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ARTICLE

Comparison of Meat Characteristics between Korean Native Duck and Imported Commercial Duck Raised under Identical Rearing and Feeding Condition

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Abstract

This research was conducted to compare the meat characteristics of Korean native duck and imported commercial duck. The Korean native ducks and imported commercial ducks (broiler duck: Grimaud) were raised under identical rearing and feeding conditions for 8 wk and 6 wk, respectively. At the end of the rearing period, ten ducks from each group were slaughtered, and breast and leg meat were obtained 24 h after slaughtering for analyses of meat characteristics. The results showed that the breast of Korean native ducks contained lower moisture and fat, and higher protein and water holding capacity (WHC) than those of imported commercial ducks ($p<0.05$). The breast of Korean native ducks also had higher CIE a* and lower CIE L* ($p<0.05$). After cooking, the breast meat of Korean native ducks had higher shear-force, sensory attributes of texture, taste and overall likeness ($p<0.05$). Also, the breast meat of Korean native ducks contained a higher percentage of palmitic acid ($C_{16:0}$) and arachidonic acid ($C_{20:4}$) ($p<0.05$) than those of imported commercial ducks. Furthermore, the leg meat of Korean native ducks contained higher percentages of total unsaturated fatty acid and lower percentages of total saturated fatty acid ($p<0.05$). It is concluded that the meat from Korean native ducks, especially breast meat, had better quality parameters and contained higher amounts of unsaturated fatty acids.

Key words: Korean native duck, imported commercial duck, meat characteristics, fatty acid composition

Introduction

Duck is becoming one of the most popular poultry commodities besides chicken in Asia, especially in East and Southeast Asian countries. Duck meats are well known for its unique flavor and taste, high composition of essential amino acids and high percentage of poly-unsaturated fatty acids (Pingel, 2009). In Korea, duck meat is being serving in restaurant with various cooking methods, such as grilled, smoked, boiled (soup), etc. The demand of duck meat is increasing continuously because a variety of cooking methods and the number of consumers are increasing. Moreover, food companies are trying to develop products made of duck meat, such as ready-to-eat smoked duck, duck sausage, and so on. It is a big challenge for the poultry industry to meet the demand of duck meats.

About 65% of the world duck production was produced in China, while only 1.58% was produced in South Korea in 2007 (Pingel, 2009). The duck production in South Korea has increased continuously within a short period, and this increment resulted not only from the growing population of local breeds, but also from expanding imported commercial ducks from foreign breeding companies. Comparing with imported commercial ducks (included in the Grimoud duck group), Korean native ducks *(Anas platyrhynchos)* have colored-feathers and they grow relatively slowly with poor feed efficiency (Hong *et al.,* 2012). Korean native ducks also have smaller average body weight (2.6 kg) and longer rearing period (8 wk) than that of imported commercial ducks (3.0 kg; 6-7 wk) (Kim *et al.,* 2012a). But, the Korean native ducks have unique meat flavor and texture (Kim *et al.,* 2012a), and

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thus can be developed as an alternative, namely fast-growing commercial breeds.

This study was conducted to compare the meat characteristics of two types of ducks, Korean native ducks and imported commercial ducks which were raised under the identical rearing and feeding condition.

Material and Methods

Animals and management

A total of one hundred-twenty 1-d old Korean native ducklings and imported commercial ducklings (broiler duck: Grimaud) were randomly placed into three replicate pens. Twenty ducklings per each pen were raised for 8 wk (Korean native ducks) or 6 wk (imported commercial ducks). They were fed the same standard diets: starter (23% CP, 3,000 kcal/kg of ME), from 1-d to 3 wk; grower (21% CP, 3,100 kcal/kg of ME), from 3 wk until the end of the experimental period. The experimental diets were formulated to meet or exceed the nutrient requirements of National Research Council (1994) as shown in Table 1. The ducks were set free of access to the diets and water. All animal care procedures were approved by Institutional Animal Care and Use Committee in Konkuk University.

At the end of the experimental period, ten ducks per each group were selected and weighed individually. Mean live body weights of ten ducks selected from each group were 2,717.5±56.6 g (Korean native ducks) and 2,704.4±75.2 g (imported commercial ducks), respectively. They were slaughtered by neck cut, scalded with hot water (60°C for 2 min), and removed the feathers mechanically. The dressing percentage of Korean native ducks and imported commercial ducks were 65.9±4.4 g and 63.3±2.5 g, respectively. Carcasses were eviscerated manually and portioned into commercial cuts such as neck, breast, leg, wing and back. The breast and leg were chilled for 30 min in ice water and transferred to cold room at 5°C for 24 h and then prepared separately for further analyses.

