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ARTICLE

Effects of Dietary Fermented Persimmon Diet on the Meat Quality of Fattening Pigs

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Abstract

The purpose of this study was to explore the effect of fermented persimmon diet on the meat quality of fattening pigs. Pigs (75 kg) were grouped and housed as 15 animals per pen and 3 replications per treatment. The basal diet (C) was substituted with 3% (T1), 5% (T2) and 10% (T3) of fermented diet. The 180 pigs were fed experimental diet for 42 d and 10 *longissimus dorsi* (LD) per treatment were collected when each swine reached 105.6 kg of body weight. The crude fat concentration of LD was lower ($p<0.05$) in treatments, but the pH value of T3 and the shear force values of T2 and T3 were higher ($p<0.05$) than those of C. The CIE L^* value (lightness) was significantly ($p<0.05$) higher in T2 and T3 than C, but the CIE b* (yellowness) of T2 and T3 was significantly ($p<0.05$) lower than C. The composition of myristic acid and oleic acid was significantly ($p<0.05$) higher in treatments than in C, while the composition of palmitic acid and stearic acid of treatments were significantly ($p<0.05$) lower than C in LD. Sensory evaluation of cooked meat as scores of aroma, taste, juiciness and overall acceptability showed higher ($p<0.05$) in treatments than in C. In conclusion, the dietary of fermented persimmon diet decreased the crude fat concentration, improved the fatty acids composition (increased composition of unsaturated fatty acid and decreased composition of saturated fatty acid) and improved the sensory evaluation of pork meat from fattening pigs.

Key words: fermented diet, meat quality, persimmon, pigs

Introduction

The consumption of brand animal products is an increasing trend these days due to an ever expanding consumer's health conscious about ways of food production, thus, expanding animal farms specialized in brand products. One of the ways for such brand animal products is microorganism-fermented diet as a supplement feedstuff for pigs (Song *et al*., 2011). The microorganism-fermented diet improved gastrointestinal environment, such as decreased gastric pH, number of enteric pathogens and incidences of clinical diseases, and increased concentration of gastric lactic acid (Kim *et al*., 2006; Lee *et al*., 2009). It was also reported that microorganism-fermented diet improved palatability and animal health (Canibe and Jensen, 2007; Kim *et al*., 2006).

Researchers studied beneficial microorganisms against high feed cost and also as antibiotic alternatives. Song *et al*. (2011) reported that dietary of fermented by-products diet improved the carcass grade and decreased the concentration of total cholesterol in the plasma, but did not affect the growth performance and feed efficiency of fattening pigs. Fermented diet also has negative impacts, such as its short storability due to high moisture contents (Westendorf, 2000), low digestibility and changed nutrient values (Chae *et al*., 2000), decrease of growth performance in growing-finishing pigs (Chae *et al*., 2000), marbling and change of soft fat in *longissimus dorsi* (LD) (So, 1999).

Persimmon (*Diospyros kaki* Thumb) is alkaline fruit that contains approximately 15% sugar, such as glucose and fructose, and it also contains over than 2% tannin and abundant of vitamin A and C (Taira *et al.*, 1990). Tannins in persimmon affect the physiological activities and act as anti-bacterial agents, antioxidants and remove heavy met-

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als (Seo *et al*., 2000). Moreover, persimmon prevented arteriosclerosis by decrease of cholesterol concentration in the plasma (Gorinstein *et al*., 1998). Persimmon can be considered a good feedstuff, because it contains sugar, tannin and vitamins. However, to our knowledge, the fermented persimmon diet has not been developed as a feedstuff for livestock.

Experiments were conducted to investigate the effects of fermented persimmon diet based on microorganisms from pine needle that included *Bacillus subtilis*, *Bifidobacterium pseudolongum*, *Lactobacillus acidophilus* and yeast (Solsolk) on the pork meat quality of fattening pigs.

Materials and Methods

Production of fermented persimmon diet

The microorganisms used were Solsolk (Solip-Bio Inc., Korea) contained 1.40×10^7 CFU/g *B. subtilis*, 2.80×10^6 CFU/g *B. pseudolongum*, 6.50×10^7 CFU/g *L. acidophilus* and 8.60×10^6 CFU/g yeast. The fermented persimmon diet composed of 76.0% rice bran for controlled nutrient value, 20.0% dropped persimmon, 2.0% tinned peach by-product, 1.0% brown rice vinegar by-product, 0.5% salt and 0.5% microorganisms. The ingredients mixed fermented in a fermenter (Bio-Rea, Tong yang, Seoul, Korea) at 37°C for 24 h, then 1.5% illite, 2.0% limestone and 1.5% oak wood charcoal were added and mixed/fermented at 37°C for 12 h. The mixture was transferred into 600 L plastic containers (anaerobic condition) and fermented at room temperature for 7 d, and then the fermented persimmon diet was used as an experimental diet.

