

**PE10.05      Effect of Cooking Temperature on the Quality Characteristics of Soy Sauce-Seasoned Chicken Meat 385.00**

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**Abstract**—The purpose of this study was to investigate the effect of cooking temperature (75°C [IT75], 90°C [IT90] of internal temperatures and autoclave [AC]) on the quality characteristics of soy sauce-seasoned chicken meat. The pH was higher ( $P<0.05$ ) in IT75 and IT90 groups than in AC group. The ORP was lower ( $P<0.05$ ) in IT75 group than in AC group, but the TRA was higher ( $P<0.05$ ) in IT75 group than in AC group. With regard to color, IT75 group had the highest ( $P<0.05$ )  $L^*$  value and IT90 group had the highest ( $P<0.05$ )  $a^*$  and  $b^*$  values. The aroma pattern with electronic nose showed the difference between IT75, IT90 groups and AC group.

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**Index Terms**—cooking temperature, seasoned chicken meat.

## I. INTRODUCTION

SEVERAL searchers have suggested that cooking temperature affect the quality of meat products.

Huang and Greene [2] have reported that the high cooked temperature decreased the TBARS content in stored beef. In beef, pork, and turkey muscles at pH 5.5-7.0, an increased in myoglobin denaturation with the high cooked temperature was observed by Trout [9]. Furthermore, in the study on buffalo meat, Vasanthi et al. [10] have reported that an increase in cooking temperature increased the pH, cooking loss, collagen content, collagen solubility,

and tenderness score.

Soy sauce is the Korean traditional fermented sauce and made with soybean and some additives [1]. It contains maillard reaction products, such as melanoidines, which have the powerful antioxidant potential [6]. Cheigh et al. [1] found that soy sauce inhibited the lipid oxidation in cooked beef. In Korea, the seasoned meat products were usually prepared with soy sauce. The quality of soy sauce-seasoned meat has been studied previously [3, 4]. However, there is little information on the effect of cooking temperature in soy sauce-seasoned meat.

Therefore, the purpose of the present study was to investigate the effect of cooking temperature on the quality characteristics of soy sauce-seasoned chicken meat.

## II. MATERIALS AND METHODS

### A. Preparation of seasoned chicken meat

Experimental seasoned chicken meat was processed with fresh leg meat (63.42%) from 35-days-old broiler. The following additives were added to meat: soy sauce (21.86%), gelatin (2.5%), sugar (2.5%), Cheongyang green pepper (3.51%), hot sauce (3.12%), onion (1.23%), garlic (1.23%), and curry (0.63%). The meat and additives were vacuum-mixed and stuffed into a ø90 mm PVDC casing (Teepak Co., USA). The samples were divided into three groups with cooking temperatures. Two groups were steam-heated at 180°C until the internal temperatures of 75°C (IT75) and 90°C (IT90) were attained, respectively. The other (AC) was autoclaved at 121°C for 15 min. After freezing at -20°C, cooked samples were sliced into about 2 cm thickness for the quality measurements.

### B. Experimental methods

The pH was determined using a pH meter (SevenEasy pH, Mettler-Toledo GmbH, Switzerland). Oxidation-reduction potential (ORP) was performed as described by Nam and Ahn [7] and expressed as mV. Total reducing ability (TRA) was performed as described by Lee et al. [5] and expressed as absorbance of 1 mM potassium

ferricyanide minus absorbance of sample. CIE  $L^*$ ,  $a^*$ , and  $b^*$  values were determined using a chroma meter (CR-400, Konica Minolta Sensing, Inc., Japan). Texture profile analysis (TPA) was determined using a texture analyzer (TA-XT2i version 6.06, Stable Micro System, UK) equipped with a  $\Phi 75$  mm aluminium platen. Aroma pattern was determined by an electronic nose (FOX3000, Alpha MOS, France) equipped with 12 metal oxide sensors and analyzed by the principal component analysis (PCA, Alpha Soft version 8.01, Alpha MOS, France). Data was analyzed by the General Linear Model procedure of SAS program [8].

### III. RESULTS AND DISCUSSION

The effect of cooking temperature on the pH of soy sauce -seasoned chicken meat is presented in Fig. 1. The pH showed the higher ( $P<0.05$ ) in IT75 and IT90 groups compared with AC group. But there was no significant difference ( $P>0.05$ ) in the pH between IT75 and IT90 groups.

The ORP (Fig. 1) was significantly lower ( $P<0.05$ ) in IT75 group than in AC group. In contrast, the TRA (Fig. 1) showed the higher ( $P<0.05$ ) in IT75 compared with AC group.

In the CIE values (Fig. 2), the  $L^*$  value of IT75 group was significantly higher ( $P<0.05$ ) than that of IT90 and AC groups. The  $a^*$  and  $b^*$  values (Fig. 2) of IT75 and AC groups showed the lower ( $P<0.05$ ) than that of IT90 group.

In the TPA (Fig. 3), there was no significant difference in the hardness between all groups.

The aroma pattern (Fig. 4) was discriminately different between IT75, IT90 groups and AC group and the discrimination index was -20.