Proximate and pH measurements

The proximate analyses including moisture, crude protein, crude fat and ash were performed using Association of Official Analytical Chemists methods (AOAC, 2007). For pH measurement, 10 g of sample was homogenized at 10,000 rpm for 60 s using a homogenizer (PH91, SMT Co. Ltd., Japan) with 100 mL of distilled water. The pH of meat slurry at room temperature was measured using a pH meter (SevenEasy pH, Mettler-Toledo GmbH, Switzerland).

Table 1. Feed formula and chemical composition of basal diets

Items	Starter	Grower
Yellow corn	40.41	50.88
Wheat	12.00	12.00
Corn gluten meal	6.50	4.56
Soybean meal	25.65	17.17
Canola meal	4.46	6.04
Wheat bran	3.00	2.52
Soybean oil	3.84	3.00
Salt	0.30	0.30
L-Lysine HCl (78%)	0.17	0.10
Choline-Cl (50%)	0.01	0.01
Dicalcium phosphate	1.72	1.37
DL-Methionine (98%)	0.17	0.03
Limestone	1.02	1.27
Vitamin mix[1)]	0.10	0.10
Mineral mix[2)]	0.15	0.15
Pellet binder	0.50	0.50
Total	100.00	100.00
CP, %	23.00	19.00
Ca, %	0.90	0.90
Avail. P, %	0.42	0.35
Total Lys., %	1.21	0.94
Total TSAA, %	1.00	0.75
Limestone	1.00	1.00
MEn, kcal/kg	3,000.00	3,100.00

[1)]Vitamin mixture provided following nutrients per kg of diet: vitamin A, 10,000 IU; vitamin D_3, 2,300 IU; vitamin E, 20 IU; vitamin K_3, 2 mg; vitamin B_1, 2 mg; vitamin B_2, 5 mg; vitamin B_6, 3.5 mg; vitamin B_{12}, 0.02 mg; biotin, 0.12 mg; niacin, 30 mg; pantothenic acid, 10 mg; folic acid, 0.7 mg

[2)]Mineral mixture provided following nutrients per kg of diet: Fe, 70 mg; Zn, 60 mg; Mn, 8 mg; Cu, 7.5 mg; I, 1 mg; Se, 0.2 mg; Co, 0.13 mg

Instrumental color

The instrumental color of fresh breast and leg meat, and cooked breast meat, including lightness (L*), redness (a*), and yellowness (b*) were measured using a color difference meter (CR-400, Konica Minolta Sensing Inc., Japan). For cooked breast meat instrumental color determination, 100 g of breast meat was boiled individually in polyethylene bags immersed in an 80°C water bath for 30 min. The samples were cooled for 30 min and ten times random measurements were taken from each sample. The color instrument was standardized with a white plate (Illuminant C: Y = 93.6, x = 0.3134, and y = 0.3194).

Water holding capacity (WHC), cooking loss and shear-force

The water holding capacity (WHC) was performed according to filter paper pressed method (Grau and Hamm, 1953). Briefly, 0.3 g of breast or leg meat was weighed on a Whatman filter paper (No. 2). The samples were pressed between 2 plexiglass plates for 5 min. The areas of pressed sample and water were measured using a planimeter (Super Planix α, Tamaya Technics Inc., Japan). The WHC was calculated as follows:

WHC (%) = (area of sample/area of water) × 100%.

To determine the cooking loss, 100 g of breast meat or 50 g of leg meat of each sample was boiled individually in polyethylene bags immersed in an 80°C water bath for 30 min. The samples were cooled for 30 min. The initial weights of uncooked and cooked meat were recorded, and the cooking loss was calculated as follows:

Cooking loss (%) = [(uncooked weight-cooked weight)/ uncooked weight] × 100%

After determining the cooking loss, cooked breast meat then were cut into cubes (1.0×1.0×1.0 cm) and the measurements of shear-force was performed using texture analyzer (TA-XT2*i* version 6.06, Stable Micro Systems Ltd., UK). The instrument settings were: maximum cell load: 30 kg; probe pre-test speed: 1 mm/s; test speed: 1 mm/s; post-test speed: 5 mm/s; and cutting distance: 100%. Twelve measurements were performed on each sample and the shear-force values were expressed on kgf.

