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USE OF VIDEO-ANALYSIS IN THE DETERMINATION OF MEATINESS OF THE CARCASS BELLY IN PIGS

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Introduction

For obtaining the higher percentage of lean meat in the pig there is advisable to concentrate our effort for increase of lean meat share in the main meat parts of pig carcass. The most interesting part seems to be belly and it's quality like meat/fat ratio. Compared other important parts of pig carcass the lean meat ratio in pig belly may differ markedly (VALIŠ et al., 2001). PULKRÁBEK et al. (2001) showed that the lean meat share vary from 30 to 60 %. The exigency of evaluation of belly-quality pointed out SCHREINEMACHERS et al. (1999). SCHWERDTFEGER et al. (1991, 1993), and other authors determined lean meat share in the belly using VIA method.

Pfuhl and Glodek (1996) have drawn the attention to the fact that it is impossible to determine lean meat percentage in the belly from the total share of lean meat in the carcass (r2=0.53). Neither the subjective evaluation of lean meat share in the belly gives accurate results (r2=0.68). The estimation of lean meat share in the belly of living pigs has been investigated by Nitter and Kolb (1994). Using the digitalized ultrasound picture they found max. r2=0.60. Baulain and Henne (1999) used magnetic resonance imaging (MIR) for the evaluation of lean meat share in the belly. The magnetic resonance method for the evaluation of lean meat share in the belly has been used also by Schreinemachers et al. (1999). For the comparison these authors used the evaluation of lean meat share in the belly by regression equation after substitution of auxiliary dimensions. The correlation coefficient between the investigated methods has been 0.60 to 0.82 according to genotype. Tholen et al. (1998b) further compared the evaluation of share using magnetic resonance and dissection (r2= 0.72 0.94) in relation on the investigated genotype.
Lean meat share in the belly is considered to be very important criterion by Schwerdtfeger et al. (1991).

Material and Methods

The study investigated bellies (n=75) of standard hybrid pigs of slaughter pigs. These ones were processed according the EU-dissection. To evaluate the lean meat share in the belly three pictures have been made according to SCHWERDTFEGER et al. (1993). By means of software LUCIA has been determined the belly section area in mm2 , meat area and total belly meat share. For the estimation of total lean meat share in the belly the regress-equation has been calculated (CÍTEK et al., 2001).
In the presented paper is described lean meat share in the belly with respect to genotype, sex, weight of carcass belly and average daily gain.
All results of experiments were assessed by standard statistical methods using SAS-software. For testing of differences between the respective evaluated criteria simple and/or multiple variance analysis have been used.

Results and Discussion

Data from analysis of the meaty part of the side in relation to the sex are summarized in the Tables 1 and 2. A weight of 88.4 kg JUT was reached in a selected set of 75 slaughter pigs, in barrows 90.0 kg and 87.1 kg in gilts. The total average weight of the side regardless the sex was 7.7 kg, in barrows 7.9 kg and in gilts 7.5 kg. Statistically provably higher weight of the side of barrows was discovered in all cases in comparison to the gilts (Table 2).

In table 1 results from the individual measurements of the side surface areas for cut are summarized. In all measurement spots a higher surface area was obtained in barrows in comparison to the gilts. Increase of the side surface area may also be obtained in the individual measurement spots from item 1 to item 3. While evaluating the surface areas of meat and lard we find that the increase is not formed by both components identically. The meat surface area regardless sex increases from item 1 to item 3 less than the side surface area including lard.

While monitoring the impact of the sex, non-provably higher surface area of meat was found out in gilts. Statistically provable share of the meat surface area found out in all three measurement spots was therefore caused prevailingly by a significantly higher surface area of lard in barrows in comparison to gilts.

Tab. 1.a. Evaluation of the belly with respect to sex

Sex	Total belly area								
		Point 1 (mm^2)		Point 2 (mm^2)		Point 3 (mm^2)		Total (mm^2)	
	n	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Barrows	35	8174	1027	10365 A	1260	11912 A	1683	10150 A	1080
Gilts	40	7818	901	9322 A	1190	10578 A	1230	9239 A	997
Total	75	7984	972	9809	1323	11201	1597	9664	1127

The percentage of meat in carcass body detected by SonoMark apparatus equal to 56.4 % presented in Table 2 and findings by regression formula (ZP system) equal to 55.6 % did not correspond to the share of meat in the side 52.1 %. Lower percentage of muscle in the carcass part “the side” in both barrows and gilts by approximately 3.5 % in comparison to the muscle percentage in the whole carcass body was seen. The same relation of sexes and meatiness of the carcass side was proved also by Vališ et al, (2001).

Tab. 1.b. Evaluation of the belly with respect to sex

Sex	Lean meat area								
		Point 1 (mm^2)		Point 2 (mm^2)		Point 3 (mm^2)		Total (mm^2)	
	n	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Barrows	35	4794	775	5579	962	6452	1298	5608	929
Gilts	40	4949	635	5600	884	6443	822	5664	712
Total	75	4876	703	5590	915	6447	1063	5638	815

Tab. 1.c. Evaluation of the belly with respect to sex

Sex	Lean meat share								
		Point 1 (%)		Point 2 (%)		Point 3 (%)		Total (%)	
	n	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Barrows	35	58.76 A	6.72	53.88 A	7.03	54.05 A	6.75	55.56 A	6.08
Gilts	40	63.61 A	7.11	60.17 A	6.50	61.05 A	5.39	61.61 A	5.42
Total	75	61.35	7.30	57.24	7.41	57.78	6.97	58.79	6.45

Tab. 2. Evaluation of the carcass half with respect to sex

Sex		Carcass weight (kg)		Belly weight (kg)		Carcass lean meat share (%)		Belly lean meat share (%)	
	n	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s	$\bar{x}$	s
Barrows	35	90.06 a	4.52	7.92 A	0.70	53.46 A	2.98	49.85 A	4.28
Gilts	40	87.11 a	6.02	7.53 A	0.57	57.51 A	3.79	54.20 A	3.42
Total	75	88.49	5.54	7.71	0.66	55.62	3.97	52.17	4.40

Conclusions

- Possibility of using video-analysis for assessment of the side meatiness was proved in the work.
- Quality (meatiness) of the meat part of the side cannot accurately be assessed out of the muscle percentage.
- The muscle percentage in the side was lower by approximately 3 % in comparison to the muscle share in the carcass body.
- Statistically provable difference in meatiness of the side in barrows and gilts was discovered.
- In comparison of the meat surface area on the cut no provable difference was found out between the boars and swine. A difference in the muscle percentage in the side is caused prevailingly by a higher percentage of fat in boars in comparison to swine.

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