

# TASTE-RELATED COMPONENTS IN HANWOO STEER AND COW *LONGISSIMUS DORSI* MUSCLES

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## I. OBJECTIVES

Taste (e.g., sweetness and umami, etc.) is an important factor affecting the eating quality of beef. Cow and steer are the 2 main sex classifications of Hanwoo (Korean native cattle) beef in the Korean meat market. Therefore, the main objective of this study was to determine and compare the taste-related components of beef from Hanwoo steers and cows.

## II. MATERIALS AND METHODS

*Longissimus dorsi* (LD) muscles ( $n=10$  per sex class) with the same quality grade (1<sup>+</sup> grade) collected from the left sides of Hanwoo steers (31–32 mo old) and cows (47–53 mo old) at 24 h postmortem were used in the present investigation. The average marbling scores and intramuscular fat content of the LD muscles used were 6.8 and 6.0, and 17.82% and 16.69%, for the steers and cows, respectively. After trimming of visual fats, the lean muscles were used for analysis of taste-related components including free amino acids (FAA), metabolites, and nucleotides. The FAA were analyzed using an ultraperformance liquid chromatography, and the results were expressed as milligram per 100 g meat. Nucleotides were analyzed using ultraperformance liquid chromatography, and then were identified by using external standards. For metabolite analysis, each sample (20 mg) was extracted with acetonitrile/water (1:1, v/v) mixture. The extracts were freezing-dried and then dissolved in deuterated water containing 2 mM 3-trimethylsilyl-2,2,3,3-tetradeuteropropionic acid-d<sub>4</sub> as an internal standard. <sup>1</sup>H-NMR (nuclear magnetic resonance) spectra were acquired on a 600 MHz NMR spectrometer equipped with 600 MHz 4-mm gHX NanoProbe at a <sup>1</sup>H frequency of 599.93 MHz. Metabolites were tentatively identified using a 600 MHz library database and NMR.

## III. RESULTS

Based on their similar taste qualities, researchers have classified the FAA into several classes, such as umami, saltiness, sweetness, bitterness, and sourness. The outcome of our analysis revealed that the levels of some FAA associated with umami (e.g., glutamic acid and lysine), sweetness (e.g., proline and glutamic acid), and saltiness (e.g., histidine and glutamic acid) in the LD muscles were significantly higher in the cows compared to the steers ( $P<0.05$ ). No differences were found in amounts of all the detected nucleotides (hypoxanthine, uridine, guanosine monophosphate, inosine 5'-phosphate) between the 2 types of beef ( $P>0.05$ ). A total of 27 metabolites were identified in the LD muscles of both cattle genders. Out of them, 8 compounds (e.g., acetate, creatine, creatinine, glucose, glycine, inosine, trimethylalanine, and tyrosine) showed their significantly higher amounts in the cow meat compared with those in steer meat ( $P<0.05$ ).

## IV. CONCLUSION

The cattle sex type partly showed its effects on the levels of taste-related components (e.g., FAA and metabolites) in the 1<sup>+</sup> grade LD muscles. However, further study is needed to

determine the associations of the identified taste-related compounds with eating quality attributes of cooked beef.

Keywords: Hanwoo, taste, free amino acid, metabolite, nucleotide