EFFECT OF IN-THE-BAG DRY AGING ON THE FLAVOR PROFILE OF BEEF LOW-VALUE CUTS

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I. OBJECTIVES

This study evaluated the effects of in-the-bag dry aging and different aging periods on the flavor profile of low-value cuts from steers.

II. MATERIALS AND METHODS

In total, 20 carcasses (AAA) from Angus cross youthful animals were used in this study. The flat iron (*infraspinatus*), clod heart (*triceps brachii*), and brisket (*pectoralis profundi*) muscles from both right and left carcass sides (n = 40 from muscle type) were collected at the Lacombe Research and Development Centre (Agriculture and Agri-Food Canada, Canada). Controlling for side, muscles were randomly assigned to wet or dry aging, using conventional oxygen/moisture impermeable vacuum bags (Winpak Vak 3.0 R, Winnipeg, MB, Canada) or specifically manufactured oxygen impermeable/moisture permeable vacuum bags (Umai®, Minneapolis, MN), respectively. After vacuum packing, muscles were placed in a conventional 2°C cooler. Half the muscles ($n = 20$ from muscle type; 10 wet and 10 dry aged) were aged for 21 d, and half ($n = 20$ from muscle type; 10 wet and 10 dry aged) for 42 d. Following aging, muscles were removed from their respective packaging, and one 2.5-cm steak from each muscle was cut and grilled to an internal temperature of 71°C for subsequent flavor profile analyses. Steaks were presented in a balanced design to a 9-member trained sensory panel to rate the intensity of aromas ($n = 19$), tastes ($n = 5$), and flavors ($n = 19$) using 15-cm line scales. Flavor profile data were analyzed for each muscle using the MIXED model procedure of SAS version 9.4 (SAS Institute Inc., Cary, NC), with the main effects of aging treatment and period and their interactions in the model, and panel session and assessor and their interactions were included as random effects.

III. RESULTS

Aging treatment × period interactions ($P < 0.05$) were observed in briskets and flat irons. Livery aroma and sour taste were higher at 42- than 21-d dry-aged but similar in both 21- and 42-d wet-aged briskets, whereas bloody/serumy aroma and corn flavor were higher at 42- than 21-d wet-aged but similar for both aging periods in dry-aged briskets. Cruciferous aroma was higher and corn aroma was lower at 42- than 21-d wet-aged but similar in 21- and 42-d dry-aged flat irons, whereas the highest bitter taste was found at 21-d dry-aged, the lowest at 21-d wet-aged, and intermediate at 42-d dry- and wet-aged flat irons. Overall, dry aging decreased ($P < 0.05$) bloody/serumy and sour dairy flavors in briskets and clod hearts, respectively, whereas it increased unidentified aroma/flavor in briskets, beef identity flavor in clod hearts, and metallic aroma and brown-roasted flavor in flat irons compared to wet aging. The 42-d aging period increased ($P < 0.05$) livery aroma in briskets, sour/dairy aroma and green/hay flavor in clod hearts, and metallic aroma in flat irons, whereas it decreased beef identity flavor in clod hearts and sweet taste and beef identity and bloody/serumy flavors in flat irons compared to 21 d of aging.

IV. CONCLUSION

These results show in-the-bag dry aging to be an effective strategy to increase some flavors identified in the literature as desirable and decrease others that could be perceived as undesirable flavors by consumers in low-value cuts of beef, thus creating potential value-added alternatives for specialty marketers to meet the demand of the new generation of foodies. Overall, extending the aging period from 21 to 42 d did not result in flavor enhancement of beef low-value cuts.

Keywords: aging period, beef, dry aging, flavor, low-value cuts