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Effect of Gender on Nutritive Value and Sensory Evaluation of Bacon from Pigs Slaughtered at 110 Kilogram

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Abstract

Entire male pigs production is not popular in Thailand because of the long time notion about boar taint. The source of boar taint as feacal-like (skatole) is attributable to the residual tryptophan (Burgoon *et al*., 1992) and fibre (Jensen *et al*., 1992) in the colon. Boar taint accumulates in fatty tissue and the consumers can detect it when cooking (Claus *et al*., 2000). Therefore, boar meat products like bacon made from fatty tissues are a major concern for meat producers. This study investigated the chemical composition and sensory score in relationship to gender of bacon from boars, barrows and gilts fed diets with 0.22 - 0.56 % tryptophan and 3.6 - 3.7 % fibre and slaughtered at market weight (110 kg). Twenty-four bacons from crossbred (Large White x Landrace x Seghers) boars, barrows and gilts (8 bacons from each group) were investigated in a completely randomised design experiment.

Protein content was higher in bacon from gilts than from barrows (16.16 vs 14.58%, $p<0.05$) but not different ($P>0,05$) from that of the boars (15.70%). Bacon from boars had lower nitrite content than that of barrows and gilts (1.97 vs 3.09 and 4.16 ppm: $p<0.05$). No differences were found for phosphate and nitrate contents. Sensory evaluation revealed a higher preference score for bacons from barrows and gilts than from boars. The overall acceptability of bacon from barrows was greater compared to boars (3.75 vs 3.56; $p<0.05$) but not different ($P>0.05$) from that of gilts (3.52). Bacon of gilts had better flavour than that of boar (3.76 vs 3.51; $p<0.05$) but not different ($P>0.05$) from that of barrows (3.59).

Introduction

Entire male pigs production is not popular in Thailand because of the long time notion about boar taint. The source of boar taint as feacal-like (skatole) is attributable to the residual tryptophan (Burgoon *et al*., 1992) and fiber (Jensen et al., 1992) in the colon. This makes the meat quality of boar less favorable than that of barrow and gilt (Jaturasitha *et al*., 2000). . Boar taint accumulates in fatty tissue and the consumers can

detect it when cooking (Claus *et al*., 2000). Therefore, meat products like bacon made from pig's belly are a major concern for meat producers.
This study investigated the chemical composition and sensory score in relationship to gender of bacon from boars, barrows and gilts fed diets with 0.22 - 0.56 % tryptophan and 3.6 - 3.7 % fibre and slaughtered at market weight (110 kg)..

Materials and Methods
Twenty-four bacons from crossbred (Large White x Landrace x Seghers) boars, barrows and gilts slaughtered at 110 kg of live weight (8 bacons from each group) were investigated in a completely randomised design experiment. Square shaped bacons (8 x 12 inch) without skin were cut from the left side and cured in brine at 10% of bacon weight. The brine formula is given in table 1. The bacon was cured for 12 hours, then dried at 70 °C for 30 minutes and smoked at 70 °C for 3 hours after which it was sliced into 2.5 mm thick slices. The nutritive values of the bacon were evaluated by the methods of AOAC (1984). Bacon was fried in a hot pan at 150 °C for 3 minutes then cut into small pieces (1.5 x 1.5 cm) and served on warm plates to 10 trained panelists, and tested according to Viriyajari (1992). Data were subject to analysis of variance and the comparison among means was carried out by least significant different test (LSD) with SPSS 9.0 for Windows (Wanitbuncha, 1999).

Results and Discussion
Table 2 shows the nutritive value of bacon. Protein content was higher in bacon from gilts than from barrows (16.16 vs 14.58%, $p<0.05$) but not different ($P>0,05$) from that of the boars (15.70%). Barrow's bacon is less meaty but more fatty than bacon of gilt and boars (Kumar and Barsual, 1991). Ash and NaCl contents of bacon from boar were higher than in bacon from barrows and gilts ($p<0.05$). These constituents are accumulated in lean parts (Chant *et al*., 1976). Bacon from boars had lower ($p<0.01$) nitrite content than that of barrows and gilts (1.97 vs 3.09 and 4.16 ppm) whereas Mottram *et al.* (1982) found no difference. No differences were found for phosphate and nitrate contents.
revealed a higher preference score for bacons from barrows and gilts than from boars (3.59, 3.50 and 3.25 respectively; $p<0.05$). The overall acceptability of bacon from barrows was greater compared to boars (3.65 vs 3.34; $p<0.01$) but not different ($P>0.05$) from that of gilts (3.34). Bacon of gilts had better flavour than that of boar (3.76 vs 3.56; $p<0.05$) but not different ($P>0.05$) from that of barrows (3.59).
Table 3 presents the results of the sensory evaluation of bacon from different pig genders. The texture of bacon from gilts was better than that from barrows (3.66 vs 3.36; $p<0.01$) but was not significantly different from boars' bacon (3.53). There was no significant difference among sexes in terms of color but boars' bacon had less ($p<0.05$) flavor than gilts' bacon (3.51 vs 3.76). These results were similar to the findings of Wood and Enser (1982) and Mottram *et al*. (1982). The overall acceptability of boars' bacon was not significantly different from those of gilts' and barrows'.

Conclusion
Bacon from entire male's fed on rations with limited tryptophan and fiber content have no disadvantage in nutritive value and sensory evaluation and may thus be an alternative to bacon of barrows and gilts.

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Table 1: The brine composition for smoked bacon

Composition	**gram**
Water	1000.00
Nitrite ($NaNO_2$)	45.60
Sugar	31.00
Monosodiumglutamate	6.50
Phosphate	31.00
Erythobate	2.50
Soy protein	1.25
Smoked	1.50

Table 2: Nutritive values of smoked bacon of different gender

Criteria	Barrow	Boar	Gilt	X	SE
No. of Bacon	8	8	8	-	-
Nutrient composition of bacon					
Water, %	45.07	49.36	45.36	46.59	1.27
Fat, %	36.92	31.89	35.47	34.76	1.26
Protein, %	14.58^{b}	15.70^{ab}	16.16^{a}	15.48	0.31
Ash, %	1.63^{ab}	2.11^{a}	1.47^{b}	1.74	0.11
NaCl, %	1.15^{b}	1.53^{a}	1.21^{b}	1.30	0.07
Phosphate, ppm	3.68	4.28	4.03	4.00	0.12
Nitrate, ppm	52.00	39.19	49.24	46.81	3.34
Nitrite, ppm	3.09^{A}	1.97^{B}	4.16^{A}	3.07	0.35

^{A,B} Means within rows showing different superscripts are highly significantly different ($P<0.01$)

^{a,b} Means within rows showing different superscripts are significantly different ($P<0.05$)

Table 3: Trained sensory panel scores for smoked bacon of different gender

Criteria	Barrow	Boar	Gilt	X	SE
No. of animals	8	8	8	-	-
Texture	3.36^{B}	3.53^{AB}	3.66^{A}	3.55	0.04
Colour	3.63	3.54	3.66	3.62	0.04
Flavour	3.59^{ab}	3.51^{b}	3.76^{a}	3.64	0.04
Overall acceptability	3.52^{b}	3.56^{ab}	3.75^{a}	3.64	0.04

^{A,B} Means within rows showing different superscripts are highly significantly different ($P<0.01$)

^{a,b} Means within rows showing different superscripts are significantly different ($P<0.05$)

5 = like extremely, extremely tender, juicy and no off-flavour

1 = dislike extremely, extremely tough, dry and strong off-flavour