EVALUATION OF CARCASS AND MEAT QUALITY ON THE SLAUGHTERLINE OF PIGS WITH FOM DEVICE

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Introduction

The decision in several Yugoslav import slaughter houses was to buy the Danish device Fat-O-Meter (FOM) for carcass and meat quality evaluation on the slaughterline of pigs.
This enabled us to find the correlation between the data on carcasses and meat quality obtained with this device (during the testing period) and by conventional methods i.e. methods used til now, and to define the reliability e.g. possibility of application of this device in Yugoslav conditions of pork production.

Materials and methods

60 meaty commercial pigs were slaughtered in the industrial import slaughterhouse "Carnex" in Vrbas. During the investigation of carcasses, the age, sex and race were not taken in consideration.
The standard technological stunning and slaughter process was used , after a night rest in the depo. The percentage (%) of meat was determined on processed left halves ca 45 min p.m. according to the Yugoslav Rulebook (1985). After that, the % of meat, class of carcasses and R-value were determined with the FOM-device on the same halves.
pH_i values was measured at two places (LD_1 and LD_2) on M. long. dorsi (LD) near the place where the sonde of the FOM-device was applied. The same parameter was determined on M. semimembranosus (SM) in the caudo-medial part and samples were taken for the determination of WHC_i (water holding capacity) in the laboratory til 1,5 h p.m. (Grau and Hamm, 1953).
After the cooling of halves, 24h p.m., pH_k value was determined at the same places and samples were taken for WHC_k.
Samples of 200-300 g, taken from the caudo-medial part of SM, from the same halves, were used for the determination of colour characteristics in laboratory conditions (Göfo, CIE and CIE Lab, Pribiš and Rede, 1982; Robertson, 1977).
Between 60 cooled carcasses where the % of meat was determined according to the Rulebook and with the FOM-device, 20 right halves were chosen for total dissection (Weniger et al., 1963).
According to the mass of hot halves, two weight groups were formed before the dissection: halves < 80 kg and >80 kg.

Results and discussion

The obtained results are presented in 5 Tables.
The average amount of meat on the carcasses determined according to the Rulebook is 41,10% (Table 1) and this value is lower than the one obtained with the FOM-device, 45,53%. The average value of reflection R is 69,95 and the variation coefficient is high (30,25%).

Table 1. Mean values of carcasses and meat quality estimation on the slaughterline (n = 60)

Parameter	% of meat		R
	Rulebook	FOM	
$\bar{x}$	41,10	45,53	69,95
S	1,899	5,220	21,156
Cv	4,62	11,46	30,25

Table 2. Mean values of carcasses quality determination (% of meat) according to the Rulebook, with FOM-device and by total dissection (n = 20)

Mass of hot halves (kg)	Parameter	Rule-book (%)	FOM (%)	Total dissection meat (%)	fatty tissue (%)	bones (%)
<80	$\bar{x}$	41,94	49,73	51,86	27,35	9,84
	S	2,131	6,533	2,838	4,448	0,897
	C_v	5,08	13,14	5,47	16,26	9,12
>80	$\bar{x}$	40,45	48,13	49,69	30,77	9,08
	S	1,299	5,853	2,755	4,909	0,574
	C_v	3,21	12,56	5,54	15,95	6,32

Compared with the total of 60 investigated carcasses (41,10%), the % of meat determined in the lighter group (< 80 kg) submitted to total dissection was only somewhat higher (41,94%) and in the heavier group (>80 kg), somewhat lower % of meat was found. In the same time, with the FOM-device, significantly higher % of meat was found in these 20 carcasses with more uniform mass (79-80 kg). The carcasses <80 kg had 49,73% of meat in comparisson with 45,53% found for all carcasses investigated.
The values of meat percentage on carcasses obtained by total dissection were significantly higher compared to the ones obtained by evaluation according to the Rulebook, as well as with values obtained with FOM-device, however, this difference is not so significant. By total dissection of carcasses lighter than 80 kg, 51,86% of meat was determined, while in carcasses heavier than 80 kg somewhat less meat was found, 49,69%.

