COMPARISON OF INTRAMUSCULAR FAT, DRIP LOSS, CIE A* VALUE, FATTY ACIDS AND AROMA PATTERN IN PORK FROM THREE DIFFERENT BREEDS

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Introduction

Korean native black pigs originated from wild small species among black pigs from Manturia and settled in the Korean Peninsula almost 2,000 years ago as domesticated animals. Kang *et al.* (2005) suggested Korean native black pork had greater water-holding capacity, colour stability and sensory quality during refrigerated storage. There are also wild pigs (*Sus scrofa creanus*) that are native pigs in Korea. Because of the importance of original gene sources, many Korean researchers are actively studying native livestock as well as wild animals in several fields (Choi *et al.*, 2005; Chung *et al.*, 2001; Kim *et al.*, 2001; Lee *et al.*, 2005). Therefore, this study was carried out to compare the intramuscular fat, CIE a* value, fatty acids and aroma pattern in *M. longissimus* from pigs of 3 different breeds such as wild pigs, Korean native black pigs and modern genotype pigs.

Materials and Methods

M. longissimus from 5 wild pigs (*Sus scrofa creanus*, WP) of 111kg, 5 Korean native black barrows (KNP) of 64kg and 5 modern genotype barrows (Landrace×Yorkshire, MGP) of 114kg were utilised for quality measurements. The wild pigs consisted of 1 boar of 100%, 1 barrow and 2 gilts of 50% (100% wild boar×100% modern genotype gilt) and 1gilt of 25% (50% wild boar×50% modern genotype gilt). After slaughter, carcasses were chilled at 2°C for 24 hr and then deboned. The 3cm thick samples were packaged in low density polyethylene zipper bags and stored at 2±0.3°C refrigerator (CRF1021D, Samsung, Korea) for 12 days. Intramuscular fat (IMF, %) and drip loss (%) were performed as a described by AOAC (1995) and Honikel (1998), respectively. The CIE a* value (redness) was measured using a colour difference meter (CR-400, Konica Minolta Sensing Inc., Japan). The discrimination of meaty aroma pattern by principal component analysis (PCA) was analyzed using an electronic nose (FOX 3000, Alpha MOS, France). The fatty acid methyl esters (AOAC, 1995) were analyzed using the Agilent 6890N GC equipped with a HP-Innowax column (30 m length×0.32 mm id×0.25 μm film thickness). Data was analysed using the General Linear Model procedure of the SAS (1999) program.

Results and Discussion

IMF was significantly higher in KNP than in WP and MGP ($P<0.05$) (Figure 1). Drip loss was significantly lower in MGP than in the others during storage ($P<0.05$) (Figure 2). The CIE a* value (redness) was significantly higher in KNP than in the others during storage ($P<0.001$) (Figure 3). The PCA by electronic nose of *M. longissimus* from WP, KNP and MGP is presented in Figure 4. Aroma pattern of all breeds was perfectly discriminated by electronic nose. Therefore, we could discriminate between pork of 3 breeds by using PCA method from electronic nose. The fatty acid composition of *M. longissimus* from WP, KNP and MGP is presented in Table 1. SFA was significantly lower in WP than in KNP ($P<0.05$) but UFA and PUFA n3 were significantly higher in WP than in KNP ($P<0.05$). MUFA and MUFA/SFA ratio were significantly higher in WP and MGP than in KNP ($P<0.05$, $P<0.01$, respectively) and UFA/SFA ratio was significantly highest in WP ($P<0.05$). However, there were no significant differences in PUFA, PUFA/SFA ratio and PUFA n6 between the breeds. PUFA n6/n3 ratio was significantly lowest in MGP and significantly lower in WP than in KNP ($P<0.0001$).