Sensory evaluations

A sensory panel was asked to evaluate the cooked Korean native ducks and imported commercial ducks. The breast meats were cooked on a polyethylene bags immersed in an 80°C water bath for 30 min. After cooling for 30 min, the sample was cut into a 1×1×1 cm cubes. A panel consisting of 20 people was assigned to score the consumer preference test including color appearance, taste, smell, texture and overall likeness. The preference scores were 9-point hedonic scale, where 1 was “very bad”, 3 was “bad”, 5 was “normal”, 7 was “good”, and 9 was “very good”.

Fatty acid composition

The lipids of breast meat and leg meat were extracted using the methods described by Folch *et al.* (1957). Briefly, 5.0 g of sample was homogenized with 25 mL of chloroform:methanol (2:1, v/v) at 13,500 rpm using a homogenizer (Ultra Turax T25 basic, Ika Werke Gmbh & Co., Germany). The homogenates were added with 0.88% of KCl and then were centrifuged at 3,000 rpm for 10 min. The supernatant was evaporated at 38°C on an N_2 gas blow concentrator (MG 2200, Eyela Co., Japan). The methylation was performed according to AOAC (2007). The fatty acid composition was analyzed in Agilent 6890 N (Agilent Technologies, USA) equipped with automatic sampler Agilent 7683 (Agilent Technologies, USA) using an HP-Innowax (30 m length × 0.32 mm i.d. × 0.25 μm film thickness; Agilent Technologies, USA). One micro liter of sample was injected (split 1:10; 260°C) and then was carried out at a flow rate of 1.0 mL/min using helium. The oven temperature was set at 150°C for 1 min, 150-200°C at 15 °C/min, 200-250°C at 3 °C/min, and 250°C for 5 min. The detector (FID) was set at 280°C.

Statistical analysis

The data were analyzed using SPSS statistic 19.0 for Windows Evaluation Version (2010). Analysis of variance (ANOVA) followed by Duncan’s multiple range tests was used to determine statistical significance among the mean at 95% significance level of proximate, pH, instrumental color, WHC, cooking loss and fatty acid composition. Student t-test was used to determine the significance differences between mean at 95% significance level of shear-force, instrumental color and sensory evaluation of cooked duck breast meat.

Results and Discussion

Proximate analysis and pH

The chemical compositions in breast and leg meat of Korean native ducks and imported commercial ducks are shown in Table 2. Breast meat of Korean native ducks had significantly higher protein and lower fat and moisture content ($p<0.05$) than that of imported commercial ducks. Comparing within duck parts, breast meat also had significantly higher protein content ($p<0.05$) than leg meat. These results showed that Korean native ducks, especially breast meat has an attractive nutritional composition to consumers who are concerned about health. Ali *et al.* (2007) reported that breast meat of Cherry berry ducks had 20.06% of protein content, which was significantly lower than chicken breast meat (22.04%). It is noted that the low fat content in Korean native ducks only can be observed in breast meat. The fat content in leg meat of Korean native ducks was the highest among the data ($p<0.05$). Our research had similar chemical composition to Ali *et al.* (2007), but the protein content of Korean native ducks was similar to that of chicken breast meat (21.90% vs 22.04%). Fat content in breast and leg meat of Korean native ducks was lower than that of Spanish wild duck (*Anas platyrhynchos*). Cobos *et al.* (2000)

Table 2. Proximate analysis (%), pH, water holding capacity (WHC; %), cooking loss (%), and instrumental color of breast and leg meat of Korean native ducks and imported commercial ducks raised under identical rearing and feeding condition