Lower yield of meat in carcasses, determined according to the Rulebook (1985) is quite understandable. Namely, according to the Rulebook the carcass meatiness means the total mass of muscle tissue, without the meat of abdominal-rib part. However, this meat is included in the total meat on the carcasses by total dissection according to Weniger (1963), as well as when formulating the regression equation for the calculation of % of meat with the FOM-device, as previously several total dissections of carcasses were performed in our plants by the same method.

Table 3. Correlation coefficients between % of meat on carcasses determined according to the Rulebook, with FOM-device and total dissection

	Total dissection					
	Meat <80	Meat >80	Meat total	Fatty tissue <80	Fatty tissue >80	Fatty tissue total
Rulebook	0,310	0,237	0,375	-0,411	-0,014	-0,343
FOM	0,253	0,770	0,525	-0,217	-0,417	-0,452

There is almost no correlation between the carcass quality determined according to the Rulebook and with the FOM-device on all investigated carcasses (r = -0,033). On the other hand, the correlation coefficient between the mass if meat on 20 halves determined according to the Rulebook and by total dissection is r = 0,375, and with FOM-device and dissection r = 0,525 (Table 3). Having in mind the previous explanation of evaluation method, the better agreement of results obtained with the FOM-device and total dissection is quite expectable. The fact that the correlation coefficient between % of meat determined with FOM-device and total dissection on carcasses heavier than 80 kg (live weight more than 100 kg) points to the reliability of the FOM-device for the carcass quality (% of meat) evaluation of slaughtered pigs, when they were standardized, though it was not the case in this plant during the experiment (Andersen, 1986; Barton-Gade and Olsen, 1986).

The usual correlation coefficient between certain technological quality parameters were determined during these investigations, measured early p.m. and on cooled muslces 24 h p.m. (Table 4). However, there is almost no correlative dependance between certain parameters of technological meat quality and measured reflection R (Table 5).

Conclusion

The quality evaluation of carcasses on slaughterline of pigs with the FOM device depends on the mass uniformity of hot halves and tissue ratio on the carcass. This way of quality evaluation is more reliable than the evaluation according to the Yugoslav Rulebook. The evaluation of meat quality by R-value is not reliable enough and should be combined with at least one parameter of technological meat quality (pH_i). This combined criterion should be defined more precisely for the working conditions in our factories.

Table 4. Correlation coefficient between parameters of technological meat quality

	pH_k	WHC_i	WHC_k	$Plast._i$	$Plast._k$	sensory	$Colour_k$ Göfo	$Colour_k$ y	$Colour_k$ L
pH_i	0,374	-0,311	-0,466	0,406	0,365	0,142	0,149	-0,133	-0,141
pH_k	-	-0,072	-0,378	0,262	0,326	0,286	0,337	-0,366	-0,305
WHC_i	-	-	0,553	-0,633	-0,387	-0,088	-0,232	-0,016	0,052
WHC_k	-	-	-	-0,417	-0,540	-0,005	-0,240	0,169	0,143
$Plast._i$	-	-	-	-	0,435	0,142	0,091	-0,122	-0,171
$Plast._k$	-	-	-	-	-	0,105	-0,011	-0,142	-0,180
$Colour_k$ sensory	-	-	-	-	-	-	0,536	-0,684	0,653
Gofo		-	-	-	-	-	-	0,787	-0,573
y	-	-	-	-	-	-	-	-	0,874

Table 5. Correlation coefficients between some parameters of technological quality measured 45 min p.m. (initial) and 24 h p.m. (final) and reflection R measured with FOM device on hot halves

		pH LD_1	pH LD_2	pH SM	WHC	Plasticity	Colour Sensory	Colour Göfo	Colour y	Colour L
R	initial	-0,231	-0,091	-0,153	0,193	-0,235	-	-	-	-
	final	-0,008	-0,065	-0,086	-0,195	-0,030	-0,135	0,026	0,002	-0,036

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