PE4.48 Effects of chicken skin on quality properties of semi-dried chicken jerky 174.00

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***Abstract*— The aim of this study to investigate the effect of chicken skin on quality properties of semi-dried chicken jerky. The experimental design of semi-dried jerky prepared with CON (chicken meat: 100%), CS02 (chicken meat:98%, chicken skin: 2%), CS05 (chicken meat:95%, chicken skin: 5%), CS10 (chicken meat:90%, chicken skin: 10%). Protein content of CS10 had a lower than others (P<0.05). Water content was decreased with increasing of chicken skin level. However, fat content was increased with increasing of chicken skin level. Water activity and shear force were decreased with increasing of chicken skin level. The percent metmyoglobin of CON and CS02 had significantly higher than others (P<0.05). There was no difference among the chicken jerky preparations within skin level in drying yield (P>0.05). There was no difference among the chicken jerky preparations within skin level in color, flavor, and juiciness (P>0.05). Tenderness and overall acceptability were increased with increasing of chicken skin level.**

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***Index Terms*— chicken, semi-dried jerky, skin, collagen.**

I. INTRODUCTION

JERKY is one of the oldest types of meat products that is preserved by salting and drying to reduce water activity, and its easy preparation, light weight, rich nutrient content, and stability without refrigeration make it a popular item for sports enthusiasts, travelers, and mountaineers. Intermediate moisture (IM) meat products such as jerky are the result of application of the so-called hurdle technology which involves factors such as temperature, water activity, and preservation such as organic acid and spices in the preparation [1].

Jerky has traditionally been made from sliced whole muscle of large animal which have been marinated and dried. But Miller et al.[2] prepared jerky with by-products. Generally, because restructured jerky can be made with muscles of poorer quality and trimmings including meats of small size relative to slice jerky, manufactures are saving production expenses, making possible the mass production of standardized products due to control of the product size and shape.

Jerky made from beef has been more widely used than jerky mad from other animals. In Korea, however jerky made from pork, chicken, and other meats is on the increase [3]. The production and consumption of chicken meat has increased continuously during the last decade in many parts of the world.

Customer demands various chicken meat products.

Therefore, the aim of this study was to investigate the effect of Chicken Skin on quality properties of semi-dried chicken jerky.

II. MATERIALS AND METHODS

Material and curing solution preparation

Fresh whole chicken were purchased from a local processor. All subcutaneous and intermuscular fat, skin and bone were removed from the fesh muscles. Lean chicken was ground through an ϕ-8mm plate. Chicken skin was trimmed of external fat and heating for 30min at 80℃ in water bath. Chicken skin was ground through an ϕ-8mm plate. The composition (w/w) of jerky curing solution was water (10%), soy sauce (3.3%), starch syrup (4.2%), sugar (2%), salt (1.5%), hot pepper paste (5.6%), D-sorbitol (6%), pepper (0.2%), ginger powder (0.1%), garlic powder (0.2%), onion powder (0.2%), sodium nitrate (0.007%), and teriyaki seasoning (0.1%)

Preparation of semi-dried jerky

The experimental design of semi-dried jerky prepared with CON (chicken meat: 100%), CS02 (chicken meat:98%, chicken skin: 2%), CS05 (chicken meat:95%, chicken skin: 5%), CS10 (chicken meat:90%, chicken skin: 10%). Each treatment was added curing solution. Ground chicken meat and skin were cured for 30min by tumbler with curing solution, and stuffed into cellulose casing. Each preparation was cut to 15 cm-lengths. Semi-dried jerky dried for 60 min at 55 °C in a hot air drier (Enex-CO-600, Enex, Yongin, Korea) were removed from the casing, and

jerky processing was carried out as follows: 55 °C (180 min) → 65 °C (180 min) → 80 °C (60 min).

Analytical method

Compositional properties

Compositional properties of the semi-dried chicken jerky were performed using AOAC [4]. Moisture content was determined by weight loss after 12h of drying at 105℃ in a drying oven (SW-90D, Sang Woo Scienctific Co., Bucheon, South Korea). Fat content was determined by Soxhlet method with a solvent extraction system (Soxtec® Avanti 2050 Auto System, Foss Tecator AB, Höganas, Sweden) and protein was determined by Kjeldahl method with an automatic Kjeldahl nitrogen analyzer (Kjeltec® 2300 Analyzer Unit, Foss Tecator AB, Höganas, Sweden). Ash was determined according to AOAC method 923.03.

Processing yields

Processing yield was determined by calculating the weight difference of jerky before and after drying as follows:

Processing yield (%) = (Jerky weight after drying/ Cured meat weight before drying) × 100

pH and water activity

The pH of sample was determined with a pH meter (Model 340, Mettler-Toledo GmbH, Schwerzenbach, Switzerland). pH values were measured by blending a 5 g sample with 20 ml distilled water for 60 s in a homogenizer (Ultra-Turrax T25, Janke & Kunkel, Staufen, Germany).

Samples for water activity were minced into pieces approximately 1 mm _ 1 mm_ 1 mm in size. The water activity of each sample was determined in duplicate with a hygrometer (BT-RS1, Rotronic ag., Bassersdorf, Switzerland).