Parameters	Korean native ducks		Imported commercial ducks	
	Breast	Leg	Breast	Leg
Proximate				
Moisture	75.77±0.35^{c}	76.35±0.73^{b}	76.91±0.39^{b}	77.11±0.45^{a}
Ash	1.10±0.22^{a}	0.89±0.10^{b}	1.12±0.08^{a}	0.93±0.10^{b}
Protein	21.84±0.92^{a}	19.36±1.10^{b}	20.19±1.16^{b}	19.29±1.13^{b}
Fat	1.30±0.17^{d}	3.40±1.83^{a}	1.79±0.53^{c}	2.67±1.43^{b}
pH	5.67±0.02^{c}	6.75±0.09^{a}	5.73±0.06^{c}	6.63±0.12^{b}
WHC	48.17±4.42^{b}	59.58±10.55^{a}	36.54±2.99^{c}	65.90±9.85^{a}
Cooking loss	31.52±1.35^{a}	32.21±4.57^{a}	31.80±2.12^{a}	28.73±4.33^{a}
Instrumental color				
CIE L*	44.90±1.90^{c}	48.29±2.26^{b}	49.53±1.95^{a}	47.93±2.79^{b}
CIE a*	14.40±1.35^{b}	15.55±2.49^{a}	13.50±1.53^{c}	13.53±1.44^{c}
CIE b*	6.86±0.91^{c}	9.15±1.88^{a}	8.25±1.22^{b}	7.33±1.56^{c}

Data are presented as Means±SD (Standard deviation, n=12)

$^{a-d}$Values within each row with different superscripts are significantly different (p<0.05).

reported that breast meat of Spanish wild ducks had 3.39% of fat content and leg meat of the same breed had 3.84%. As customers are concerned more about their health related with fat intake, they seem to believe that the breast meats of Korean native ducks are good for health.

pH had no significant difference between breast meat of Korean native ducks and imported commercial ducks (5.67 and 5.73, respectively). pH values of Korean native ducks and imported commercial ducks were similar to breast meat of Pekin ducks (Kim *et al.,* 2012b) and broiler chickens (Wattanachant *et al.,* 2004), but were lower than that of any other duck breeds. For example, Mazanowski *et al.* (2003) reported that pH of A44 and A55 strains of ducks were 6.0 and 6.4, respectively. pH value might be various depending on the breeds, feeds, and postmortem condition. Alvarado and Sams (2000) reported that pH of breast meat of White Pekin ducks decreased as postmortem time increased. Significantly different pH was observed depending on parts of meat. Namely, the pH of leg meat was higher than that of breast meat in both Korean native ducks and imported commercial ducks (p<0.05). It was also observed that leg meat of Korean native ducks had higher pH than that of imported commercial ducks (p< 0.05). According to Lyon *et al.* (1984) and Wang *et al.* (2009), breast meat of broiler chickens had lower pH than that of leg meat.

Water holding capacity and cooking loss

WHC and cooking loss were observed as shown in Table 2. WHC of Korean native ducks (48.17%) was higher than that of imported commercial ducks (36.54%). Kim *et al.* (2012b) also reported that Pekin ducks had similar WHC (45.43%) to breast meat of Korean native ducks. Leg meat of both duck breeds had higher WHC than breast meat (p<0.05). No significant difference was observed in cooking loss between Korean native ducks and imported commercial ducks (31.80 and 31.52%). For reference, breast meat of Cherry berry ducks had 34.48% of cooking loss (Ali *et al.,* 2007), and White Pekin ducks deboned after 0.25 h had 31.26% of cooking loss (Alvarado and Sams, 2000). Alvarado and Sams (2000) also stated that cooking loss of duck meat varied according to different deboning time. There was no statistical difference of cooking loss between breast and leg meat in both Korean native ducks and imported commercial ducks. These results were different from the research done by Wattanachant *et al*. (2004), in which breast meat had higher cooking loss than leg meat in broiler chickens, but lower cooking loss in Thai Indigenous chickens.

Instrumental color of fresh meat

Color is one of the most important quality parameters, and especially red color of fresh meat is the most affected consumers' purchasing (Mancini and Hunt, 2005). The instrumental color evaluation of fresh meat (Table 2) showed that the Korean native ducks had significantly higher redness (CIE a*) in both breast and leg meat than that of imported commercial ducks (p<0.05), but it had lower lightness (CIE L*) and yellowness (CIE b*) in breast meat than that of imported commercial ducks (p<0.05). Comparing with results of other study, the redness of breast meat of Korean native ducks (14.40) was lower than that of Cherry berry ducks (15.50) (Ali *et al.,* 2007) and Pekin ducks (15.61) (Kim *et al.,* 2012b). It was reported that duck breast meat had higher redness than broiler breast meat (Ali *et al.,* 2007; Wattanachant, 2004). The leg meat of Korean native ducks had higher redness than the breast meat, and showed the highest value among the 4 parts of treatments ($p<0.05$). A similar result was reported that leg meat had higher CIE a* than breast meat in broiler and Thai indigenous chickens (Wattanachant *et al.*, 2004).

