DEVELOPMENTS IN PIG CARCASS CLASSIFICATION IN THE CZECH REPUBLIC

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Abstract

In the analysed period from 1995 to 2010, the average carcass weight slightly increased by 1.75 kg. In 2010 it was 90.89 kg (s=11.136) and the average carcass lean meat content was 56.33 % (3.217). The lean meat content increased totally by 4.28 percent points. This increase was more rapid in the first part of the period analysed whereas it was generally stabilized in the second part.

The increase of lean meat content was only marginally related to the reduction of carcass weight. Based on the previous analyses it is estimated that the above mentioned decrease in carcass weight would only result in 0.20 to 0.30 % increase of carcass lean content. Therefore, other factors and especially genetics are responsible for the improvement in carcass lean content. This logically resulted in different average classification results according to the SEUROP system. It is evidenced by the proportion of carcasses classified in S, E and U classes which was 68.4 % in 1995 compared to 96.1 % in 2010. Similarly, the proportion of R, O and P classes decreased over the analysed period. For instance, the proportion of R class was reduced by 22.8 percent point and the P class is currently practically absent.

Key Words: pig; lean meat content; development tendency

The assessment of pig carcasses according to their lean meat content is based on nutritional recommendations for consumers, requirements of the meat industry and also pig producers. The principles of this assessment are described in several German reports (Oster et al. 1987; Branscheid et al. 1992) and also in the study of Pulkrábek et al. (1994). The pig carcass classification methods applied in compliance with the EU legislation were evaluated in the reports by Daumas (2003), Branscheid, Höreth and Dobrowolski (2004), Pulkrábek et al. (2004) and others.

Pig producers strive to sell slaughter pigs as profitably as possible. Therefore, they are encouraged to employ necessary measures to improve pig carcass quality with respect to the lean meat to fat ratio. Different factors influencing pig carcass composition were quantified and genetics and hybridization were identified as the most important (Pulkrábek et al. 1999).

Pig carcass classification based on the SEUROP system had already been applied in the Czech Republic before the accession to the European Union. Therefore, it is possible exploit some evaluations performed during the preparation period before the classification system was fully implemented.

The objective of this study was to evaluate the changes in pig carcass quality over time in a single slaughterhouse. The development of lean meat content, which is one of the most important carcass quality traits, was analysed during the period of fifteen years.

Material and Methods

A total of 66,102 pigs of hybrid combinations commonly used in the Czech Republic were included in the evaluation. The batch system was used in fattening operations. The ratio of gilts and barrows was 1:1. The data were obtained from a single abattoir in the period from 1995 to 2010. Four subgroups consisted of (I) 9,502, (II) 31,610, (III) 9,679, and (IV) 15,311 pigs slaughtered in 1995, 2001, 2005, and 2010, respectively. The weight of all carcasses ranged between 60 and 120 kg. The content of lean meat was determined using the FOM apparatus.

First, basic statistical characteristics were calculated for carcass weight and lean meat content. Then, the proportions of carcasses classified in different classes in different years were analysed in more detail and the group differences were compared. All the calculations were performed using the SAS software, version 9.2.

Results and Discussion

Carcass weights and lean meat contents are presented in Table 1. The figures correspond to the values commonly obtained in pig operations under the production conditions of the Czech Republic.

The results indicate that the weight of carcasses increased by 1.75 kg during the overall period analysed. In the period from 1995 to 2001 the carcass weight decreased by 1.48 kg and this tendency continued until 2005 when it reached 86.68 kg. In the last period it increased up to 90.89 kg. This tendency is demonstrated in Figure 1.

The development of the carcass lean meat content over time is shown in Figure 2. It increased by 4.28 percent points during the last 15 years. The most rapid increase was observed from 1995 to 2001 (2.59 percent points; 0.43 percent points per year). It corresponds to the estimates of Matoušek et al. (2004) and others.

