

Comparison of Fatty Acids, Amino Acids and Mineral Composition of Korean Native Pigs by Gender

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Introduction

The fatty acid composition, amino acid composition and mineral components are important in nutrition, processing and sensory qualities of both fresh meat and processed meat products. Several studies have been shown that gender is one of the factors that can cause variation in porcine fatty acid composition⁽¹⁾. Koga et al.⁽²⁾ showed that amino acid composition and ratios are also possibly effected on the sensory properties such as flavor and palatability⁽³⁾. Although Korean Native Black Pigs(KNBP) have been characterized with more redness of meat color and higher palatability than other breeds, there were not enough information available and many studies conducted so far. Therefore, the aim of this experiment was to determine the properties of fatty acids composition, amino acid composition and mineral components of Korean Native Black Pigs by gender.

Materials and Methods

Forty Korean native black pigs(KNBP, 21 sows, 19 boars) which average live weight and age for 72kg and 192 days, were transported to the National Livestock Research Institute and conventionally slaughtered over two consecutive days with an electronic stunner (230 volts for 2.5 sec). The carcasses were placed in a 1°C chiller until the following day. Loin muscles with subcutaneous fat were separated from each gender(sow and boar) of Korean Native Black Pigs(KNBP) and total lipids were extracted using chloroform-methanol (2:1, v/v) according to the procedure of Folch et al.⁽⁴⁾ An aliquot of the lipid fraction was methylated as described by Morrison and Smith⁽⁵⁾. Fatty acid methylesters were analyzed by a gas chromatograph (Varian 3400) fitted with a fused silica capillary column, Omegawax (205, 30 m × 0.32 mm I.D., 0.25 μ m film thickness), The injection port was at 250°C and the detector was maintained at 260°C. Nitrogen was used as the carrier gas. Results were expressed as percentages based on the total peak area. For analysis of amino acid composition, five grams of meat sample and 6N HCl 40mL were mixed in round flask, injected with nitrogen gas and hydrolyzed at 110°C for 24hr. After HCl was evaporated at 50°C, the

samples were diluted to 50mL with 0.2N sodium citrate buffer(pH 2.2) and filtered using filter paper(0.45 μ m). The samples(30 μ l) were injected into Amino acid analyzer(Alpha, LKB-4150, Hitachi, Japan). Mineral components were determined by the AOAC(1996)⁽⁶⁾.

Result and Discussion

Fatty acid composition

Fat contents of boar and sow were 2.5 and 2.3% of muscle weight, respectively. Gender was a significant source of variation in the fatty acid profile in this study. In comparison with boar, loin muscles from sows contained significant higher levels of C18:1n-9, C16:0, C16:1n-7 and C20:5n-3. In addition, sow had higher contents of total MUFA and boar had significant higher contents of total PUFA and PUFA(n6) than boar(P<0.05)(Table 1). The present study showed that boar contained significantly higher levels of PUFA n-6 fatty acids and the ratio of n6 to n3 (n6/n3). The ratio of n6 to n3 (n6/n3) were 15.87 and 22.27 in the loin muscles from sows and boars, respectively.

Table 1. Comparison of fatty acid profiles of Korean Native Pigs by Gender (Unit : %)

Fatty acids	Sow	Boar
SFA	40.47(0.22)*	38.95(1.07)
MUFA(mono)	45.16(0.39) ^a	42.28(0.52) ^b
PUFA(poly)	14.36(0.45) ^b	17.82(0.44) ^a
MUFA/SFA	1.12(0.01)	1.07(0.03)
PUFA/SFA	0.36(0.01) ^b	0.45(0.02) ^a
n3	0.86(0.02)	0.85(0.05)
n6	13.51(0.43) ^b	16.97(0.42) ^a
n6/n3	15.87(0.35) ^b	22.27(1.82) ^a

*Mean(Standard error of mean).

Amino acid composition

There were not significant differences in amino acid composition of loin muscles from boar and sows(P>0.05)(Table 2). The major amino acids of both gender were glutamic acid(3.25%), aspartic acid(1.94%), lysine(1.83%), leucine(1.77%), alanine(1.17%) and arginine(1.15%) in decreasing order.

Mineral composition

There were not significant differences in mineral composition of loin muscles from boar and sows(P>0.05)(Table 3). The major minerals for both gender were potassium, phosphorous, sodium, magnesium, and calcium in decreasing order.

Table 2. Comparison of amino acid profiles of Korean Native Pigs by Gender (Unit : %)

	Sow	Boar	Overall Mean
ALA	1.16(0.02)*	1.18(0.02)	1.17(0.01)
ARG	1.13(0.02)	1.17(0.02)	1.15(0.02)
ASP	1.94(0.03)	1.94(0.02)	1.94(0.02)
CYS	0.24(0.00)	0.24(0.00)	0.24(0.00)
GLU	3.22(0.06)	0.26(0.05)	3.25(0.04)
GLY	0.92(0.01)	0.91(0.01)	0.92(0.00)
HIS	1.06(0.03)	1.03(0.01)	1.04(0.01)
I-LE	0.82(0.01)	0.83(0.01)	0.83(0.01)
LEU	1.77(0.03)	1.78(0.02)	1.77(0.02)
LYS	1.82(0.03)	1.83(0.02)	1.83(0.02)
MET	0.49(0.01)	0.51(0.01)	0.50(0.01)
PHE	0.96(0.02)	0.97(0.01)	0.97(0.01)
PRO	0.83(0.01)	0.82(0.01)	0.82(0.01)
SER	0.85(0.01)	0.85(0.01)	0.85(0.01)
THR	0.95(0.02)	0.96(0.01)	0.96(0.01)
TYR	0.72(0.01)	0.74(0.01)	0.73(0.01)
VAL	0.86(0.01)	0.88(0.01)	0.87(0.01)

*Mean(Standard error of mean)

Table 3. Comparison of mineral composition of Korean Native Pigs by Gender (Unit : ppm)

Mineral	Sow	Boar	Overall Mean
Ca	55.07(0.84)*	55.76(2.11)	55.419(1.077)
P	1919.76(41.41)	1972.46(28.54)	0.232(0.026)
K	2995.27(103.57)	3234.34(75.00)	3114.803(72.258)
Na	431.24(15.87)	410.36(11.54)	31.251(9.882)
Mg	231.10(9.03)	235.60(6.64)	16.878(5.337)
Fe	6.30(0.70)	5.91(0.46)	6.104(0.401)
Zn	13.51(0.83)	12.82(0.77)	1.721(0.544)
Cu	0.22(0.04)	0.24(0.03)	0.084(0.026)

*Mean(Standard error of mean)

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