### IV. CONCLUSION

The effect of cooking temperature on the quality characteristics of soy sauce-seasoned chicken meat was investigated in this study. The cooking to internal temperature of 75°C showed the higher oxidation stability and different aroma compared with autoclave. Moreover, it showed the lighter color than the cooking to internal temperature of 90°C and autoclave.

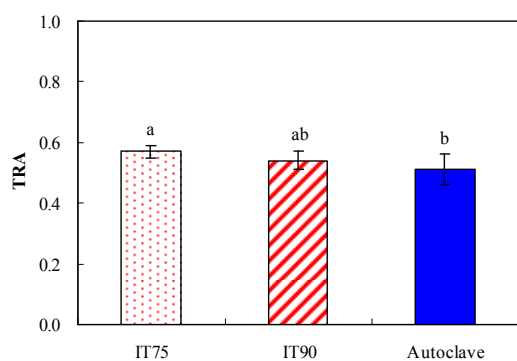
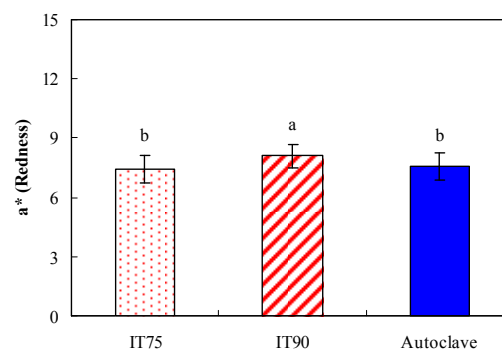
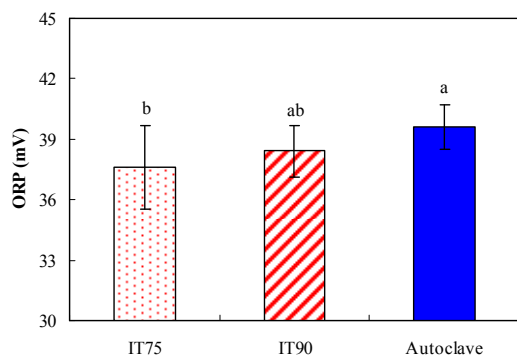
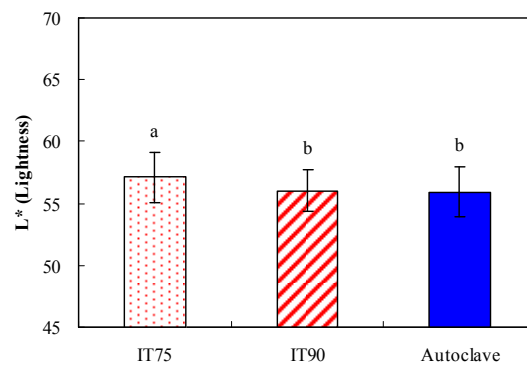
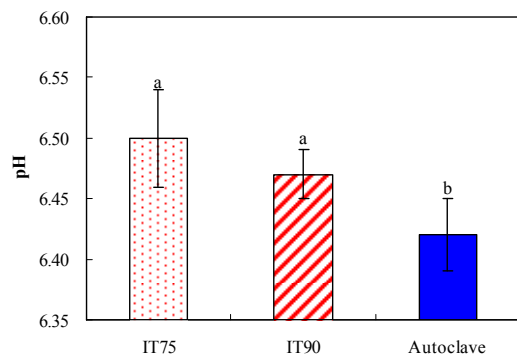
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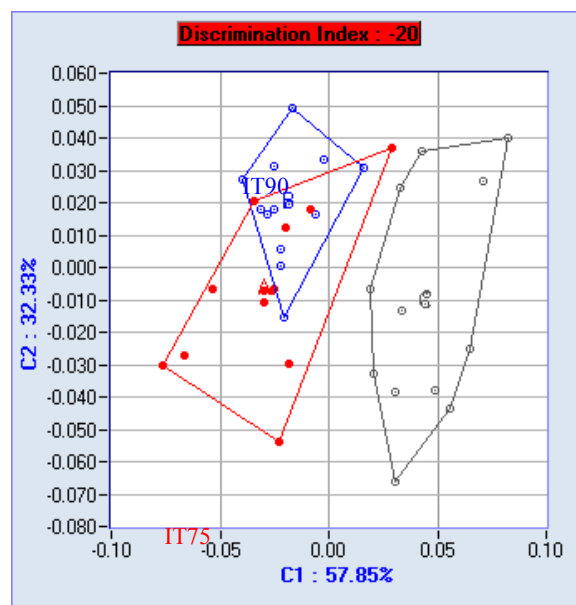
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**Fig. 1.** The effect of cooking temperature on the pH, ORP, and TRA of soy sauce-seasoned chicken meat.

**Fig. 2.** The effect of cooking temperature on the color of soy sauce-seasoned chicken meat.



**Fig. 3.** The effect of cooking temperature on the aroma pattern of soy sauce-seasoned chicken meat.