QUALITY ATTRIBUTES, TASTE-AND AROMA-RELATED COMPOUNDS IN BEEF FROM KOREAN HANWOO AND BRINDLE CHIKSO CATTLE

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I. INTRODUCTION

Chikso a Korean native cattle breed is characterized by its unique brindle coat colour. Historically, Chikso was used mainly as draft and pack animals. Compared to the other commercial beef cattle breeds (e.g., Hanwoo) raising in Korea, the Chikso breed is generally maintained at a smaller population size, around 4000 heads in 2016 [1]. In recent years, due to the increasing demands for safe meat products derived from native cattle breeds in South Korea, the Chikso breed has recently been recognized as a valuable breed and received more attention by beef producers. Meat quality can be defined in different ways, from product yield to a set of properties (e.g., colour, texture, water holding capacity and eating attributes etc.) that together identify what we appreciate about meat when buying or eating [2]. Additionally, flavour consisted of tastes and odours, is among the leading factors determining the eating quality of meat [3]. Tastes of cooked meat are contributed by non-volatile constituents such as free amino acids in the fresh meat [4]. Volatile compounds derived from the thermal oxidation of fatty acids and Mallard reaction between amino acids with reducing sugars are the major contributors to the development of aroma characteristics in cooked meat during cooking/heating [5]. Researchers have shown that both pre-and post-harvest managements can affect the tastes-and aroma-related components which subsequently impact the flavour of cooked meat [6]. The aim of this study was to compared the quality, taste- and aroma- related components in beef between Chikso and Hanwoo cattle under identical raising condition.

II. MATERIALS AND METHODS

A total of 12 same-age cattle (n=6 per breed, 30 months old) reared in commercial cattle farms (Korea) under identical condition was used in the present investigation. The animals were slaughtered using an industry-accepted procedure. After 24 h chilling at 4 ^{o}C, *longissimus lumborum* (LL) muscles were collected from the left side of carcasses and were analysed for meat quality analysis. The LL muscles were prepared into steaks depending on the analysis. The colour was measured on 5 different areas on the transverse section of each sample using a Minolta Chroma Meter CR-400 (Minolta Camera Co, Osaka, Japan). Prior to the measurement, all the samples were kept at 4 °C for blooming for 30 min. The results were expressed CIE *L** (lightness), CIE *a** (redness), and CIE *b** (yellowness). The cooking loss and WBSF were measured on a same steak of each sample according to the procedure of Hoa *et al*. [7]. Free amino acids associated with tastes, and volatile compounds in the LL muscles were determined using the protocols as described by Hoa *et al.* [7]. Data was analysed with a SAS Enterprise software (version 7.1; SAS Inst. Inc., Cary, NY), using the General Linear Model procedure where the cattle breed was considered as a fixed effect, and the quality traits, free amino acids and volatile compounds were considered as dependent variables.

III. RESULTS AND DISCUSSION

Our results (Figure 1) showed that meat of Hanwoo showed higher lightness and redness values, and lower shear force and compared with Chikso meat ($P<0.05$). Chikso meat presented a higher amount of free amino acids associated with sweetness and umami compared with the Hanwoo ($P<0.05$) (Figure 2). A significantly higher amount of total aldehydes and alcohols associated with fatty odour note was found in the Hanwoo meat while, a higher amount of pyrazines associated with roasted odour note was found in Chikso ($P<0.05$) (Figure 2).

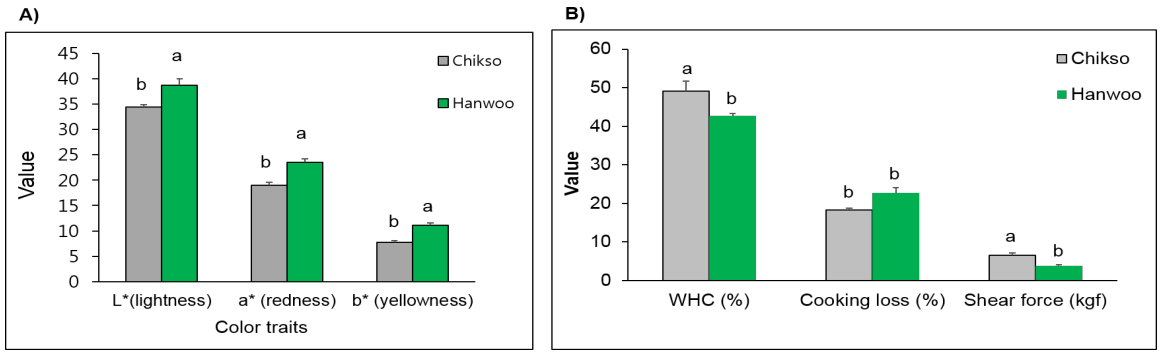

Figure 1. Colour (A) and meat quality traits (B) of beef as affected by cattle breed. Different letters (a,b) indicate significant difference at P<0.05.

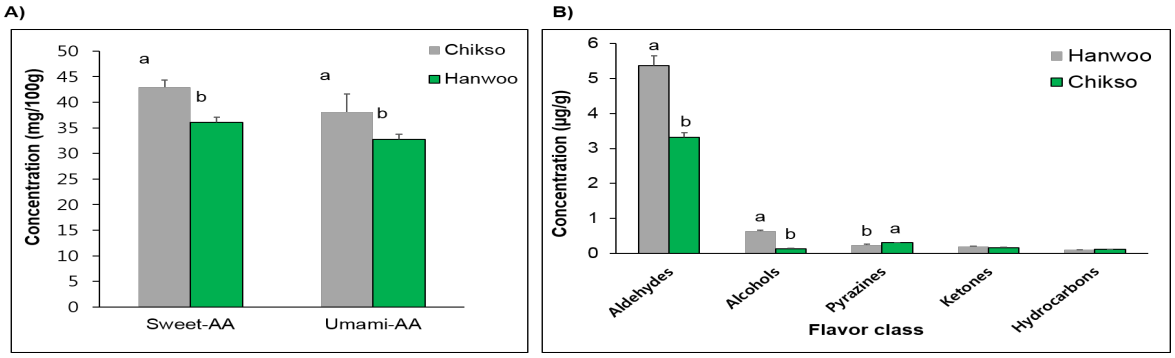

Figure 2. Tastes (A)-and aroma (B)-related compounds in beef as affected by cattle breed. Different letters (a,b) indicate significant difference at P<0.05.

IV. CONCLUSION

The breed showed an effect on the meat quality attributes such as; shear force and colour, and tastes- and aroma-related components. Chikso meat had a higher concentration of free amino acids associated with sweetness and umami taste compared with Hanwoo meat. The Hanwoo meat, with a higher amount of fat-derived aldehydes and alcohols, may be associated with fatty odours whilst, the Chikso meat may be associated with roasty aroma due to its higher amount of pyrazines.

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