PIG CARCASS VALUE PARAMETERS ANALYSED WITHIN THE CONTEXT OF SEUROP GRADING SYSTEM

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Abstract

The study was focused on the selected parameters of carcass value used within the SEUROP grading system. There were 1591 pig carcasses put in the test. The lean meat content was determined using the new predicting formula Y(%)=70.28164 – 0.75376 S + 0.00270 M. The average lean meat content reached the value of 59.62 +/- 0.069% and the average carcass value was 91.67 +/- 0.259 kg. Comparing to the old regression formula there was an increasing tendency of the lean meat content of two percentage points. The results of the test according to the grading classes show a very similar share of the two best classes S and E. In the class S were 741 carcasses (46.57%) and in the class E were 739 carcasses (46.45%). Into these two classes were ranked more than 93% of all carcasses put in the test. In the class U were 107 carcasses, which made 6.73% of the sample. In the class R were only 4 carcasses (0.25%) and the classes O and P were not represented. For the use in practice is then necessary to put the subclasses in the range of 1% in the SEUROP grading system – every class is divided into 5 subclasses. In the Czech republic, the carcasses with the carcass weight between 80 and 100 kg are preferred. In this weight interval were 65% of the carcasses. The highest lean meat content (62.14%) was within the weight category 60-70 kg compared to the category of 110-120 kg where the lean meat content was only 56.11%.

Key Words: Pig; SEUROP system; lean meat content; new prediction formulae

The carcass value and its observation is always actual and an intensive research activity is focused on this problem. This appears from the consument's demand and also from the complex characteristics of the carcass value which concerns many partial parameters (Ingr 2003 and others).

In the slaughterhouse conditions are the grading methods focused only on the carcass. The farm prices are made on the base of the carcass value and also other information are obtained about the carcass composition and used for the subsequent slaughter processing (Pulkrábek et al. 2014). The monitoring includes the correct carcass grading and verifying of the carcass composition with use of the detailed carcass dissection. For the construction of the regression formulae for the lean meat content estimation are basic the work studies from Causer et al. (2004).

Material and Methods

There were 1591 pig carcasses put in the test. The carcasses were graded in selected slaughterhouse according to the SEUROP grading system. 45 minutes *post mortem* were measured these parameters in every carcass:

- Carcass weight (hot) in kg
- The backfat thickness (S) on the left carcass half, between the 2nd and 3rd last rib, 7cm from the split-line (point P2), using the FOM device (in mm)
- The muscle depth (M) measured at the same point „P2" with the FOM device (in mm).

On the base of these measured parameters was estimated the lean meat content (y) in each carcass using this formula:

Y (%) = 70.28164 – 0.75376*S + 0.00270*M

The hot carcass weight was lowered by 2% and so the cold carcass weight was determined. The lean meat content and the cold carcass weight are the base for the price of the carcass.

All the measured parameters were evaluated with use of the statistical methods (programs SAS 9.3 and Excel 2007).

Results and Discussion

In Table 1 are presented the basic statistical characteristics of the measured parameters. The average lean meat content estimated with the FOM device reached the value of 59.62%. This result is about 2 percentage points higher than the results presented by Kernerová et al. (2007), Vítek et al. (2008) and other authors who observed the lean meat content in the pig carcasses in the Czech republic. This increase could be explained due to the new methodics for the lean meat content estimation formulae in the European Union. These values are comparable with the results presented in foreign studies (Branscheid, Judas and Höreth, 2011).

The lean meat content was determined in every grading class. The results are presented in the Table nr. 2. The results show an equal representation of the highest classes S and E. In the grading class S were 741 individuals (46.57%) and in the class E were 739 individuals (46,45%). In these two grading classes were more than 93% of all observed carcasses. In the class U were 107 carcasses (6.73%) and in the class R only 4 carcasses (.25%) and the lowest classes O and P weren't present at all. For the practical reasons is important to use the subclasses with the range of 1% of the lean meat content so each of the classes is divided into 5 subclasses.

In the Table 2 are also presented the parameters measured with the FOM device in the P2 point – the backfat thickness and the muscle depth. Depending on the grading class there is a tendency in the changes of the backfat thickness. In the class S was the average backfat thickness 11.40mm and in the worse classes the thickness increased up to the maximum average value in the class R (30.50mm). The class R contented only 4 carcasses, so this result is only estimative. The muscle depth (M) registered no significant changes between the selected grading classes. This point out the heterogenity in the carcass composition and the significant influence of the fat thickness on the lean meat content.