Table 1. Carcass weights and lean meat contents

Year Animals (n)	Carcass weight (kg)		Lean content (%)	
	$\overline{x}$	s	$\overline{x}$	s
1995 (n=9 502)	89.14	12.282	52.05	4.289
2001 (n=31 610)	87.66	13.334	54.64	4.089
2005 (n=9 679)	86.68	10.035	55.60	3.345
2010 (n=15 311)	90.89	11.136	56.33	3.217

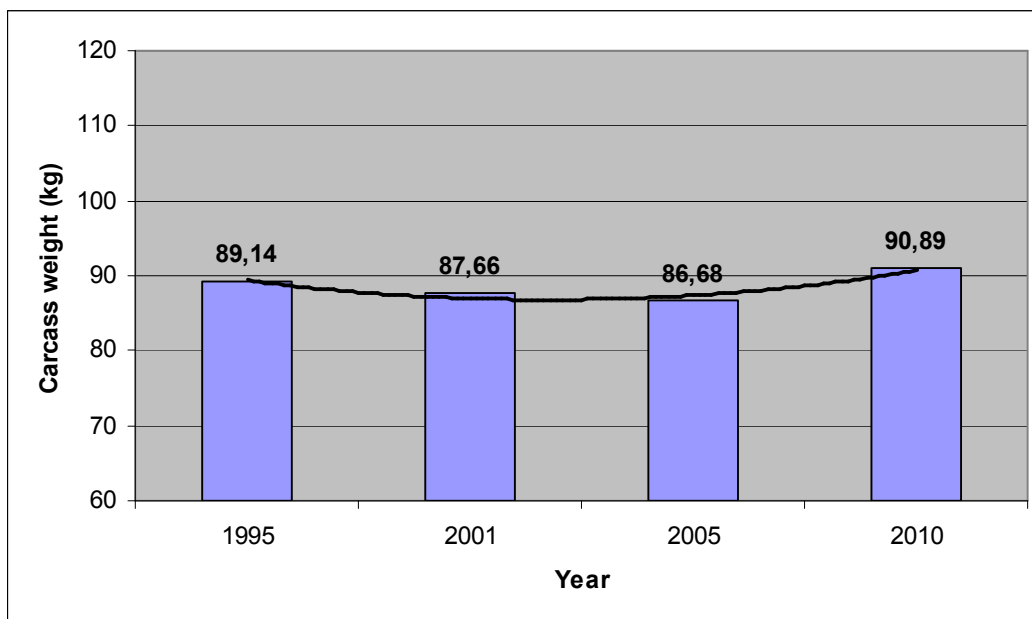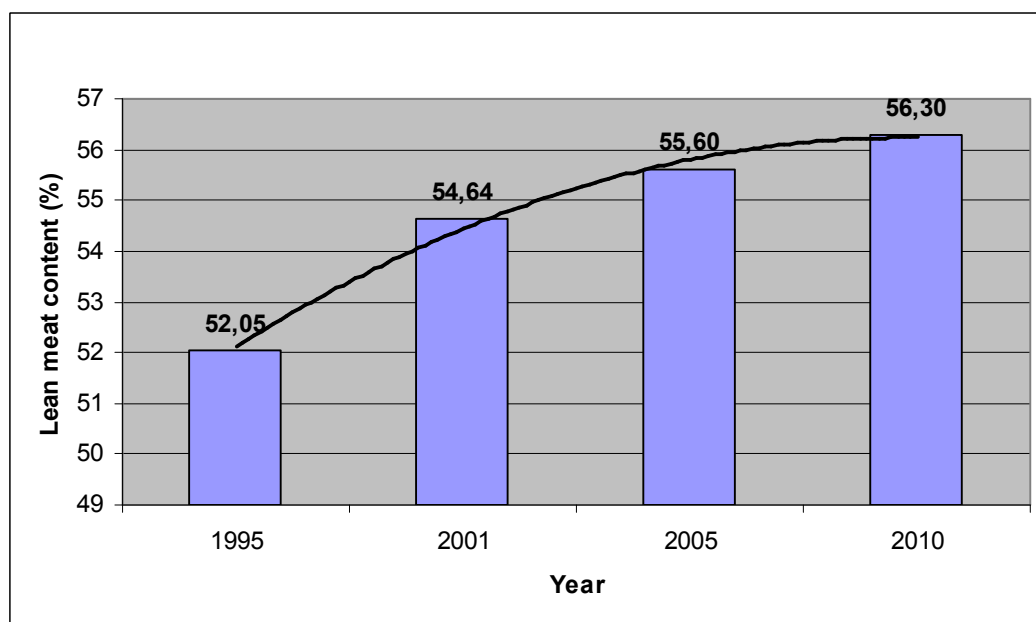*Figure 1. Average carcass weights in different years*

Figure 2. Average carcass lean contents in different years

From 2001 to 2005 the content of lean meat increased more slowly by 0.24 percent points per year, and it was only 0.15 percent points in the last period from 2005 to 2010. In fact, the level of lean meat content is currently stabilized which corresponds to the long-term trends in farmer prices of pigs in the Czech Republic. These prices do not stimulate pig producers to strive for carcasses with a high content of lean. However, it is noteworthy that specialized hybrid combinations with the average carcass lean meat content ranging from 58 to 62 % are currently also present in the Czech Republic.

