

# EFFECTS OF DRY AND WET AGING ON VOLATILE AND AMINO ACID PROFILE OF USDA CHOICE AND PRIME STRIP LOINS

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## I. OBJECTIVES

Dry aging beef is suggested to enhance the flavor profile compared with conventional wet aging. Proteolysis and changes in chemical profile are thought to enhance the flavor profile of beef, improving the overall eating experience. To better understand this hypothesis, this study aimed to investigate the volatile compounds and amino acid profile of dry-aged beef.

## II. MATERIALS AND METHODS

A total of 48 short loins (Institutional Meat Purchase Specifications 174; 24 Prime and 24 Choice) were commercially acquired and assigned to a  $2 \times 2 \times 2$  factorial design. Fixed effects were USDA quality grade (Choice and Prime), aging method (dry and wet), and aging length (21 d and 42 d). Dry-aged samples were held at  $2^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Cooler humidity was maintained at 80%–85% and air speed at 2 m/s. Wet-aged samples were stored under the same temperature in their original vacuum-sealed bag. Strip loins were fabricated, and two 2.54-cm steaks were obtained from each short loin, cooked, and evaluated for volatile compound profile. Volatiles were collected by Solid-phase microextraction fibers and analyzed using gas chromatography-mass spectrometry. For amino acids, fresh steaks were pulverized with liquid nitrogen and analyzed using EZfaast Amino Acid kit. Data were analyzed using PROC GLIMMIX of SAS (SAS Institute Inc., Cary, NC). When significance was detected at  $P \leq 0.05$ , means were separated using LSMEANS.

## III. RESULTS

Overall, the majority of the amino acids were affected only by aging length. As aging length increased, the concentration of alanine, asparagine, aspartic acid, glutamic acid, glycine, isoleucine, leucine, lysine, methionine, ornithine, phenylalanine, proline, serine, threonine, tyrosine, and valine increased. Dry-aged beef had higher tyrosine and lower sarcosine concentrations when compared to wet-aged. Interactions between aging length and aging method were observed for 3-hydroxyproline and 4-hydroxyproline. Dry aging increased concentrations of both amino acids when compared to wet aging. For the volatile profile, a significant three-way interaction was observed for 2,3-butanedione, and for the sum of ketone compounds. An interaction between aging method and aging length showed that 21-d dry-aged loins had higher concentrations of 2-ethyl-3,5/6-dimethyl pyrazine compared to 21-d wet-aged loins. Interactions between aging method and grade were observed for pentanal, 2-butanone, and methyl pyrazine. Choice wet-aged loins had higher concentrations of pentanal compared to Choice dry-aged and Prime wet-aged. Prime dry-aged loins had higher concentrations of 2-butanone compared to Choice. Prime dry-aged loins also showed higher methyl pyrazine concentrations compared to wet-aged Prime and dry-aged Choice. Overall, dry aging increased concentrations of octane compared to wet aging.

#### IV. CONCLUSION

The amino acid profile of beef was primarily affected by aging length. The individual effect of aging method (dry or wet aging) played a minimal role in determining the volatile profile of beef. However, when combined with USDA grade, dry aging may affect the volatile profile. Quality grade seems to be the major driving effect for changes in volatiles of beef.

Keywords: amino acids, beef, dry aging, volatiles