The results of the test were stratified depending to the carcass weight – six weight categories were observed inbetween the range of the SEUROP system (60-120kg). This stratification is shown in the Table 3. In the weight category between 90 and 100 kg were 559 carcasses (35.14%) and in the category between 80 and 90 kg were 475 (29.86%) carcasses. These two categories were the most numerous and together made more than 65% of all carcasses. In the current price mask in the Czech republic is the carcass weight between 80 and 100 kg the most wanted and also best paid. Since 2005, the share of these two weight categories (between 80 and 100kg) increased from 62% to 65% of all carcasses. The highest lean meat content was in the weight category of 60-70kg where it reached the value 62.14% of the lean meat. With increasing carcass weight decreased the average lean meat content. The lowest average of the lean meat content was in the weight category between 110 and 120kg. These results are in accord with the study of Sládek et al. (2010) and other authors.

In all the weight categories were observed also the values of the backfat thickness and the muscle depth measured with the FOM device. In the lightest weight category (60-70kg) reached the fat thickness 10.97mm and increased significantly with the increasing carcass weight to the value of 19.06mm by the heaviest weight category. Similar tendency was registered by the muscle depth which also increased with increasing carcass weight from 46.55mm to 70.22mm.

These changes are shown in the Figure 1, where are also the results from the regression analysis between the carcass weight and the parameters measured in P2 point. The relations between the lean meat content and the measured parameters are shown through the correlation analysis in the Table 4. The highest correlation was detected between the lean meat content and the backfat thickness (S). This confirms the high importance of the fat thickness in the regression model.

Table 1. Basic statistical characteristics for the selected parameters of carcass value

Parameter	Hot carcass weight (kg)	Cold carcass weight (kg)	Fat (mm)	Muscle (mm)	Lean meat content (%)
average	93.55	91.67	14.38	63.30	59.62
x_{min}	62.2	61.0	7	37	46.3
x_{max}	122.3	119.9	32	89	65.2
s	10.528	10.317	3.640	9.319	2.743
S_x	0.264	0.259	0.091	0.234	0.069

Table 2. Results of the test stratified according to the grading classes

Grading class	Individuals	Cold carcass weight (kg)	Lean meat content (%)	Share of the class (%)	Fat thickness (mm)	Muscle depth (mm)
S	741	87.60	61.86	46.57	11.40	63.74
E	739	94.71	58.35	46.45	16.06	63.06
U	107	98.12	53.30	6.73	22.75	61.85
R	4	112.80	47.45	0.25	30.50	66.50

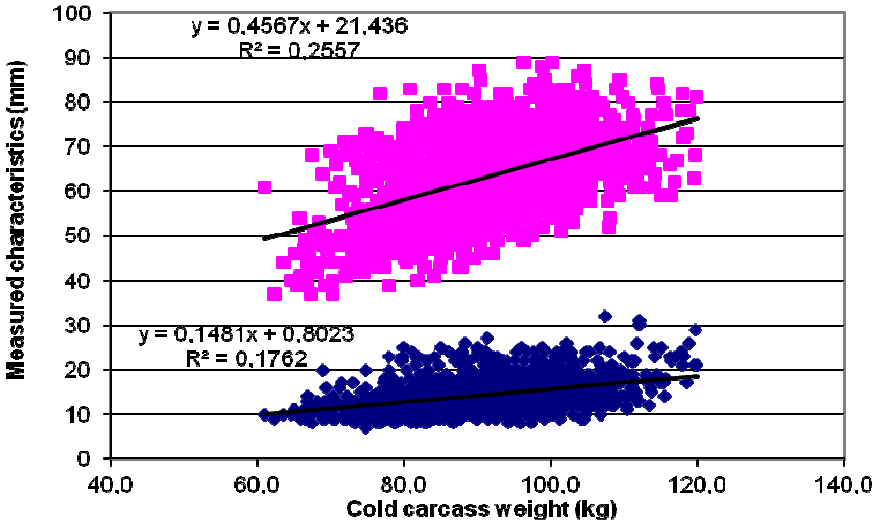
Table 3. Results of the test stratified according to the carcass weight

Weight cathego-ry (kg)	Individuals	Cold carcass weight (kg)	Lean meat con-tent (%)	Share of the ccathegory (%)	Fat thickness (mm)	Muscle depth (mm)
60 – 69.9	33	66.96	62.14	2.07	10.97	46.55
70 – 79.9	176	76.05	61.25	11.06	12.19	55.94
80 – 89.9	475	85.43	60.29	29.86	13.47	60.64
90 – 99.9	559	94.84	59.34	35.14	14.76	65.67
100 – 109.9	294	103.83	58.43	18.48	15.96	68.12
110 – 120.0	54	113.71	56.11	3.39	19.06	70.22
Total 100%	**1 591**	**91.67**	59.62	**100.00**		

Table 4. Relations between the selected parameters (correlations)

	2	3	4	5
	correlation coefficient			
1 Hot carcass weight	+ 0.999	+ 0.420	+ 0.506	-0.416
2 Cold carcass weight	-	+0.420	+0.506	-0.416
3 Fat thickness		-	-0.019	-0.999
4 Muscle depth			-	+0.028
5 Lean meat content				

Figure 1. Characteristics S and M depending on the carcass weight



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