The increase of lean meat content as a result of a reduced average slaughter weight is negligible. Based on the results of previous studies, such a decrease would only result in the increase of lean meat content ranging from 0.20 to 0.30 %. Therefore, other factors and especially genetics are responsible for the improvement in carcass lean content. This improvement confirms the assumption that Czech pig producers successfully adapted for the application of EU principles in pig production. The results of the earlier study by Pulkrábek et al. (1999) also demonstrate this development of carcass lean meat content. In this study, the results were reported of first analyses performed in the CR in 1990 with the aim to determine lean meat content in pig carcasses. The average lean meat content of purebred animals of the breeds present in the CR at that time was 47.17 % and the carcass weight was 117.1 kg.

The carcass weight ranging from 60.0 to 120.0 is required as a criterion for classification. However, this interval is relatively wide, and therefore carcass weights from 80 to 100 kg are usually preferred in the pig carcass price grids used in the CR.

The quality of pig carcasses produced is also described by the classification according to the SEUROP system (Table 2). Together with the average lean meat content it provides more detailed information about the variance of lean contents in different subgroups. The improved results over the analysed period are also evidenced by the changing proportions of carcasses in different classes.

The increase of carcass lean meat content is accompanied by higher frequencies of carcasses classified in higher classes and a reduced incidence of low quality classes. In 1995, 2001, 2005 and 2010, total proportions of carcasses classified in S, E and U classes were 68.4, 86.9, 93.9 and 96.2 %, respectively. Similarly, the proportions of carcasses classified in R, O and P classes in 1995, 2001, 2005 and 2010 were 31.6, 13.1, 6.1 and 3.9 %, respectively. The tendencies were even more pronounced in individual classes. For instance, the proportion of R class was reduced by 22.8 percent points over the period analysed and the P class is currently practically absent.

The introduction of lean meat content as a new evaluation criterion at least in the first period stimulated producers to seek for possibilities to enhance the content of meat in the final product. Due to the heritability of carcass value, the measures taken included especially new hybridization approaches. Some authors recommended reducing the slaughter weight of pigs but this seems to have only a marginal effect on lean meat content increase. In addition, it may negatively affect the profitability of pig production. It should be also mentioned that specialised breeding and hybridization programmes are focused on increasing lean meat contents even in higher weight categories.

Table 2. Carcass classification results

Quality class	Carcass lean meat content (%)	1995	2001	2005	2010
		%	%	%	%
S	>60.0	2.6	9.7	8.0	12.0
E	55.0 to 59.9	23.1	37.6	54.1	58.1
U	50.0 to 54.9	42.7	39.6	31.9	26.1
R	45.0 to 49.9	26.4	11.8	5.5	3.6
O	40.0 to 44.9	4.8	1.2	0.5	0.3
P	<39.9	0.4	0.1	0.1	0.0

Summary

During the period from 1995 to 2010 a slight change occurred in the average carcass weight. It increased by 1.75 kg and in the final year it reached 90.89 kg (s = 11.136) with the content of lean meat 56.33 % (3.217). Lean meat content increased by 4.28 percent points. This increase was more rapid in the first part of the period analysed whereas it was generally stabilized in the second part.

The increase of lean meat content was only marginally related to the reduction of carcass weight. Based on the previous analyses it is estimated that the above mentioned decrease in carcass weight would only result in 0.20 to 0.30 % increase of carcass lean content. Therefore, other factors and especially genetics are responsible for the improvement in carcass lean content. This logically resulted in different average classification results according to the SEUROP system. It is evidenced by the proportion of carcasses classified in S, E and U classes which was 68.4 % in 1995 compared to 96.1 % in 2010. Similarly, the proportion of R, O and P classes decreased over the analysed period. The tendencies were even more pronounced in individual classes. For instance, the proportion of R class was reduced by 22.8 percent points over the period analysed and the P class is currently practically absent.

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