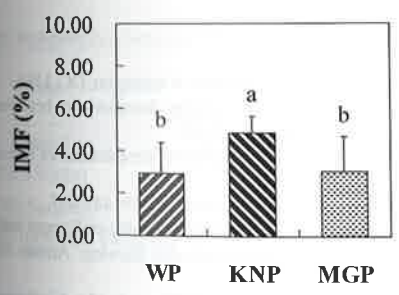

Figure 1: Comparison of intramuscular fat of *M. longissimus* from wild pigs, Korean native black pigs and modern genotype pigs.

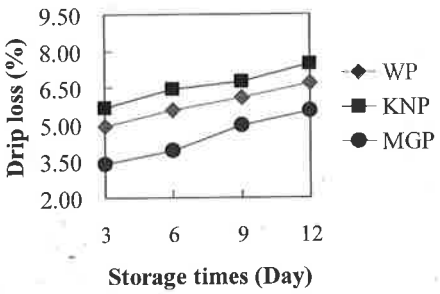

Figure 2: Comparison of drip loss of *M. longissimus* from wild pigs, Korean native black pigs and modern genotype pigs during refrigerated storage.

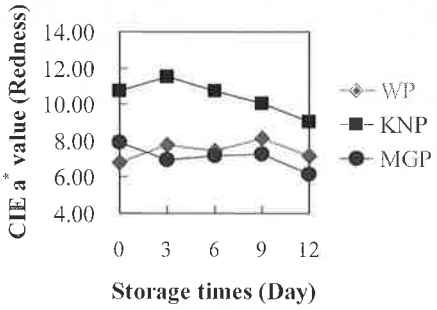

Figure 3: Comparison of CIE a* value (redness) of *M. longissimus* from wild pigs, Korean native black pigs and modern genotype pigs during refrigerated storage.

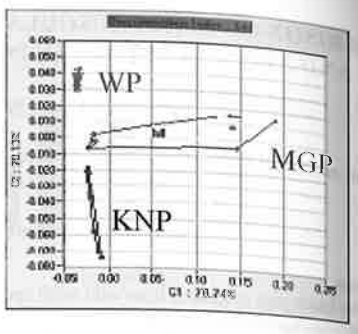

Figure 4: Comparison of PCA by electronic nose of *M. longissimus* from wild pigs, Korean native black pigs and modern genotype pigs.

Table 1: Comparison of fatty acid composition (%) of *M. longissimus* from wild pigs, Korean native black pigs and modern genotype pigs.

Items	Breed			SEM[A]	P^B
	WP	KNP	MGP		
Saturated fatty acid (SFA)	38.44[b]	42.05[a]	40.58[ab]	0.491	*
Unsaturated fatty acid (UFA)	61.56[a]	57.95[b]	59.42[ab]	0.494	*
Total	100.00	100.00	100.00		
Monounsaturated fatty acid (MUFA)	48.43[a]	46.69[b]	48.52[a]	0.326	*
Polyunsaturated fatty acid (PUFA)	13.13	11.26	10.90	0.529	ns
UFA/SFA	1.60[a]	1.38[b]	1.46[b]	0.029	*
MUFA/SFA	1.26[a]	1.11[b]	1.20[a]	0.017	**
PUFA/SFA	0.34	0.27	0.27	0.016	ns
PUFA n6	12.33	10.65	10.14	0.499	ns
PUFA n3	0.80[a]	0.60[b]	0.76[ab]	0.036	*
PUFA n6/n3	15.41[b]	17.75[a]	13.34[c]	0.559	****

[a,b,c] Means in the same row with different superscripts are significantly different.

[A] Standard error of the mean.

[B] ns, not significant; *, $P<0.05$; **, $P<0.01$; ***, $P<0.001$; ****, $P<0.0001$.

Conclusions

KNP had the highest IMF and the reddest colour value during refrigerated storage. MGP had the best water-holding capacity during refrigerated storage and wild pork had the highest UFA/SFA ratio. The pork from 3 different breeds could be discriminated by different aroma patterns using an electronic nose.

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