

Comparison of Cut Meat Yield from Two Different Breeds of Broilers in Korea

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ABSTRACT This study was carried out to compare the cut meat yields of Cobb and Avian and their profits at productive aspect. Two different breeds, Cobb (34,086,758 birds) and Avian (4,087,600 birds) produced from January 2009 to August 2009 were used. The whole chickens were divided into cut meats including tenderloins, breast fillets, whole wings, boneless thighs, and drumsticks. The growth performance and cut meat yield of Cobb and Avian were measured to investigate possible profit difference. Cobb was superior in the aspect of production performance to Avian with significant differences in survival rate and slaughtering age. As the weight gained, the yields of Cobb increased in breast fillets and boneless thighs as well as lean meat percentage. Significantly higher yield (%) of breast fillets was produced by Cobb at size 14 when compared with Avian. However, there was no significant difference in expected market prices for both cut meat and whole chicken meat between the two breeds in all sizes.

(Key words : Cobb, Avian, cut meat yield, expected market price)

INTRODUCTION

Meat consumption in Korea increased approximately 17 times from 1956 (6.10 kg/person) to 2006 (105.33 kg/person). Economic growth in terms of per capita income brought a change on food consumption in Korea (265.1 times compared to 1956). As meat consumption increased, domestic animal number was grown by 2.8 (cattle), 7.4 (pig), and 13.3 (chicken) times during the last 50 years (Nam et al., 2010). Among the animals, chicken number in Korea recorded the highest increase rate. Since 2005, chicken meat produced in Korea has increased from 451 to 660 kilotons and its consumption drew a potential growth from 508 to 755 kilotons (USDA, 2011).

Considerable increases in chicken meat have been occurred because of its excellent nutrition value and good impression to the consumers as an emerging well-being food. Compared to beef and pork, chicken meat contains higher protein but lower fat and cholesterol contents (Lee, 2005). Furthermore, its fatty acid contents are composed of higher unsaturated fatty acid (%), especially, polyunsaturated fatty acid. Along with the advantages in nutrition value, chicken meat is cheaper and easier to process as processed meat finally providing a nutritious food source at better price and making the consu-

mers more convenient in cooking (Lee, 2005). Due to modern life pattern, which is characterized as fast and convenience, chicken consumption is mainly based on cuts and processed meat products rather than whole chicken (Park and Yu, 1998). Furthermore, the consumers are able to choose cuts as their preferences so that consumption of cuts and processed meat products seems to be even raised to fit the modern preferences of their life style and appetite.

There are 4 dominant broiler breeds in Korea which are Cobb500TM (Cobb), CobbAvian48TM (Avian), Ross, and Arbor acres. Based on the data in 2010, Cobb and Avian occupied 27% among them (Korean Chicken Council, 2010). For the cut meat production, however, there is no information available in the difference of yield and profit among the broiler breeds reared in Korea. Therefore, this study was carried out to compare the cut meat yields of Cobb and Avian reared in Korea and their profits at farmers' aspect.

MATERIALS AND METHODS

1. Experimental Animals

Two different breeds, Cobb (34,086,758 birds) and Avian (4,087,600 birds), were used for this study and obtained from

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a local producer (Harim Co., Ltd) reared from January 2009 to August 2009 with 7 production cycles. Two broiler breeds were reared in the same environment and feed and within normal production practice in the farm. After slaughtering in a commercial slaughter house, the whole chickens were divided into different size including No. 12 (1,151~1,250 g), No. 13 (1,251~1,350 g), and No. 14 (1,351~1,450 g) on the basis of Korea Institute of Animal Quality Evaluation Guideline. Those sizes were selected because they are the most favorable for cut meat production. For each size, 30 chickens were randomly selected (3 sizes \times 2 breeds, 180 birds in total for each production cycle) and transferred into a 4°C cold room for 24 hrs. Then, whole chicken was divided into cut meat.

2. Growth Performance and Sample Preparation

The survival rate was calculated as input number of birds divided by final slaughtered birds at each production cycle. Feed conversion rate and average weight at slaughter was calculated in whole period. Average weight divided by feed intake was expressed as feed conversion rate.