Shear-force, instrumental color and sensory evaluation of cooked breast meat

Shear-force, instrumental color and sensory evaluation scores of cooked duck breast meat were observed as shown in Table 3. It is known that ducks meat had unique texture compared to other poultry meat (Pingel, 2009). The shear-force of Korean native ducks (3.81 kg/cm^3) was significantly higher ($p<0.05$) than that of imported commercial duck (2.73 kg/cm^3). Shear-force of Korean native ducks was similar to that of Chungdongori *(Anas platyrhynchos*) (Ali *et al.,* 2008) and Pekin ducks (Kim *et al.,* 2012b), in which the shear-forces were 3.76 and 4.18 kg/cm^3 respectively. The higher shear-force measured from Korean native ducks than imported commercial ducks might be related with genetic characteristics of the breed and the different slaughter age. It was reported that Korean native ducks grow relatively slowly with poor feed efficiency (Hong *et al.,* 2012) and have unique meat texture (Kim *et al.,* 2012a). And, on our study, the slaughter age of Korean native ducks (8 wk) was older than commercial native ducks (6 wk). Lyon and Hamm (1984) and Abdullah *et al.* (2010) stated that hardness of broiler breast meat increased with the increment of age. The result of instrumental shear-force was similar with the texture scores from the sensory evaluation (Table 3). The panels scored 7.2±1.5 in the texture of cooked breast meat of Korean native ducks, and it was significantly higher than the score of imported commercial ducks (5.8±1.7).

Table 3. The shear-force (kg/cm^3), instrumental color, and sensory evaluation of cooked breast meat of Korean native ducks and imported commercial ducks raised under identical rearing and feeding condition

Parameters	Korean native ducks	Imported commercial ducks
Shear-force	3.81±1.49^a	2.73±1.22^b
Instrumental color		
CIE L*	58.22±1.68^b	65.30±1.59^a
CIEa*	6.65±0.48^a	6.87±0.94^a
CIE b*	10.92±0.67^b	12.12±0.70^a
Sensory evaluation		
Color	6.4±2.2^a	6.2±1.2^a
Taste	7.4±1.5^a	6.0±0.9^b
Smell	6.4±0.8^a	5.8±1.2^a
Texture	7.2±1.5^a	5.8±1.7^b
Overall likeness	7.6±1.4^a	6.4±1.3^b

Data are presented as Means ± SD (Standard deviation)

[a,b]Values within each row with different superscripts are significantly different ($p<0.05$).

For instrument color, cooked duck breast had no difference in redness between Korean native ducks and imported commercial ducks ($p>0.05$), but lightness and yellowness of cooked breast of Korean native ducks were lower than that of imported commercial ducks ($p<0.05$). Even though a significance higher redness was found in fresh meat of Korean native ducks, there was no statistical difference of redness in cooked breast meat between two different duck breeds. Moreover, cooked breast Korean native ducks had a greater decrease of redness than imported commercial ducks, as the results the redness of Korean native ducks was numerically lower than that of imported commercial ducks (6.65±0.48 and 6.87±0.94, respectively). It is assumed that the greater decrease of redness after cooking in breast meat of Korean native ducks might be attributed to the greater pigments' denaturation caused by specific biochemical condition. Holownia *et al.* (2003) stated that biochemical conditions such as pH, redox potential, reacting ligands of the meat are related to structure and reactivity of the pigment in cooked meat. Additionally, pre-slaughter factors such as genetic, age and sex also played role in color and myoglobin concentration in poultry meat (Froning *et al.,* 1968).

According to the sensory evaluated by the panels, average scores for the taste attributes of cooked breast of Korean native ducks was significantly higher than that of imported commercial ducks (7.14±1.5 and 6.0±0.9) ($p<0.05$). Moreover, the average score of overall likeness of Korean native ducks also was significantly higher than that of imported commercial ducks ($p<0.05$). Therefore, the sensory quality of cooked breast meat of Korean native ducks was better than that of imported commercial ducks.

