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MEATINESS AND QUALITATIVE MEAT PROPERTIES OF CROATIAN CROSSBREEDS AND HYPOR PIGS

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Introduction

Croatian pig production, according to breeding program, has a creation of genotypes with high meatiness (over 60% of muscle tissue in the carcass) as the objective. Regarding the fact that average meatiness in Croatia is very low (44-46%), efforts to create genotypes which will have great yields of muscle tissue are quite understandable. Alas, selection of pigs for faster growth and bigger meatiness led to homeostasis disturbances followed by frequent disposition to stress and production of meat with poor technological characteristics. PSE and DFD meat are recognized as the special problem which occurs due to accelerated or decelerated processes of glycolysis post mortem. The aim of our research was to compare the meatiness of the carcasses with physical meat quality indicators of the Croatian genotypes in relation with the genotypes of imported pigs.

Material and Methods

Research was performed on the pig carcasses of the crossbreeds created from, according to Croatian national program Large White, Swedish Landrace and German Landrace (CCB, n=90) and Hypor hybrids (Hy, n=130). Meatiness of the pig carcasses was determined by the WENIGER et al. method (1963.). Comparison of the carcasses was conducted according the (S)EUROP classes. Qualitative characteristics of the meat were determined on the m. longissimus dorsi samples. After slaughtering, 45 minutes p.m., pH_1 value was measured. After 24 hours of cooling on +4 °C, pH_2 value, water holding capacity (Grau and Hamm method) and the color of the meat (Göffo-device) was measured. Results of the research were processed by the statistical methods using MS Excel 5.0 program.

Results and discussion

Carcass mass was equalized in both of the pig genotypes, which was one of the prerequirements for defining the research (table 1.). Share of the muscle tissue in the carcass, determined by total dissection, depended on the genotype of the pigs. Carcasses of the imported genotypes (Hy) contained 1.39 kg, that is 3.05% more meat than Croatian genotype of the pigs (CCB). The difference between absolute and relative muscle tissue share was highly statistically significant ($P < 0.01$), compatible with earlier results (KRALIK et al. 1991).

Valuation of the carcasses according to (S)EUROP classes is shown in the table 2. Analyzed genotypes of the pigs are grouped, due to the high yield of the meat, in classes (S) and E: 50% of the CCB pigs, and 65.4% of the Hy pigs (Graph1).

Table 1. Meatiness of pig carcasses

Genotype	n	Carcass weight, kg		Meatiness of carcasses			
				kg		%	
		x	s	x	s	x	s
Croatian Crossbreeds	90	84.48	5.90	45.53	4.23	53.89	3.11
Hypor	130	84.68	6.98	46.92	5.05	55.53	2.65
Significance test		n.s.		**		**	

n.s. = non significant; **P<0.01

Table 2. Distribution of pig carcasses according to (S)EUROP standard

Genotype		S	E	U	R	O	P	Total
Croatian Crossbreeds	n	4	41	33	12	-	-	90
	%	4.4	45.6	36.7	13.3	-	-	100.0
Hypor	n	6	79	43	2	-	-	130
	%	4.6	60.8	33.1	1.5	-	-	100.0

Quality traits of the muscle tissue are shown in table 3. Water holding capacity can not be related to genotypes of pigs ($P > 0.05$). Figures shown are within the boundaries previously determined by SENČIĆ (1993), PETRIČEVIĆ et al. (1990), and ŽIVKOVIĆ et al. (1992), so they can be considered acceptable from technological aspect. Means for color (Göfo) in both groups are, according to BLENDL et al. (1991), in the normal boundaries (55-80), and tested differences between groups are different on the level $P < 0.05$. However, individual measured values shows that more than one third of the group CCB (44.4%), i.e. one quarter of the group Hy (27.7%) are below border value for the color of the normal meat (PSE=Göfo<55). Significant differences are found between means of pH_1 and pH_2 considering the genotypes of the pigs. Lower pH values points at faster glycolysis flow in the muscles of the pigs. By the frequency analysis of the occurrence of $pH_1 \geq 5.80$ it was identified 96.74% of the CCB pigs, and 92.09% of the Hy pigs (Table 4). Applied proportion test shown that this can be attributed to the genotype ($P < 0.01$). Meat unsuitable for processing occurred more frequently in Hy genotype than in CCB genotype of the pigs (Graph 2 and 3).

Table 3. Indicators of some qualitative meat properties

Indicator	Genotype				Significance test
	Croatian Crossbreeds		Hypor		
	x	s	x	s	
W.H.C, cm^2	7.91	1.61	8.07	1.52	n.s.
pH_1	6.28	0.32	6.09	0.24	**
pH_2	5.79	0.16	5.74	0.20	**
Color, Göfo	60.38	12.06	58.38	16.37	*

n.s. = non significant; * P<0.05; ** P<0.01

Recommendations of BLENDL et al. (1991) and HOFMANN (1994) were accepted for the classification of the meat samples according to pH_1 and pH_2. According to the last author mentioned above, less useful meat (PSE and DFD) can be used in the production of specific goods by addition of the suitable meat

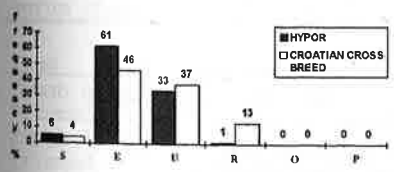
Table 4. Share (%) of "useful" and "less useful" meat with regard to its pH_1 and pH_2 values

Genotype	"Useful"	"Less useful"		"Useful"	"Less useful"	
	$pH_1 \geq 5.80$	pH_1 5.61-5.79	$pH_1 \leq 5.60$ (PSE)	$pH_2 \leq 6.00$	pH_2 6.01-6.19	$pH_2 \geq 6.20$ (DFD)
Croatian Crossbreeds	96.74	3.26	0.00	93.48	5.43	1.01
Hypor	92.09	6.47	1.44	92.80	3.60	3.60

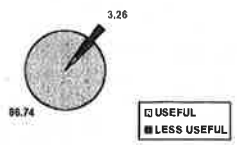
Conclusion

On the basis of the research results the following conclusions can be derived:
- Analyzed Croatian (CCB) and imported (Hy) genotypes of pigs are characterized by high yield of muscle tissue in the carcass (CCB 53.89%, Hy 55.53%). Differences in meatiness among genotypes are highly significant ($P < 0.01$).
- Occurrence of PSE and DFD as "less useful" meat was less expressed in Croatian than in imported genotype of pigs.
- Croatian pig carcasses with lower meatiness have better qualitative traits of the muscle tissue than the Hypor's with higher meatiness.

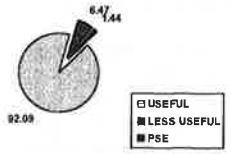
Graph 1. Carcass frequency according to (S)EUROP classification



Graph 2. Share of useful and less useful meat according to pH1 value (CCB)



Graph 3. Share of useful and less useful meat according to pH1 value (Hy)



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