ANALYSIS OF THE INFLUENCE OF SEX ON THE MEAT QUALITY IN (DUROC X LARGE WHITE SIRE LINE) ×(LARGE WHITE X LANDRASE) PIGS

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Introduction

The breeding programs in the pig production brought a real improvement in measurable characteristics in the last decade. It came to fruition mainly in the percentage of lean meat weight and back fat thickness (Mikolášková, Urban, 2005). On the other hand, several new problems had occurred concerned of meat quality.
Meat quality depends on both animal-related and environmental factors. These factors can affect muscle metabolism, thus influencing the development of PSE-meat (pale, soft and exudative), a major problem in the pork industry. Literature describes the factors influencing meat quality such as genotype (Larzul et al., 1997), on farm and slaughterhouse pig manipulation (Barton-Gade, Warriss, Brown, & Lambooij, 1995), transport and lairage (Aaslyng & Barton-Gade, 2001), stunning method (Berg, 1998). The objective of this survey was to investigate the effect of the sex on the pork quality.

Material and Methods

The aim of the study is the evaluation of influence of sex on carcass value in final hybrid pigs (D x LWs) x (LW x L). Feeding of pigs was implemented in compliance with the nutrients needs standards (ŠIMEČEK et al., 2000) in ad-libitum way in three phases with continuous transition, while complete feeding mixtures (CFM) were used containing three components (wheat, barley, soya, premix) and they were optimized with a view to age and weight of pigs.

The following factors in gilts and barrows were monitored:

- carcass body weight in kg,
- lean meat share in %,
- MLLT electric conductivity (EC) in mS (measured 50 minutes post mortem),
- MLLT pH (measured 45 minutes and 24 hours post mortem),
- shear force values (sheared in a Warner-Bratzler Shear),
- color (L*, a*, b*) (measured by Minolta CM-2500d),
- water Binding capacity (%).

For the purposes of objective analysis of the carcass value properties and comparison of the individual indicators between each other, the monitored indicators were converted by means of a linear model with fixed effects to a uniform weight of 90 kg. In this case the following model was used $y_i = \mu + a_j + e_i$, where y_i - the monitored variable, μ - the population mean, a_j - effect of the j-th sex, e - residual error of an individual.
Obtaine form results of the tests were evaluated by a statistical program SAS® Propriety Software Release 6.04, and expressed both in charts and graphically, while differences between the individual monitored signs were tested by single analyses of variance.

Results

The obtained results presentate tables 1- 5 which contain statistic differentiations as well as its´ significances too.

Ta***ble 1.: Survey of carcass value with respect to sex***

	barrows n=21		gilts n=22		total n=43		α-level
	`x	s	`x	s	`x	s	
Live weight (kg)	109.1	*4.57*	107.2	*7.01*	108.1	*5.96*	0.2873
Carcas weight (kg)	92.0	*4.27*	90.4	*6.09*	91.2	*5.29*	0.3074
Lean meat share (%)	55.99	*1.28*	57.43	*1.58*	56.69	*1.59*	0.0026

Table 2.: Survey of carcass value with respect to sex – 45 min P.M.

	barrows n=21		gilts n=22		total n=43		α-level
	`x	s	`x	s	`x	s	
EV MLLT [mS]	3.3	*0.53*	3.6	*1.02*	3.4	*0.81*	0.2431
EV MS [mS]	3.2	*0.40*	3.5	*1.03*	3.4	*0.79*	0.095
pH 45min MLLT	6.2	*0.22*	6.2	*0.21*	6.2	*0.22*	0.1946
pH 45min MS	6.4	*0.21*	6.5	*0.30*	6.5	*0.26*	0.6286

Table 3.: Survey of carcass value with respect to sex – 24 hours P.M.

