COMPARISON OF MEAT COLOR BETWEEN ORGANIC AND CONVENTIONAL KOREAN BLACK PIGS

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Introduction

Economic pressure on pig industry has resulted in intensive production system in order to decrease production costs. In recent years, animal health, welfare and environment-friendly production have been more and more attracted public concern. Furthermore, the production of lean meat to meet consumers' demands for low-fat pork has resulted in a substantial decrease of intramuscular fat levels and an increased concern that eating quality may be consequently reduced (Cisneros et al., 1996). To face these new challenges, alternative production methods such as organic livestock farming have been developed. Organic farming puts more emphasis on the production system to meet the demands of a specific consumer segment (Sundrum, 1998). According to the basic standards of IFOAM (1996), organic livestock farming is primarily based on home-grown feedstuffs with the objective of establishing an almost complete on-farm nutrient cycle.

At the point of sale, selection will be dependent on the perceived pork quality in terms of its physical appearance (Bredahl, 1998). Color of meat or meat products is an important quality attribute that influences consumer acceptance of the meat. Consumers prefer bright-red fresh meats, brown-gray cooked meats (Cornforth, 1994). Due to the extensive production, there is doubt whether organic production can meet the demands of high carcass quality (Sundrum, 2000). There is, however, very little information on the impact of organic feeding regimes on growth and meat color of black pigs. Therefore, the objective of the study is to compare between organic and conventional Korean black pigs, in order to reveal differences in meat color.

Materials and Methods

Sixty barrows (Korean Black Pigs) were divided into two groups and fed two different diets, one conventional (30 animal) and the other organic bred pigs (30 animal). As shown in Table 1, organic pigs were raised restrictedly for 11 months in accordance with the Korean Organic Standard, while conventional pigs were fed for 8 months in a conventional manner. All pigs were slaughtered at a commercial abattoir and sampled from a market-weighted industrial population (carcass weight: 90.00±2.7 kg). Samples of the M. *longissimus dorsi* (LD) were transported to the National Livestock Research Institute (NLRI) for analyses.

Meat color was measured with colorimeter (Croma Meter, CR300, Minolta Camera Company, Japan) set for L* (lightness), a* (redness), and b* (yellowness) values. It was standardized with a white tile (D65 Y= 93.0, x = 0.3133, y = 0.3194). The relative contents of Mb, MbO and MetMb were calculated from the reflectance curve according to Krzywicki (1982). Reflectance values at wavelengths not given by the instrument (473, 525 and 572 nm) were calculated using linear interpolation. The Statistical Analysis System (1998) was used to determine means, standard errors and analysis of variance. T- test was used to compare differences between conventional and organic pigs. An alpha level $P < 0.05$ was used to determine significance.

Results and Discussion

The CIE L-value of the conventional pork was significantly higher than that of the organic one ($P < 0.05$). However, the CIE a- and b- value of the conventional was significantly lower than that of the organic one ($P < 0.05$). There were no significant differences in MbO and MetMb between conventional and organic samples ($P>0.05$). However, the conventional pork had lower total Mb than the organic one ($P<0.05$). From these results, the organic pork became more yellow, less light and had higher total myoglobin, due to difference between conventional and organic diet. Further studies should be tried in relation to other meat quality factors between conventional and organic pigs.

Conclusions

In the view of above results, the color of organic pork from Korean Black Pigs was more reddish than that of conventional one. This may be advantageous to marketing. It is thought that Korean consumers regard pork color as an important quality trait and tend to choose red color.

Table 1. Ingredient composition (%) of the experimental diets for Korean Black Pigs

Ingredient	Conventional diet	Organic diet
Crude protein (%)	17	17
Crude fat (%)	4	2.5
Calcium (%)	0.45	0.5
P (%)	0.4	0.5
Ash (%)	8	10
Crude fiber (%)	6	8
L-lysine (%)	0.85	0.9
Calrorie (cal/g)	3550	3450

Table 2. Color value and Myoglobin contents of M. *longissimus* muscle between conventional and organic pork from Korean Black Pigs

	Conventional (n=30)		Organic (n=30)	
	Mean	SE	Mean	SE
CIE L	53.57^{A}	0.60	48.74^{B}	1.15
a	6.81^{B}	0.16	8.17^{A}	0.52
b	2.93^{B}	0.19	3.46^{A}	0.61
Hunter L	46.07^{A}	0.60	41.46^{B}	1.23
a	5.66	0.15	6.57	0.48
b	2.17	0.14	2.69	0.23
MbO	0.20	0.01	0.20	0.03
MetMb	0.30	0.01	0.30	0.03
Total Mb	0.38B	0.01	0.50A	0.06

$^{A-B}$ Values with different superscripts in the same row differ significantly ($P<0.05$)

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