

Lean share of Croatian pigs assessed by previous and current EU legislation

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Abstract

The experiment was performed on 144 swine carcasses slaughtered at several Croatian slaughterhouses, selected according to backfat measures obtained by method for lean percentage prediction approved in Croatia (NN 119/1999). One day after slaughter left sides of the carcasses were dissected according to EU referent method (Commission Regulation No 3127/94, Walstra and Merkus, 1996). The dissected lean percentage was assessed using the formulae prescribed in EU Regulation from 1994 (Commission Regulation (EC) No 3127/94) and 2006 (Commission Regulation (EC) No 1197/2006). There were statistically significant differences between the lean shares estimated by Croatian prediction routine and assessed by both previous and current European regulation ($p < 0.01$). When pig carcasses were classified by SEURO system based on the lean percentage established by three mentioned methods, the distribution into quality classes was markedly different. It was concluded that because of substantial difference between the procedures for estimation of dissected lean percentage (51.00 vs. 56.32%) further investigations on that matter are suggested. Croatian lean meat prediction equation significantly differed from dissected lean expressed by both European assessment methods and needs to be adjusted.

Introduction

A problem of lean meat prediction has always been a preoccupation of pork producers. In order to estimate the pork meatiness data objectively determined by dissection of the carcasses are needed. The first reference dissection method used in EU countries was "the Kulmbach reference method" developed by Institut für Fleischerzeugung und Vermahlung in Germany. However, this was very time consuming and laborious method because it included a total dissection of the pig carcass (it lasted 10-12 h per half of the carcass and per person). For this reason a new simplified dissection method called "EU reference method" was introduced in 1994 (EC No 3127/94, in details described by Walstra and Merkus in 1996). This method is based on the dissection of only four main parts (ham, loin, shoulder and belly) and this highly reduces time and personnel needed (only 4-5 h per half of the carcass and per person).

The change of the factors included in equation can lead to significant alteration of meatiness established by dissection; hence the aim of this paper was to determine if there were changes in dissectional meatiness calculated by previous and current EU legislation and to compare this objectively determined meatiness with currently valid method of meatiness estimation in Croatia.

Material and methods

Research was performed on 146 swine carcasses selected in accordance with backfat measures obtained by "two points"- method, approved in Croatia (NN. 119/1999). There was no stratification according to the carcass weight. Pigs were slaughtered in several Croatian slaughterhouses.

One day after slaughter left sides of the carcasses were dissected using an EU referent method. Four main parts (ham, shoulder, loin and ribs) were dissected into muscles, bones, intramuscular and subcutaneous fat with skin. The tender loin was taken into calculation as a separate part. The reference lean meat percentage was calculated by two equations: the first one (EU_1) was prescribed by EC No 3127/1994 and the second one (EU_2) was prescribed by No 1197/2006. Reference lean meat share were calculated by following expressions:

$$Y^* = 1.3 \times 100 \times \frac{\text{weight of tender loin} + \text{weight of lean (fascia included) in shoulder, loin, ham and belly}}{\text{weight of tender loin} + \text{weight of dissected cuts} + \text{weight of remaining cuts}}$$

* EU_1 ,
and

$$Y^{**} = 0.89 \times 100 \times \frac{\text{weight of tender loin} + \text{weight of lean (fascia included) in shoulder, loin, ham and belly}}{\text{weight of tender loin} + \text{weight of dissected cuts}}$$

** EU_2

Share of meat was also predicted by equation for “two points” - method currently prescribed in Croatia (NN 119/1999). The following mathematical expression was used for estimation of pig carcass meatiness:

$$M\% = 47.978 + \left(26.0429 \times \frac{S}{M} \right) + \left(4.5154 \times \sqrt{M} \right) - \left(2.5018 \times \log S \right) - \left(8.4212 \times \sqrt{S} \right)$$

M% = predicted lean meat percentage

Measures for obtaining the variables according to “two points”- method were: lumbar muscle thickness- S (mm); measured as the shortest connection between the cranial end of the lumbar muscle and dorsal edge of the vertebral canal, and fat thickness - M (mm), measured as the minimum thickness of subcutaneous fat (with skin) at the split of the carcass, above *m. gluteus medius*. Results of lean meat yield determination by EU-referent methods from 1994 and 2006 and by equation for “two points” - method were processed and compared. The obtained data were statistically processed by GLM procedure of Statistica (7.1) for Windows Software (StatSoft Inc., 1984-2006).

