CERCA from Generalitat de Catalonia is also acknowledged. For the financial support by INIA funds and the FPTA 373 Strategic Partnership Alliance project "Production of premium beef products from different production systems through novel aging process" (Teagasc-IRTA-AgResearch).

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