Animals and diets

The average body weight (BW) of experimental pigs was 75.3±1.0 kg at initiation. One hundred eighty crossed pigs (Landrace×Yorkshire×Duroc) were assigned to 4 dietary treatments based on BW and sex, and each treatment contained 15 pigs (8 barrows and 7 female mixed within pen) per pen and 3 replicates (15 pigs×4 diets×3 replications). They were given pre-feeding for 3 d, had free access to water and fed experimental diet for 42 d (until 105.6±3.0 kg of BW). The Guide for Care and Use of Laboratory Animals (Animal Care Committee of Gyeongnam National University of Science and Technology) was followed in this study. The basal diet as formula feed of fattening period contains approximately 33.47% corn, 23.00% wheat bran, 13.00% wheat and 30.52% of other additives as detail in Table 1. The pigs were fed basal diet (C), while basal diet contained 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet were the treatments. The nutritional values of experimental diet are shown in Table 2.

Table 1. Ingredients and chemical composition of basal diet

Items	Basal diet
Ingredients, as-fed basis, %	
Corn	33.47
Wheat bran	23.00
Wheat	13.00
Soybean meal, 44%	8.33
Lupin kernel	6.50
Molasses	4.50
Palm kernel meal	3.00
Rice bran	1.70
Tallow	1.50
Rapeseed meal	1.00
Calcium phosphate, tribasic	1.14
Limestone	1.01
L-lysine hydrocholoric acid	0.95
Sodium chloride	0.50
Mineral Mix[1)]	0.19
Vitamin Mix[2)]	0.16
DL-methionine	0.05

[1)]Provided per kg diet: Cu, 43 mg; Zn, 55 mg; Mn, 50 mg; Fe, 150 mg; Co, 0.5 mg; I, 0.5 mg; Se, 0.2 mg

[2)]Provided per kg diet: Vitamin A, 4,840 IU; Vitamin D3, 1,100 IU; Vitamin B2, 4.4 mg; Nicotinic acid, 22 mg; Vitamin B6, 1.65 mg; Vitamin B12, 0.22 mg; Biotin, 0.55 mg; Folic acid, 0.33 mg; Calcium pantothenic acid, 11 mg

Sampling of *longissimus dorsi* and determination of chemical composition

The pigs weighed on average approximately 106 kg at the end of this experiment. Experimental animals were transported to a normal abattoir near the experimental station and slaughtered by stunning with electrical tongs (300 volts for 3 seconds) 12 h after feed restriction. The shocked pigs were exsanguinated while hanged, then the carcasses were placed in a dehairer at 62°C for 5 min and remained hair was removed using a knife and flame. Carcasses were eviscerated, split and placed in a chiller set at 5°C for 12 h.

The LD (6th to 13th rib) was randomly cut off and collected from 10 pigs in each treatment and kept at 5°C before it was transported to the Laboratory of Meat Science for the determination of chemical composition. The pH, water holding capacity (WHC), shear force, cooking loss, meat color and sensory analysis were determined about 24 h after slaughter. The LD was frozen storaged at -60°C for proximately analysis and fatty acid composition. The proximate analysis of moisture, crude protein,

Table 2. Chemical composition of experimental diets and pork meat

Items	Treatments[1)]				SEM[2)]
	C	T1	T2	T3	
Diet composition, %					
Dry matter	85.85	85.21	84.79	83.72	0.24
Crude protein	16.00	15.88	15.80	15.60	0.10
Crude fat	6.41	6.39	6.37	6.33	0.05
Crude fiber	2.98	3.09	3.16	3.34	0.10
Ash	4.78	4.81	4.83	4.89	0.05
Total calorie, Mcal/kg	3.28	3.27	3.26	3.25	0.03
Meat composition, %					
Moisture	72.42	73.16	74.78	74.49	1.23
Crude protein	21.53	21.86	21.94	21.44	0.71
Crude fat	2.97[a]	2.62[b]	2.51[b]	2.48[b]	0.14
Ash	1.10	1.17	1.10	1.43	0.20

[1)]The basal diet (C) was supplied 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet.
[2)]Standard error of the means
[a,b]Values in the same row with different superscripts differ at $p<0.05$.

crude fat and ash concentration of LD were determined according to the methods of AOAC (2000) until 4 wk after storage.

pH, water holding capacity, cooking loss and shear force

A sample of 5 g was homogenized about 24 h postmortem in 10 volumes of distilled water (DW) using a polytrom homogenizer (MSE, USA). Hanna HI 9025 pH meter (Woonsocket, USA) with an Orion 8163 glass electrode (Berverly, USA) was used to determine pH values.