Results and discussion

Figure 1 shows distribution of pig carcasses into market classes according to SEUROOP system. It can be observed that EU₂ formula for lean meat percentage has classified 27.40% of pig carcasses into the “S” group (highest lean meat share), whilst the EU₂ and prediction formulae have classified only 5.48 and 13.01% of pig carcasses into the same market class. It can also be observed that EU₁ and TP formulae have not classified any of the pig carcasses into market groups with lowest lean share (group “O” and “P”), while the EU₂ formula for referent meatiness have classified into the same groups 1.37% and 2.05% of pig carcasses, respectively.

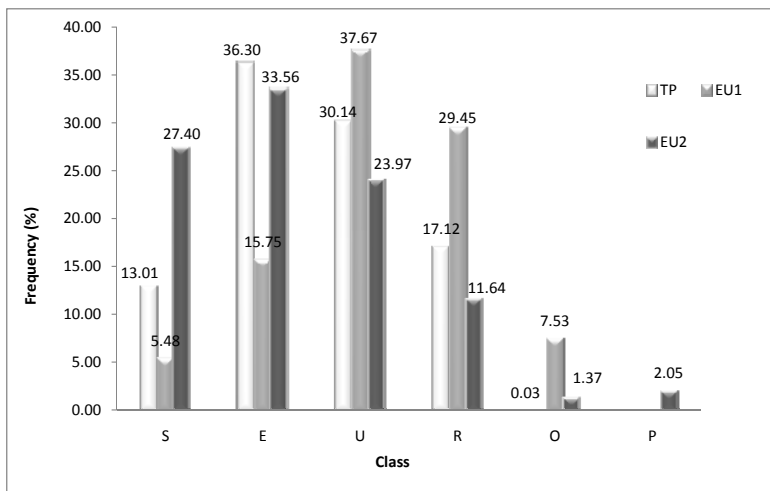


Figure 1. Relative distribution (%) of the pig carcasses into SEUROOP quality classes (N=146).

Table 1 shows the results of meatiness calculated by two formulae prescribed by previous and current EU legislation and predicted by “two points” method prescribed in Croatia. Comparison of the prediction formulae for “two points” method and both previous and current equation for establishing dissection meatiness in pig carcasses showed statistically significant differences ($p < 0.01$) between them. This suggests that equation for meat yield estimation, approved by Croatian regulation underestimates the lean share of investigated pig population and therefore the coefficients used in the equation need to be corrected. Comparison of the dissected meat share determined by previous (EU₁) and current (EU₂) formulae for determination of reference lean meat share prescribed by EU legislation in 1994 and 2006, respectively,

shows surprisingly large differences between them (51.00 vs. 56.32%), hence further investigations on that matter are suggested.

Table 1. Lean meat percentage of pig carcasses calculated by three investigated formulae (N=146)

	EU ₁	EU ₂	TP
Mean	51.00 ^c	56.32 ^a	54.35 ^b
Std	6.39	6.41	5.34
Std Err.	0.53	0.53	

^{a,b,c} Row means with common superscripts do not differ (P>0.05)

Conclusions

On the basis of the investigation on comparison of lean meat share established by previous and current EU legislative, as well as predicted by “two points” estimation method, it can be concluded that the estimation method prescribed by current Croatian regulation underestimates the lean meat share of Croatian pig population and therefore the coefficients used in formulae for this method need to be adjusted. Because of notable difference between the lean share determined by previous and current calculations further investigations on that matter are suggested.

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