THE METHOD OF PARTIAL DISSECTION FOR DETERMINATION OF LEAN MEAT PROPORTION IN PIG CARCASSES*

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With regard to considerable labor consumption associated with full dissections of pig carcasses used for determination of lean meat proportion, the possibility to derive this percentage by dissecting only the main parts of carcass was analyzed. Totally 76 final hybrids representing common pig production in the CR were included into the analysis. Selection of animals and carcass analyses were similar to the method used for derivation of regression equations estimating carcass lean proportion. At first the left carcass sides were jointed into individual cuts in which lean proportions were determined and expressed as lean percentages from carcass weight. A total carcass lean proportion was calculated as the sum of lean percentages in different cuts. To examine the possibility to employ only data from partial dissections, the correlation coefficients (r) between lean proportion in carcass and lean proportions in different cuts were determined. The highest coefficients 0.93, 0.87, 0.70 and 0.63 were found for ham, loin, belly and shoulder, respectively. The correlation coefficient between carcass lean proportion and the sum of lean proportions from the mentioned cuts was 0.88. This result confirms the possibility to use only the full dissection of these four parts to predict carcass lean proportion.

pig; lean meat; partial dissection

INTRODUCTION

The importance of pig carcass assessment based on lean meat proportion is stressed by Matoušek et al. (1995) and Pour (1999). In the CR the methods of lean percentage estimation in pig carcasses were studied by Pulkrábek et al. (1994). These analyses were mostly based on the studies of German researchers, particularly Sack (1982) and Branscheid et al. (1987). For estimating lean proportion under the conditions of the CR the regression equations were proposed for probe and ultrasound techniques and the two-point method. From the literature it is known that regular innovations of these equations are necessary, as pig populations are changing all the time (Engel, Walstra, 1991 and others). The innovations of the regression equations used in the Czech Republic are described by Pulkrábek et al. (2001).

Full dissections based on jointing the whole carcass are, however, extremely laborious. Therefore there is an effort to find a more simplified dissection method based on the dissection of only some main parts of carcasses which, however, would not mean a reduction of prediction accuracy (Walstra, Merkus, 1995).

With regard to the possibility to use the partial carcass dissections, we examined the relationship between lean meat proportion in carcass and lean meat proportions in different cuts. The objective of the study was to specify the cuts available for carcass lean estimation based on the partial pig carcass dissections.

MATERIAL AND METHODS

The methods of animal selection and carcass analysis were similar to the methods used for carcass lean content estimation by detail dissections of pig carcasses. This method is a basic approach used in different techniques of pig carcass classification. Left carcass sides were used for obtaining carcass measures and dissections. The maximum difference between both carcass sides was 1 kg. Therefore, the results obtained for a left side are valid for the whole carcass.

Totally 76 final hybrids (38 gilts and 38 barrows) from common pig production enterprises were included into the analysis. Housing conditions and nutrition of animals were standard for an all in/all out system of pig production. The used hybrid combination comprised both dam lines (Large White and Landrace) and one of the two most frequent sire lines (Czech Meat Pig and Pietrain and the sire sub-line of Large White). Another criterion for selection was, in agreement with recommendations of Branscheid et al. (1987), thickness of fat and skin measured in the paramedian plane 70 mm from the bisection cut. Measuring takes place in the area be-

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Table 1. Different cuts and lean from these cuts as proportions of carcass weight (n = 76)

Cut	Proportion of carcass (%)			
	cut		lean	
	$\bar{x}$	$s_{\bar{x}}$	$\bar{x}$	$s_{\bar{x}}$
Neck	9.10	0.887	6.58	0.814
Loin	11.14	1.065	8.54	1.056
Shoulder	9.74	1.184	7.49	0.964
Ham	20.24	1.794	17.13	1.707
Belly	19.21	1.729	9.93	1.151
Trim	1.26	0.453	0.48	0.137
Cheek	3.61	0.637	1.17	0.431
Fat and skin from back	7.27	1.790	–	–
Fat and skin from belly	4.24	1.071	–	–
Flare	1.84	0.674	–	–
Os sacrum	0.84	0.372	0.36	0.209
Shanks and feet	5.09	0.572	2.14	0.286

tween 2nd and 3rd rib (counted from the last rib marked with no. 1 in the cranial direction).