Water holding capacity (WHC) was determined by the centrifugal method of Honikel (1998). Each sample was measured 3 times and averaged.

For the cooking loss, 80 g of 1.5 cm thick LD was placed in a polyethylene bag. The packages were then kept in a water bath (DS-23S, Dasol, Korea) at 75°C for 1 h and cooled at RT for 30 min. The cooking loss percentage was determined using the muscle weight that was taken before and after cooking.

Shear force was determined as described by Honikel (1998). The shear force was measured by an Instron 3343 (US/MX50, A&D Co., USA) equipped with one Warner-Bratzler shear blade (crosshead speed of 1mm/second). Each sample was measured 3 times and averaged.

Meat surface color

Meat color of LD was evaluated on freshly cut surface (3 cm thick slice) using a Chroma Meter CR-300 (Minolta, Japan) after 20 min at room temperature. Three color measurements were carried out across individual sample surfaces and the average of five replicates was expressed as CIE L^*, CIE a^* and CIE b^*. The Chroma Meter CR-300 was calibrated against a white tile (L^*=89.20, a^*=0.921 and b^*=0.783). The aperture was 8 mm, illuminant D65 and 10° Standard Observer.

Fatty acid composition

For the determination of fatty acids composition, total lipid was extracted using a modified Folch method as described by Ways and Hanahan (1964), and then saponification and esterification was conducted using a 0.5 N potassium hydroxide in methanol and 14% boron trifluoride methanol solution. Finally, the fatty acid methyl esters (FAME) in the hexane were injected to a gas chromatography (Agilent 6890+, Agilent HP, USA) fitted with a capillary column (HP-5MS capillary GLC column, 30 m×0.32 mm i.d. 0.25 mm film thickness, Agilent HP, USA) and a mass spectrometry detector (G1530A, Agilent HP, USA). The mass spectrometry interface and injector temperature were fixed at 270°C and 260°C, respectively, and oven temperature was instituted to 160°C at 2.5 min, 160 to 260°C at 4°C per min and then 260°C at 5 min. Each fatty acid was identified by comparing its retention time with that of FAME standard (FAME Mix C8-C24, Supelco, USA) and expressed as a percentage of the standard.

Texture profile analysis

Texture profile analysis (TPA) of eight samples (2.00 cm×2.00 cm×2.0 cm) from each treatment was assessed using an Instron 3343 (US/MX50, A&D Co., USA) equipped with a cylindrically shaped plunger (5-mm diameter) and a 500-N load cell (Bourne, 1978; Szczceniak, 1963). To determine texture parameters including hardness, cohesiveness, springiness, gumminess, chewiness and adhesiveness, each sample cube was equilibrated to a room temperature and compressed twice to 50% of its original thickness at a constant speed of 60 mm/min. Texture profile parameters were calculated from the force deformation curves as follows: hardness (kg f; force necessary to attain a given deformation, maximum force), cohesiveness (dimensionless, ratio; ratio of the positive force area during the second compression to that during the first compression excluding the areas under the decompression portion of each cycle), springiness (ratio; ratio of distances that the sample recover after the first compression), gumminess (kg f; simulated energy required to disintegrate a semisolid food to a steady state, hardness×cohesiveness) and chewiness (kg f; hardness×cohesiveness× springiness).

Sensory evaluation

For sensory evaluation, a total of 35 panelists participated and conducted a duplicate test on each sample. Training of panelists was performed according to a sensory evaluation guideline (Meilgaard *et al.* 1991). The meat samples were cooked to an internal temperature of 74°C in a water bath and then cut into $10\times3\times25\ mm^3$ pieces, placed on white plastic trays covered with aluminum foil and served immediately to each panelist. The cooked meat samples were evaluated for color (1=very unacceptable; 9=very acceptable), off-flavor (1=very weak; 9=very strong), juiciness (1=very dry; 9=very juicy), flavor (1=very unacceptable; 9=very acceptable), tenderness (1=very tough; 9=very tender) and total acceptability (1= very unacceptable; 9=very acceptable).