Fatty acid composition

The fatty acid composition of breast and leg meat of Korean native ducks and imported commercial ducks are shown in Table 4. The major fatty acid composition in both breeds was oleic acid ($C_{18:1}$; 32.66-41.10%), linoleic acid ($C_{18:2}$; 24.40-27.44%), and palmitic acid ($C_{16:0}$;

Table 4. Fatty acid composition (%) of Korean native ducks and imported commercial ducks raised under identical rearing and feeding condition

Fatty acid	Korean native ducks		Imported commercial ducks	
	Breast	Leg	Breast	Leg
Mystiric acid ($C_{14:0}$)	0.57±0.05[a]	0.55±0.04[a]	0.55±0.04[a]	0.61±0.03[a]
Palmitic acid ($C_{16:0}$)	24.12±1.02[a]	21.35±0.66[c]	23.09±0.23[b]	21.52±0.55[c]
Stearic acid ($C_{18:0}$)	10.08±1.33[a]	6.70±0.59[c]	10.34±1.22[a]	8.25±0.55[b]
Oleic acid ($C_{18:1}$)	32.66±3.39[b]	41.10±1.68[a]	34.64±4.39[b]	38.69±2.01[a]
Linoleic acid ($C_{18:2}$)	24.40±1.08[b]	27.44±0.64[a]	25.20±1.41[b]	27.40±2.29[a]
Linolenic acid ($C_{18:3}$)	0.08±0.02[a]	0.08±0.01[a]	0.07±0.03[a]	0.08±0.01[a]
Cis-eicosenic acid ($C_{20:1}$)	0.46±0.06[b]	0.56±0.05[a]	0.53±0.07[a]	0.53±0.01[a]
Arachidonic acid ($C_{20:4}$)	7.50±2.10[a]	2.11±0.70[c]	5.44±1.88[b]	2.80±0.78[c]
Eicosepentaenoic acid ($C_{20:5}$)	0.11±0.03[a]	0.10±0.02[a]	0.13±0.02[a]	0.12±0.01[a]
ΣSFA	34.78±2.31[a]	28.60±1.05[c]	33.99±1.32[a]	30.38±0.44[b]
ΣUFA	65.21±2.30[c]	71.40±1.05[a]	66.00±1.32[c]	69.61±0.44[b]
ΣMUFA	33.11±3.44[b]	41.67±1.70[a]	35.17±4.43[b]	39.22±2.01[a]
ΣPUFA	32.10±1.41[a]	29.73±0.94[b]	30.84±1.17[b]	30.40±1.76[b]
Σn-6	31.91±1.38[a]	29.55±0.93[b]	30.64±1.14[b]	30.20±1.76[b]
Σn-3	0.19±0.03[a]	0.17±0.02[a]	0.20±0.03[a]	0.19±0.02[a]

Data are presented as Means ± SD (Standard deviation, n=12)

[a-d]Values within each row with different superscripts are significantly different (p<0.05).

21.35-24.12%). The percentage of other fatty acids such as stearic acid ($C_{18:0}$) and arachidonic acid ($C_{20:4}$) were 6.70-10.34% and 2.11-7.50% respectively, and the rest fatty acids were below 1%. Breast meat of Korean native ducks had more percentage of palmitic acid and arachidonic acid, total PUFA and total n-6 fatty acids than those of imported commercial ducks (p<0.05). Similar to this result, Cobos *et al.* (2000) reported that the major fatty acids in breast meat of Spanish wild ducks were $C_{16:0}$, $C_{18:0}$, $C_{18:1}$, $C_{18:2}$ and $C_{20:4}$.

The fatty acid composition of duck breast and leg meat is showing the characteristics of each. The leg meat of both Korean native ducks and imported commercial ducks contained higher percentage of oleic and linoleic acid, but contained lower percentage of palmitic acid, stearic acid and arachidonic acid than breast meat. Cobos *et al.* (2000) reported that leg meat of Spanish wild ducks had lower arachidonic acid than breast meat of the same breed. According to Wang *et al.* (2009), leg meat of Cherry berry ducks had 25% of arachidonic acid among total fatty acids. On the other hand, leg meat of Korean native ducks and imported commercial ducks showed lower level of arachidonic acid (2.11 and 2.80%, respectively). Leg meat also contained higher percentage of total unsaturated fatty acids, especially total monounsaturated fatty acid (MUFA) than breast meat, and lower percentage of saturated fatty acids than breast meat regardless of two breeds. In case of chicken meat, Wattanachant *et al.* (2004) reported that the percentage of fatty acid composition of leg meat and breast meat of broiler chickens were similar statistically.

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