3. Value Expectation

The weight of whole chicken and cut meats including tenderloins, breast fillets, whole wings, boneless thighs, and drumsticks were measured. The average market price of chicken cut meat in 2010 was used to evaluate value expectation for breed comparison. The used cut meat price of tenderloins, breast fillets, whole wings, boneless thighs, and drumsticks were 6,970, 6,970, 7,248, 9,028, and 6,777 Korean won/kg, respectively (Korean Chicken Council, 2010). The average whole chicken price was 2,062 Korean won at that time.

4. Statistical Analysis

Statistical analysis was performed by one-way Analysis of

Variance (ANOVA), and significant differences between mean values were identified by Student-Newman-Keul's multiple range test using SAS software with a confidence level at $p < 0.05$ (SAS, Release 9.2, SAS Institute Inc., Cary, NC). Mean values and standard error of the means (SEM) are reported.

RESULTS AND DISCUSSION

A significant difference in survival rate between Cobb and Avian was observed in final numbers of 4,087,600 and 34,086,758 birds at slaughter, respectively (Table 1). The growth performance of birds examined from January to August in 2009. It was shown that the slaughtering age of Cobb was younger than that of Avian ($p < 0.05$). Lee et al. (2011) referred to slaughtering age of broiler in Korea is 35 days in average, and the slaughtering age in this study was younger in two breeds, Cobb and Avian, which can be interpreted that the both breeds were superior than the previous study. Cobb was slaughtered significantly at earlier age (30.87 days) compared to Avian (32.43 days).

When it comes to production cost, feed cost was rated as the main portion (59.3%, Statistics Korea, 2011) but there were no major differences in average weight and feed conversion of both breeds. Even though the livestock cost is the second largest (24.9%) in the production cost, it was not considered in this study. Operating cost was reported to be 1,292 won/kg in 2010 which is as important as the production cost (1,341 won/kg) (Statistics Korea, 2011). In this study, Avian breed might have a higher operating cost because of its late slaughtering age. Considering the above, Cobb seems to be superior in the aspect of production performance to Avian.

The yields of cut meat of different breeds and weight classes are shown in Table 2. At size 12, Cobb produced significantly higher yield of tenderloins and lower yield of boneless

Table 1. The growth performance of Cobb and Avian breed in Korea

Breed	Final number ¹	Survival rate (%)	Slaughtering age (day)	Average weight at slaughter (kg)	Feed conversion rate
Cobb	4,087,600	96.08±1.03 ^a	30.87±1.31 ^b	1.53±0.09	1.65±0.07
Avian	34,086,758	94.47±1.04 ^b	32.43±0.51 ^a	1.54±0.04	1.67±0.06

¹ The total chicken numbers tested from January 2009 to August 2009.

^{a,b} Different letters within the same column differ significantly ($p < 0.05$).

thighs when compared to Avian. However, no significant differences in the yields of these cuts were observed at size 13 and 14 in spite of similar tendency. Instead, significantly higher yield of breast fillets was produced by Cobb at size 14 when compared with Avian.

As the weight gained, the yields of Cobb increased in breast fillets and boneless thighs as well as lean meat percentage. It can be concluded that the growth in breast fillets had significant impact on the increase of lean meat percentage and this increase might influence on profit (Table 2). It is not easy to find the study in cut meat yield of different breeds from broilers. However, Bang et al. (2009) investigated the growth performance and cut meat yield of 3 different duck breeds including Cherry valley, Grimaud, and F1, and reported that the growth performance, the yields of breast fillet and boneless thighs, and lean meat percentage were different among breeds.

Expected market price from cut meat yield of two breeds was calculated using the data given in section 2.2. Along with the increased breast fillets and lean meat percentage of Cobb, the expected market price resulted in higher value but there was no difference found in the expected market price on the basis of whole chicken meat (Table 3). Avian had superior value at size 12 due to higher amount of its boneless thighs (176.34 g), resulting in significantly higher expected market price (50.9 Korean won difference). Even though tenderloins of Cobb (404.37 Korean won) and its profit were higher than Avian (372.20 Korean won), it was not a main

factor due to its lower price (6,771 won/kg). Higher amount of Cobb's tenderloins made a difference about 32.17 won/kg when compared with Avian. Breast fillets and boneless thighs were the most valuable cuts of Avian but their yields were not increased with the weight gain. At each size, breast fillets appeared to have a big influence on market value compared with the other cut meats. Boneless thighs were the second key factors affecting market value among the cuts, however, there were no significant differences between the two breeds except for size 12. It was revealed that the yield of breast fillets was significantly increased in Cobb when the size of a bird was larger (Table 2). However, when the overall market price of different cut meats in different breeds are considered, there was no significant difference in whole market price between the two breeds in all sizes (Table 3).