Statistical Analyses

Data was analyzed with one-way ANOVA. General Linear Model (GLM) procedure of SAS (2008) was applied to conduct all analyses and significant differences among the means were determined using the Duncan's Multiple Range Test method (Duncan, 1955) and significant difference between means was examined at 5% threshold.

Results and Discussion

Diets and chemical composition of pork meat

Effect of dietary fermented persimmon diet on the chemical composition of meat is shown in Table 2. The increasing of fermented persimmon diet decreased the concentration of dry matter, crude protein and total calorie, while increased that of crude fiber and ash concentration in experimental diet. In pork meat, although dietary of fermented persimmon diet showed no effect (p>0.05) on moisture, crude protein and ash concentration, it significantly (p<0.05) decreased crude fat concentration of LD.

Song *et al.* (2011) reported that dietary of 3, 5 and 10% fermented diet using the 76.0% rice bran, 20% dropped persimmon and 4.0% of other additives did not affected growth performance and feed efficiency in fattening pigs, because the energy value of fermented persimmon diet were formulated to meet or exceed the nutrient requirements recommended by NRC (1998). The results suggested that the low concentration of crude fat and low total calorie in diet may have decreased crude fat concentration of LD in fattening pigs.

Physico-chemical characteristics

The effects of dietary fermented persimmon diet on the physico-chemical characteristics, such as pH, WHC, cooking loss and shear force of LD from fattening pigs is shown in Table 3. The pH was significantly (p<0.05) higher in C and T3 than in T1. The pH of meat is changed by nutrient values of diet (Rosenvold *et al*., 2003), and energy values of diet affect the concentration of macroglycogen in muscles and change the glycolysis and cooling rate of meat (McDonagh *et al*., 1999; Rosenvold *et al*., 2001). Current study measured concentration of glycogen, but it is well know that increased pH was a result of decreased glycogen concentration in meat (Rosenvold *et al*., 2001). Based on the results of this study, although the energy values of experimental diet did not differ between treatments and C, the diet of T2 has 0.03 Mcal/kg of low energy value compared with C diet. Hence, low energy values may have increased the pH of meat compared with others due to decrease glycogen concentration of pork.

Dietary of over than 5% fermented persimmon diet increased shear force, but imposed no effect on WHC and cooking loss. The WHC is an important factor for quality of fresh pork meat and affected by many factors after slaughter (Kwon *et al*., 1995). Cooking loss of meat is affected by soluble creatine and soluble fat (Carlin *et al*., 1965). Up to now, effects of fermented diets or probiotics on the WHC and texture analysis are not well understood (Jin *et al*., 2006; Kang *et al*., 2010). Further studies are

Table 3. Effects of supplemental fermented persimmon diet on the physico-chemical characteristics and meat color in *longissimus dorsi* of fattening pigs

Items	Treatments[1)]				SEM[2)]
	C	T1	T2	T3	
pH	6.05^b	6.01^b	6.29^{ab}	6.62^a	0.15
Water holding capacity, %	80.27	81.02	80.86	81.55	1.04
Cooking loss, %	32.41	32.15	31.59	31.23	1.58
Shear force, kg/cm^2	4.94^b	4.88^b	5.63^a	5.65^a	0.24
Meat color					
CIE L^*	47.94^b	49.04^{ab}	51.15^a	51.42^a	1.41
CIE a^*	9.51	8.96	9.32	9.41	0.86
CIE b^*	1.19^a	1.44^a	0.46^b	0.21^b	0.51

[1)]The basal diet (C) was supplied 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet.

[2)]Standard error of the means

[a,b]Values in the same row with different superscripts differ at p< 0.05.

required to clarify the relationship between fermented diet and physico-chemical characteristics of meat, because of contradicted results of these parameters.

Meat color

Dietary of fermented persimmon diet had no effect on a* (redness), but affected L* (lightness) and b* (yellowness) of LD from fattening pigs. The lightness was significantly (p<0.05) higher in T2 and T3 than in C, and the yellowness was significantly (p<0.05) lower in T2 and T3 than in C and T1 (Table 3). Moreover, the fermented persimmon diet did not significantly (p>0.05) affect the surface color (lightness, redness and yellowness) of backfat (not shown data).

