SENSORY ACCEPTANCE OF CHUNCHEON *DAKGALBI* PROCESSED BY SOUS VIDE METHOD AND ITS QUALITY CHANGES DURING STORAGE

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Abstract – The aim of this study was to observe the sensory acceptance of Chuncheon *dakgalbi* (Korean marinated chicken) cooked using sous vide (SV) method at 63 °C for 90 min (SV-90), 180 min (SV-180), and 270 min (SV-270) and their quality changes during chilled storage at 5±1 °C for 7 weeks compared with raw (control). The longer the SV heating time was used, the lower the overall acceptance score and the higher the malondialdehyde content was observed. The volatile basic nitrogen content of control was higher than those of SV groups. Although prolonged cooking time resulted in lower viable cell counts significantly, SV-90 is recommended to both match the sensory preferences and extend the shelf life of ready-to-serve Chuncheon *dakgalbi*.

Key Words – sensory quality, shelf life, thermal process.

I. INTRODUCTION

Dakgalbi is a traditional Korean cuisine, which is made up of chicken meat, marinated with authentic sauce and grilled before serving [1]. Recently, Chuncheon *dakgalbi* can be purchased as ready-to-cook or ready-to-eat product in market. However, development of the product is still going for expanding its market and extending its shelf life. Sous vide (SV) is a thermal method to cook food in heat-stable, food-grade plastic pouches under vacuum conditions at precisely controlled temperature. The benefits of the SV cooking technique are eliminating the possibility of cross-contamination, inhibiting the growth of bacteria, thus extending shelf life [2]. Therefore, the purpose of this study was to observe the most appropriate SV cooking time for Chuncheon *dakgalbi* based on its sensory acceptance and bacterial growth during storage.

II. MATERIALS AND METHODS

Frozen deboned chicken drumette was used in this study and purchased from local butcher shop and marinated sauce consisting Korean fermented pepper, soy sauce and other seasonings was purchased from local market. Frozen meat was thawed at 2±2 °C overnight and marinated with the sauce. Marinated samples were vacuum-packed (IV-2000, Incoin Tech Co., Gyeonggi, Korea) in polyethylene bags. Samples were cooked in a water bath set at 63±2 °C (BW-20G, Jeio Tech Co., Daejon, Korea). Cooking time was recorded as the core temperature of three trial samples reached 63±2 °C. Samples from each treatment group were taken out after 90 (SV-90), 180 (SV-180), and 270 minutes (SV-270). Samples were cooled in icy water for 15 min and stored in a refrigerator at 5±1 °C for 7 weeks with vacuum packed-raw marinated meat used as control. The raw samples were pan-roasted at 180 °C for 15 min (control) and SV cooked samples were reheated using microwave for 2 min for sensory evaluation, carried out by 16 college students on initial day. The hedonic scores ranged from 1 (dislike extremely) to 9 (like extremely) points were used to determine the preferences in color, flavor, texture, juiciness and overall. The pH value of homogenized sample was recorded. Malondialdehyde content was measured using thiobarbituric acid reactive substances (TBARS) assay. Total volatile basic nitrogen (VBN), viable cell counts and coliforms were measured using Korean Food Standards Codex [3]. Storage experiment data were subjected to two-way analysis of variance (ANOVA), while sensory data were analyzed using Kruskal-Wallis test. Analyses were performed using R-version 3.3.2 with "Agricolae" library (The R-foundation for Statistical Computing, Austria). The statistical significance of the differences between means from different treatments was determined by Duncan's multiple range test ($p<0.05$).

III. RESULTS AND DISCUSSION

Table 1 shows the sensory scores of sous vide-cooked Chuncheon *dakgalbi*. The score for flavor, texture, juiciness and overall acceptance was highest in control or pan-roasted samples and the score decreased as longer heating time was

used in SV treated samples. As Chuncheon *dakgalbi* is usually served after grilling or roasting, panels are not familiar with the mushy texture and least roast aroma of SV cooked samples.

Table 1 Sensory scores of sous vide-cooked Chuncheon *dakgalbi* compared with pan-roasted samples

Sensory attributes	Control	SV-90	SV-180	SV-270	SEM
Color	6.3^{b}	7.3^{ab}	7.0^{ab}	7.4^{a}	
Flavor	8.0^{a}	6.9^{b}	6.2^{b}	6.3^{b}	0.15
Texture	7.6^{a}	6.8^{ab}	5.9^{b}	5.5^{b}	0.25
Juiciness	7.1^{a}	7.0^{ab}	6.4^{ab}	5.9^{b}	0.20
Overall acceptance	7.6^{a}	6.5^{ab}	6.0^{b}	5.5^{b}	0.22

SEM, standard error of the mean. $^{a-c}$ Means within each row with different superscripts are significantly different ($p<0.05$).

SV groups showed an increment of pH slightly during storage (Fifue 1A). TBARS values of all treatments tended to increase during storage (Figure 1B). However, SV-180 and SV-270 groups showed higher increment than the others. The VBN value of control increased higher than those of SV groups (Figure 1C). Viable cell count of non-heated treatment group increased sharply after the first week of storage (Figure 1D). In contrast, SV groups did not exceed 6.0 log CFU/g until 7th week of storage. The total coliforms of raw samples ranged from 3.5 to 4.0 log CFU/g during the storage period, while no coliforms were found in SV group (data are not shown).

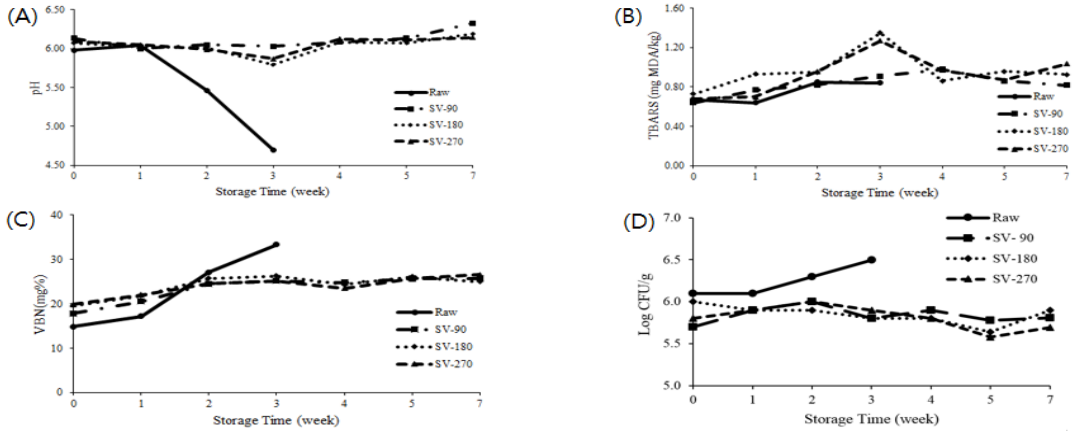

Figure 1. The pH (A), TBARS value (B), VBN (C) and viable cell counts (C) of sous vide-cooked Chuncheon *dakgalbi* during chilled storage at 5±1 °C for 7 weeks compared with raw

IV. CONCLUSION

The potential use of sous vide method to maintain the quality and extend the shelf life of ready-to-serve Chuncheon *dakgalbi* was observed and the most appropriate conditions was found with heating temperature of 63 °C and cooking time of 90 minutes.

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