According to this criterion, the animals were classified as follows:

Thickness of fat with skin	Number of animals	Percentage
11.9 and less	10	13.1
12.0 to 16.9	27	35.5
17.0 to 21.9	18	23.8
22.0 to 26.9	13	17.1
27.0 and more	8	10.5

The average weight of left sides prior the dissection was 44.52 ± 1.184 kg. At the beginning of the dissecting procedure (24 hours *post mortem*), carcasses were jointed into different cuts. From the cuts (with the exception of head and feet) muscle tissue was separated and weighed. The results are expressed as percentages from carcass weight. Correlations (r) between carcass lean and lean from different cuts were determined.

RESULTS AND DISCUSSION

The results are given in Tables 1 and 2. Different cuts and lean meat from these cuts as percentages from carcass are presented in Table 1. The relationships between carcass lean and lean in different cuts are shown in Table 2.

The average slaughter weight of animals and carcass lean proportion were 111.3 ± 1.480 kg and 53.82 ± 0.552%, respectively. These results correspond to the values currently reached by top pig producers in the Czech Republic (Matoušek et al., 1995; Pulkrábek et al., 2001).

The values presented in the tables suggest that individual carcass cuts have different significance for prediction of carcass lean proportion. Lean from the main carcass parts (ham, loin, shoulder and neck) represents more than 73% of the total carcass lean. In case that neck is replaced by belly, lean content from these cuts is as high as 80% from the total carcass lean weight.

This corresponds with the relationship between lean proportions in carcass and different cuts. As the direction of correlations was always positive, their degrees (correlation coefficients) were evaluated. This approach is in agreement with the study of Fiedler et al. (1995) in which the authors analyzed the relationships among all the carcass components.

The only exception to this overall tendency is the comparison of the correlation coefficients describing the relationship between carcass lean and lean in neck and belly. A higher degree of correlation was found for lean from belly. It confirms the extraordinary importance of belly for the prediction of carcass lean proportion, which is in agreement with Pfeifer et al. (1993).

This fact was reflected in the formulation of conclusions on the main objective of the study, i.e. selecting cuts suitable for the partial pig carcass dissection. It is possible to reduce the dissection to ham, loin, shoulder

Table 2. Correlations between carcass lean and lean in different cuts (n = 76)

Correlations between lean in		r
Carcass	– neck	0.60**
	– loin	0.87**
	– shoulder	0.63**
	– ham	0.93**
	– belly	0.70**
	– trim	0.06
	– cheek	0.29**
	– *os sacrum*	0.25**
	– shanks and feet	0.52**

** $P < 0.01$

and belly. It corresponds with the conclusions of Branscheid et al. (1990) and Walstra, Merkus (1995).

In our study the highest correlation coefficients 0.93, 0.87, 0.70 and 0.63 were found between carcass lean proportion and lean proportions in ham, loin, belly and shoulder, respectively. The correlation coefficient between the sum of lean proportions in the mentioned cuts and carcass lean proportion was 0.88. All the mentioned correlation coefficients with the exception of the correlation between carcass lean content and trim were statistically significant.

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PULKRÁBEK, J. – PAVLÍK, J. (Výzkumný ústav živočišné výroby, Praha-Uhříněves, Česká republika):

Metoda zkrácené disekce pro stanovení podílu svaloviny v jatečném těle prasat.

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S ohledem na značnou pracnost disekcí při zjišťování podílu svaloviny v celém jatečném těle prasat byly prošetřeny možnosti stanovení tohoto údaje z dílčích zhodnocení jen v některých jatečných partiích. Byl sledován soubor 76 finálních hybridů odpovídajících běžné produkci jatečných prasat. Při výběru zvířat i při vlastním jatečném rozboru byl využit způsob, který se uplatňuje při stanovení regresních rovnic pro odhad podílu svaloviny. Levé jatečné půlky byly nejprve rozděleny na jednotlivé jatečné partie, v nichž byla sledována svalovina. Údaje z jednotlivých partií byly vyjádřeny jako podíly z celého jatečného těla. Podíl svaloviny v jatečném těle byl tedy získán součtem uvedených dílčích údajů. Pro přešetření možnosti využít dílčích údajů při metodě zkrácené disekce byly stanoveny korelační koeficienty (r) mezi podílem svaloviny v celém jatečném těle a podíly svaloviny v jednotlivých jatečných partiích. Nejvyšší hodnoty korelačních koeficientů byly zjištěny v případě kýty (r = 0,93), pečeně (r = 0,87), boku (r = 0,70) a plece (r = 0,63). Korelační koeficient mezi podílem svaloviny v celém jatečném těle a součtem podílů svaloviny z těchto jatečných partií dosáhl hodnoty r = 0,88. Tím se tedy potvrdila možnost využít při zkrácené detailní analýze zmíněné jatečné partie.

prase; svalovina; zkrácená disekce

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