Meat color is an important factor of pork quality and the most important factor that appeals to consumers who prefer high redness of pork meat. Meat color mainly affects by pH and temperature of meat during slaughter process (Lindahl *et al*., 2006). In this study, dietary of 5% and 10% fermented persimmon diet increases lightness and decreased yellowness of pork, which suggested with Kang *et al*. (2010) who reported that dietary of fermented high energy diet using the agro by-products increased lightness of pork.

Fatty acid composition

The composition of palmitoleic acid, linoleic acid and arachidonic acid of LD from fattening pigs was not affected by dietary of fermented persimmon diet, but significantly (p<0.05) increased the myristic acid and oleic acid composition and decreased (p<0.05) the palmitic acid and stearic acid composition of LD. Moreover, the composition of unsaturated fatty acids (USFA) and ratio of USFA to saturated fatty acids (USFA/SFA) was significantly (p<0.05) higher in treatments than in C, while saturated fatty acids (SFA) composition was significantly (p<0.05) lower, though dietary of fermented persimmon diet had no effect on the essential fatty acids (EFA) composition and ratio of EFA to USFA (EFA/USFA) of LD (Table 4).

The fatty acids composition of LD is changed by diet in monogastric animals (Pascual *et al*., 2007). In this study, the nutrient values of fermented persimmon diet might have increased USFA and decreased SFA composition. The concentration of total cholesterol and low density lipoprotein (LDL)-cholesterol in plasma were increased by SFA (Grundy *et al*., 1982) and decreased by USFA (Becker *et al*., 1983) in diet. A high level of USFA and low level of SFA in LD is more beneficial to human

Table 4. Effects of supplemental fermented persimmon diet on the fatty acid composition in *longissimus dorsi* of fattening pigs

Items	Treatments[1)]				SEM[2)]
	C	T1	T2	T3	
Fatty acid composition, %					
Palmitic acid	20.71[a]	18.00[b]	18.20[b]	17.92[b]	0.71
Palmitoleic acid	2.36	2.70	2.63	2.63	0.61
Stearic acid	10.14[a]	8.64[b]	8.49[b]	8.57[b]	0.53
Oleic acid	36.48[b]	39.11[a]	38.76[a]	38.86[a]	1.07
Linoleic acid	21.24	23.09	23.01	22.97	0.88
Arachidonic acid	8.45	7.66	8.13	8.24	0.80
Saturated fatty acid (SFA)	31.47[a]	27.44[b]	27.47[b]	27.30[b]	0.49
Unsaturated fatty acid (USFA)	68.53[b]	72.56[a]	72.53[a]	72.70[a]	0.90
Essential fatty acid (EFA)	29.69	30.75	31.14	31.21	0.97
USFA/SFA	2.178[b]	2.644[a]	2.640[a]	2.663[a]	0.083
EFA/USFA	0.433	0.424	0.429	0.429	0.078

[1)]The basal diet (C) was supplied 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet.
[2)]Standard error of the means
[a,b]Values in the same row with different superscripts differ at p< 0.05.

health, such as prevention of arteriosclerosis and hypertension (Decker and Shantha, 1994; Engler *et al*., 1991). Hence, from results of this study, dietary of fermented persimmon diet may have improved fatty acid compositions of LD that maybe beneficial to human health. The meat flavor showed positive correlation with the concentration of SFA and mono-UFA (MUFA), but has negatively correlated with the concentration of poly-UFA (PUFA) in meat (Cameron and Enser, 1991). The ratio of MUFA to SFA (MUFA/SFA) of meat was used as an indirect index for meat taste (Anderson *et al*., 1975; Janicki and Appledorf, 1974). In this study, dietary of fermented persimmon diet affected sensory characteristics due to increased composition of MUFA/SFA of LD from fattening pigs. Hence, dietary of fermented persimmon diet affected fatty acid composition of LD towards the benefit of human health by increasing USFA and decreasing SFA composition of LD.

Texture profile analysis

Dietary of fermented persimmon diet showed no effect (p>0.05) on hardness, cohesiveness, gumminess and chewiness, but significantly (p<0.05) decreased adhesiveness of LD in treatments compared with C and the springiness was significantly lower (p<0.05) in T2 and T3 than in C (Table 5).

