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Reproducibility of classification method

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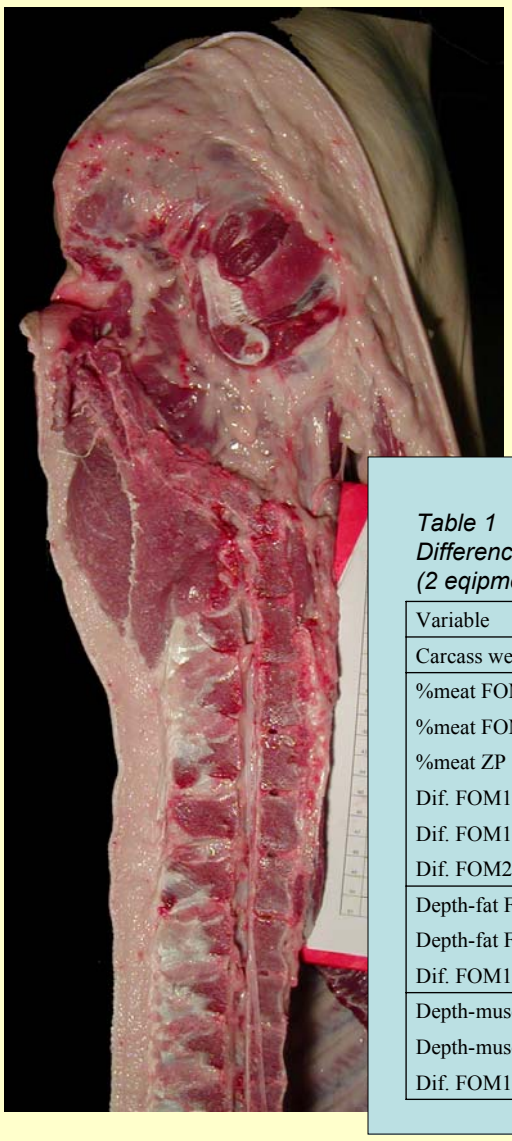
Introduction

Every classification equipment used for predicting lean meat percentage at abattoirs in the EU must be approved by Commission Decision EC No. 3127/94.Most of the classification methods use 2 or 3 predictors: 1 or 2 fat depths and one muscle depth. One fat depth and the muscle depth are measured laterally to the midline, generally 6 cm off, at rib area, in most cases at ¾ last ribs (LR). When a second fat depth is used it is either at ¾ last lumbar vertebra 8 cm off the midline or at LR 6 or 8 cm off the midline. For lean meat measuring there are used probes based on indirect measuring (reflectance, optical or ultrasound) back fat as well as loin eye area depth (Daumas, 1999, Olsen, 2003).

Unless the indirect measure is related perfectly, the predicted values deviate from the true value because there are various measurement techniques, skills and problem that no two identical pigs exit (Olsen, 2002). To manage these deviations, repetitions and statistical analysis can be used (Daumas, 2003, Walstra, Merkus, 1995).

From this point of the view the aim of the trial was to determine the reproducibility of the classification methods FOM/ZP used in abbatoirs in the Czech Republic.



Material and method

The aim of the trial (part) was to determine the reproducibility of the classification methods FOM/ZP used in abbatoirs in the Czech Republic.
The test was carried out on 120 heads of final hybrid pigs an average live weight 108 kg. For lean meat prediction the following equation were used.
Equation for lean meat prediction FOM were:
y = 81,8909 + 0,2006 * M + 14,1911 * ln S
M – Depth-muscle
S – Depth-fat
Equation for lean meat prediction ZP were:
y = 76,6722 – 1,0485 * M + 0,00794 * M2 – 0,002884 * S2 + 9,0151 * ln (M/S)
M – Depth-muscle
S – Depth-fat
The trial has been done according following schema (Daumas, 1999) without respect to equipment (differences between FOM/ZP), with respect to equipment.

The test results were evaluated by using a statistic program SAS® Propriety Software Release 6.04 while differences were tested by means of single/multiple analyses of variance.

	FOM1		FOM2		ZP
	P1	P2	P1	P2	-
1--60	X			X	X
61-120		X	X		X

Table 3
Correlation coefficients with respect to ZP method and equipment- sequence.

Sum			
		FOM 1	FOM 2
ZP	Correlation coef.	0.60514	0.7209
	Prob	*0.0001*	*0.0001*
FOM 1 – 2			
		FOM 1	FOM 2
ZP	Correlation coef.	0.65882	0.69443
	Prob	*0.0001*	*0.0001*
FOM 2 – 1			
		FOM 1	FOM 2
ZP	Correlation coef.	0.5755	0.74041
	Prob	*0.0001*	*0.0001*

Conclusion

On the base of obtained results is evidently that between ZP / FOM systems were obtained lower then 0.8 correlations, which are similar to Olsen (2002), Nissen et al.(2006) and are recommend in the Czech Republic.

Results

The obtained results are presented in the table 1.

Table 1
Differences of the FOM/ZP classification method without respect to equipment (2 eqipments to 1 animal)

Variable	N	Min.	Max.	Mean	Std. Dev.	Std. Error
Carcass weight	120	72.0	139.4	101.72	12.90	1.18
%meat FOM1	120	42.7	65.6	52.22	3.71	0.34
%meat FOM2	120	45.1	69.1	54.77	4.04	0.37
%meat ZP	120	43.4	73.7	52.78	4.37	0.40
Dif. FOM1-FOM2	120	-14.4	10.3	-2.55	2.65	0.24
Dif. FOM1-ZP	120	-19.0	8.7	-0.56	3.64	0.33
Dif. FOM2-ZP	120	-5.1	10.3	1.99	3.16	0.29
Depth-fat FOM1	120	8	38	20.96	4.82	0.44
Depth-fat FOM2	120	7	35	18.82	4.80	0.44
Dif. FOM1-2	120	-4	5	2.14	1.64	0.15
Depth-muscle FOM1	120	48	80	64.97	6.82	0.62
Depth-muscle FOM1	120	52	89	70.14	7.90	0.72
Dif. FOM1-2	120	-23	16	-5.18	6.58	0.60

In the range of measuring there were documented a large difference between equipments FOM1-2 (2.55%) caused mainly of depth-fat-difference (2.14) and depth-muscle (5.17). The equation for CR prefer mainly depth-fat as it is obvious. Following there is clear that the differences range are not affected of sequence of measuring equipment as well as that the classification of pig carcass by abbatoir-equipment (FOM1) was worse.
As far as the same type of equipment errors is concerned (FOM), table 2 shows correlation coefficients between measured fat/muscle depth as well as lean meat percentage.

Table 2
Reproducibility correlations with respect to equipment - sequence.

Equipment (seq.)		Depth-fat	Depth-muscle	Meat %
FOM 2-1	Correlation coef.	0.97422	0.70819	0.91888
	Prob	*0.0001*	*0.0001*	*0.0001*
FOM 1-2	Correlation coef.	0.91552	0.5261	0.67575
	Prob	*0.0001*	*0.0001*	*0.0001*
In sum	Correlation coef.	0.94217	0.609	0.76889
	Prob	*0.0001*	*0.0001*	*0.0001*

It can be mentioned that various equipments without a little bit problems are able to measured the same depth fat (0.91-0.97). However lower values of correlation coefficients was obtained for muscle-depth followed in the range 0.52-0.71. One could say that equipment (FOM) determine exactly depth-fat, worse depth muscle.
In the field of dependence of method of pig realization (ZP/FOM), there are presented in the table 3.

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