In conclusion, there was no difference in overall market price per a bird after cut meat production between the two breeds, Cobb and Avian. However, there were some differences in survival rate and slaughtering age, which showed superior in Cobb.

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Table 2. Cut meat yield (%) of different breeds by weight standard

Size standard	Breed	Tenderloin	Breast fillet	Whole wing	Boneless thigh	Drumstick	Lean meat percentage ¹
Size 12	Cobb	4.95±0.48 ^a	19.13±1.54 ^y	9.11±0.36	14.13±0.74 ^{by}	13.50±0.79	60.82±1.50 ^y
	Avian	4.56±0.43 ^b	18.94±1.62 ^y	9.16±0.41	14.63±0.89 ^a	13.65±0.82	60.94±1.98
Size 13	Cobb	4.88±0.26	19.83±1.17 ^x	9.15±0.30	14.45±0.72 ^{xy}	13.45±0.72	61.76±1.31 ^x
	Avian	4.75±0.48	19.76±1.36 ^x	9.03±0.32	14.58±0.75	13.70±0.69	61.81±1.46
Size 14	Cobb	4.90±0.34	20.30±1.26 ^{ax}	9.07±0.36	14.53±0.74 ^x	13.22±0.72	62.02±1.24 ^x
	Avian	4.78±0.40	19.57±1.13 ^{bxy}	9.07±0.37	14.48±0.66	13.50±0.72	61.40±1.38

^{a,b} Different letters within the same column in different breeds within the same size differ significantly ($p < 0.05$).

^{x,y} Different letters within the same column in different size within the same breeds differ significantly ($p < 0.05$).

¹ (Weight of lean meat/weight of carcass)×100.

Table 3. The yield and expected market price of cut meat from two different broiler breeds with different weight standard

Size standard	Cut	Yield (g)		Expected market price (won/carcass)	
		Cobb	Avian	Cobb	Avian
Size 12	Tenderloins	59.72±5.65 ^a	54.97±5.12 ^b	404.37 ^a	372.20 ^b
	Breast fillets	231.05±18.34	228.47±22.95	1,610.67	1,595.67
	Whole wings	110.12±5.45	110.40±5.46	798.17	800.20
	Boneless thighs	170.70±8.79 ^b	176.34±12.51 ^a	1,541.42 ^b	1,592.32 ^a
	Drumsticks	163.13±11.46	164.61±11.75	1,105.88	1,115.89
	Subtotal (Korean won/carcass)			5,460.51	5,476.28
Size 13	Tenderloins	63.35±3.61	61.78±6.56	428.92	418.31
	Breast fillets	257.27±16.43	257.18±19.66	1,793.41	1,792.78
	Whole wings	118.70±4.92	117.54±5.67	860.34	851.95
	Boneless thighs	187.45±11.05	189.65±10.63	1,692.70	1,712.54
	Drumsticks	174.50±11.10	178.23±10.32	1,182.91	1,208.22
	Subtotal (Korean won/carcass)			5,958.28	5,983.80
Size 14	Tenderloins	68.02±4.75	66.92±6.35	460.54	453.09
	Breast fillets	281.75±20.25	273.97±15.83	1,964.08	1,909.82
	Whole wings	125.90±6.17	126.95±5.93	912.55	920.16
	Boneless thighs	201.56±11.18	202.79±10.86	1,820.09	1,831.16
	Drumsticks	183.43±11.63	189.06±12.32	1,243.45	1,281.64
	Subtotal (Korean won/carcass)			6,400.71	6,395.87
Mean (Korean won/carcass)				5,939.83	5,951.98

^{a,b} Different letters within the same row in different breeds within the same weight standard differ significantly ($p < 0.05$).

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