Shear force measurement

Shear force values were determined with a Warner-Bratzler shear attachment on a texture analyzer (TA-XT2i, Stable Micro System Ltd., Surrey, UK). Test speeds were set at 2 mm/s. Data were collected and analyzed from the shear force values to obtain for the maximum force required to shear through each sample and were then converted into kg.

Percent metmyoglobin

Metmyoglobin concentration of the semi-dried chicken jerky was used a modification of procedures by Krzywicki [5]. Briefly, amples were blended with five volumes of cold 0.04 M phosphate buffer at pH 6.8 for 10 s in a homogenizer (Model AM-7, Nihonseiki Kaisha Ltd., Tokyo, Japan). After standing at 1 _C for 24 h, the mixtures were centrifuged at 3500g at 4 _C for 30 min. The supernatant was further clarified by filtration through Whatman No. 1 filter paper. The absorbance of filtrate was measured at 525, 572, 700 nm using a spectrophotometer (Optizen III, Mecasys, Seoul, Korea). The percent metmyoglobin was calculated using the following formula:

$$\text{Metmyoglobin}(\%) = [1.395-(A_{572}- A_{700})/(A_{525}- A_{700})] \times 100$$

where A_λ = Absorbance at λ nm.

Sensory evaluations

The semi-dried chicken jerky were subjected to sensory evaluations. The samples were served to 12 experienced panel members. Panelists were presented with randomly coded samples. The colour (1 = extremely undesirable, 10 = extremely desirable), flavour (1 = extremely undesirable, 10 = extremely desirable), tenderness (1 = extremely tough, 10 = extremely tender), juiciness (1 = extremely dry, 10 = extremely juicy), and overall acceptability (1 = extremely undesirable, 10 = extremely desirable) of the samples were evaluated using 10-point descriptive. Panelists were required to cleanse their palate between samples with water [6].

Statistical analysis

An analysis of variance were performed on all the variables measured using the general linear model (GLM) procedure of the SAS statistical package [7]. The Duncan's multiple range test ($P < 0.05$) was used to determine differences between treatment means.

III. RESULTS AND DISCUSSION

Table 1 show the proximate analysis of semi-dried chicken jerky prepared with various chicken skin. Protein content of CS10 had a lower than others ($P<0.05$). Water content was decreased with increasing of chicken skin level. However, fat content was increased with increasing of chicken skin level. Ash content was significantly decreased with increasing of chicken skin level ($P<0.05$)

Table 1
Proximate analysis of semi-dried chicken jerky prepared with various skin levels

Traits	CON	CS02	CS05	CS10
Protein content (%)	37.58^{A}	37.49^{A}	37.08^{A}	35.97^{B}
Water content (%)	34.50^{A}	33.82^{B}	33.23^{C}	32.98^{C}
Fat content (%)	4.99^{C}	6.28^{B}	6.92^{B}	9.38^{A}
Ash content (%)	6.12^{A}	5.96^{B}	5.81^{C}	5.66^{D}

All values are meat ± standard deviation
$^{A-D}$Mean values with different superscripts within a same column are significantly different (P<0.05).

The physicochemical properties of semi-dried chicken jerky prepared with various skin levels is shown in Table 2. The pH values of chicken jerky generally ranged from 6.12 to 6.22. In this study, the water activity of semi-dried chicken jerky was within the range of 0.78-0.82. The percent metmyoglobin of CON and CS02 had significantly higher than others (P<0.05). The shear force of CON was the highest (P<0.05). There was no difference among the chicken jerky preparations within skin level in drying yield (P>0.05).

Table 2
Comparison on physicochemical properties of semi-dried chicken jerky prepared with various skin levels

Traits	CON	CS02	CS05	CS10
pH	6.16^{D}	6.17^{C}	6.20^{B}	6.22^{A}
Water activity (%)	0.82^{A}	0.82^{A}	0.82^{A}	0.78^{B}
Metmyo-globin (%)	90.75^{A}	90.73^{A}	89.90^{B}	86.01^{C}
Shear force(kg)	12.90^{A}	11.98^{B}	11.69^{B}	11.73^{B}
Drying yields (%)	44.89	45.10	45.25	45.26

All values are meat ± standard deviation
$^{A-D}$Mean values with different superscripts within a same column are significantly different (P<0.05).

The sensory properties of semi-dried chicken jerky prepared with various skin levels are shown in Table 3. There was no difference among the chicken jerky preparations within skin level in colour, flavour, and juiciness (P>0.05). Tenderness and overall acceptability were increased with increasing of chicken skin level.

Table 3
Comparison on sensory properties of semi-dried chicken jerky prepared with various skin levels

Traits	CON	CS02	CS05	CS10
Colour	8.1	8.4	8.4	8.0
Flavour	8.1	8.3	8.4	8.5
Tenderness	7.3^{B}	7.8^{AB}	8.2^{A}	8.3^{A}
Juiciness	7.7	8.2	8.4	8.4
Overall acceptability	7.7^{B}	8.2^{AB}	8.6^{AB}	8.3^{A}

All values are meat ± standard deviation
$^{A-B}$Mean values with different superscripts within a same column are significantly different (P<0.05).

IV. Conclusion

In conclusion, the result of the present study indicated that the effects of chicken skin on quality properties of semi-dried chicken jerky. Water content was decreased with increasing of chicken skin level. Water activity and shear force were decreased with increasing of chicken skin level. However, tenderness and overall acceptability were increased with increasing of chicken skin level.

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