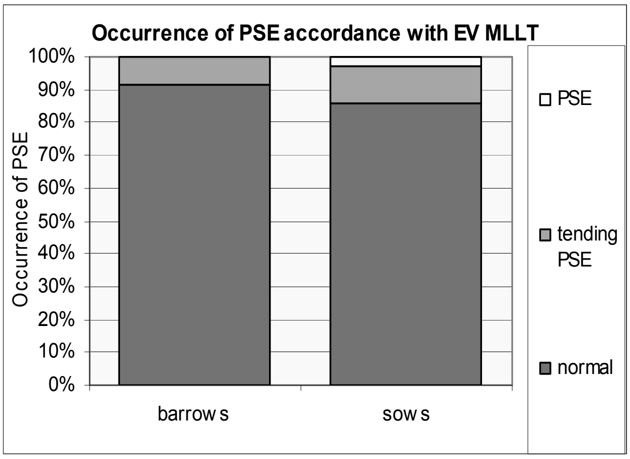
	barrows n=21		gilts n=22		total n=43		α-level
	`x	s	`x	s	`x	s	
WB-shear force value (kg)	2.82	*1.15*	3.14	*1.37*	2.99	*1.29*	<.0001
pH 24 hod MLLT	5.47	*0.18*	5.48	*0.16*	5.47	*0.17*	0.839
pH 24 hod MS	5.47	*0.12*	5.42	*0.50*	5.44	*0.37*	0.6494
Colour L*	58.00	*3.64*	58.13	*4.52*	58.07	*4.07*	0.9201
Colour a*	1.01	*1.27*	0.88	*1.37*	0.94	*1.31*	0.7464
Colour b*	11.14	*1.55*	10.86	*1.93*	11.00	*1.74*	0.6079
Binding capacity (%).	12.65	*3.43*	12.51	*2.81*	12.58	*3.09*	0.8867

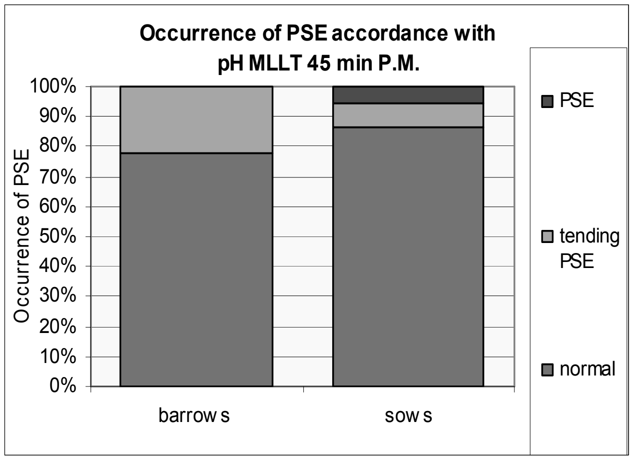
Table 4.: Occurrence of PSE with respect to sex accordance with EV MLLT

	normal			tending PSE			PSE			Total
	`x	n	%	`x	n	%	`x	n	%	n
barrows	3.23	33	91.7	4.56	3	8.3		0	0.0	36
gilts	3.25	31	86.1	4.85	4	11.1	8.07	1	2.8	36
Total	3.24	64	88.9	4.73	7	9.7	8.07	1	1.39	72

Table 5.: Occurrence of PSE with respect to sex accordance with pH MLLT 45 min. P.M.

	normal			tending PSE			PSE			Total
	`x	n	%	`x	n	%	`x	n	%	n
barrows	6.33	28	77.8	5.91	8	22.2		0	0.0	36
gilts	6.23	31	86.1	5.90	3	8.3	5.65	2	5.6	36
Total	6.28	59	81.9	5.91	11	15.3	5.65	2	2.78	72





Conclusion

On the base of obtained results one could say, that:

- sex significantly influences percentage of meat in the carcass, while the differences between the barrows and gilts amount roughly to 2 % for the benefit of gilts,
- differences exist within sex among various genotypes in percentage of meat in barrows, or gilts,
- impact of sex on meat quality was proved,
- the Warner–Bratzler shear force of longissimus muscle from barrows was about 11% lower than that of muscle from gilts,
- impact of sex on the electrical conductivity and pH of MLLT 45 min and 24 hours P.M. was not proved,
- impact of sex on the colour (L*, a*, b*) was not proved, but colour a* value (redness) was higher by barrows, and L* was lower by barrows.

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