Tenderness of meat is the most important factor for evaluation of pork meat and animal products, though

Table 5. Effects of supplemental fermented persimmon diet on the texture profile analysis in *longissimus dorsi* of fattening pigs

Items	Treatments[1)]				SEM[2)]
	C	T1	T2	T3	
Hardness	1.43	1.41	1.44	1.47	0.26
Cohesiveness	0.41	0.42	0.42	0.42	0.15
Springiness	1.20[a]	1.09[ab]	1.02[b]	1.03[b]	0.09
Gumminess	0.68	0.67	0.67	0.67	0.01
Chewiness	0.81	0.81	0.82	0.81	0.04
Adhesiveness	1.69[a]	1.41[b]	1.43[b]	1.48[b]	0.13

[1)]The basal diet (C) was supplied 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet.
[2)] Standard error of the means
[a,b]Values in the same row with different superscripts differ at $p<0.05$.

appearance, meat color, flavor, taste and juiciness are also important factors to consumers (Bailey, 1972). It was reported that dietary of probiotics had no effect on TPA of LD from fattening pigs (Jin *et al*., 2006) but it was greatly affected by fatty acids composition in LD (Wood *et al*., 2008). In this study, dietary of fermented persimmon diet may have changed TPA of LD due to the change of crude fat concentration and fatty acids composition of LD.

Sensory evaluation

The results of fresh meat were not affected by the dietary of fermented persimmon diet as well its marbling and overall acceptability, but significantly ($p<0.05$) increased drip loss of LD from fattening pigs. The drip loss was significantly ($p<0.05$) higher in T2 and T3 than in C. In the case of cooked meat, dietary of fermented persimmon diet significantly ($p<0.05$) increased the aroma, taste, juiciness and overall acceptability of LD. The color and hardness were significantly ($p<0.05$) higher in T3 than in C (Table 6).

Evaluation of meat quality is depends on physico-chemical analysis and sensory evaluation and these methods are affected by the animal breed, heritability, sex, feeding conditions, fatting rate, slaughter process, treatment conditions of carcass, storage days, muscle part and so on (Joo *et al*., 2002). Tenderness and juiciness of meat were correlated with the concentration of crude fat, WHC and cooking loss (Wood *et al*., 2008). In this study, dietary of fermented persimmon diet increased sensory evaluation of cooked meat from fattening pigs. The abundant concentration of trace factors and fiber in fermented diet decreased off-flavor of pork, suppressed production of soft yellowness fat and improved carcass grades (Lee *et al*., 1998; Song *et al*., 2001). Therefore, dietary of fermented persimmon diet might be used to produce pork from fattening pigs with appealing features to such as color to consumers.

Table 6. Effects of supplemental fermented persimmon diet on the sensory evaluation[1)] in fresh and cooked *longissimus dorsi* of fattening pigs

Items	Treatments[2)]				SEM[3)]
	C	T1	T2	T3	
Fresh meat					
Meat color	6.50	6.61	6.80	6.77	0.77
Drip loss	7.97[b]	7.37[b]	6.67[a]	6.61[a]	0.41
Marbling	5.73	5.79	6.20	6.30	0.83
Overall acceptability	6.40	6.21	6.80	6.93	0.81
Cooked meat					
Color	6.93[b]	7.10[ab]	7.10[ab]	7.30[a]	0.21
Aroma	6.63[b]	7.10[a]	7.11[a]	7.20[a]	0.24
Taste	6.73[b]	7.37[a]	7.37[a]	7.47[a]	0.27
Juiciness	6.90[b]	7.30[a]	7.30[a]	7.33[a]	0.16
Hardness	6.87[b]	7.03[ab]	7.03[ab]	7.37[a]	0.17
Overall acceptability	6.85[b]	7.18[a]	7.18[a]	7.39[a]	0.16

[1)]Values were scored 9 point scale based on 1 (extremely bad or slight) to 9 (extremely good or much).
[2)]The basal diet (C) was supplied 3% (T1), 5% (T2) and 10% (T3) fermented persimmon diet.
[3)]Standard error of the means
[a,b]Values in the same row with different superscripts differ at $p<0.05$.

Conclusion

The results of this study indicated that the fermented persimmon diet decreased the concentration of crude fat, yellowness of meat and SFA composition, while increased lightness of meat, USFA composition and sensory evaluation of LD muscles from fattening pigs. This improved sensory evaluation could be due to decreased crude fat concentration and improved fatty acids composition that was noticed as increased USFA composition and decreased SFA composition of LD from fattening pigs. Further, investigations are required to clarify the effects of fermented persimmon diet on the mechanisms that affect meat quality and its sensory evaluation parameters, which in turn affect consumer's decision to buy pork.

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