

## CARCASS AND MEAT CHARACTERISTICS OF CROATIAN PIGS

Gordana Kralik and Goran Kušec

J.J. Strossmayer University of Osijek, The Faculty of Agriculture, Trg sv. Trojstva 3, 31000 Osijek, Croatia

**Keywords:** pig, crossbreeds, carcass weight, meatiness, meat quality indicators**Background**

The production of fattening pigs in Republic of Croatia is based upon utilization of meat breed crossings. The value of pig carcasses is determined on the basis of muscle and fatty tissue shares as well as of qualitative meat traits. Market demands pig carcasses with high percentage of good quality muscle tissue and lowered share of fat. Adequate evaluation of pig carcasses sets up a task to breeders to create genotypes of pigs with all favourable characteristics having in mind that between extreme muscularity and qualitative traits negative correlation exists (Blendl et al., 1991). Appropriate selection led to such a pig genotypes that yield up to 60% of muscle tissue (Kralik et al., 1999).

**Objective**

The aim of this study was to explore the quality of carcass and meat of pigs; triple crosses of Swedish Landrace, Large White and German Landrace. Pig carcasses were divided into three weight groups in order to examine the influence of this trait on other indicators of slaughtering quality.

**Material and methods**

Study was carried out on 100 triple crossbred pigs: Swedish Landrace x Large White dams terminally crossed with German Landrace sire. After slaughter pig carcasses were separated according to carcass weight into three groups: 1<sup>st</sup> group 66-75 kg (n=19), 2<sup>nd</sup> group 76-85 kg (n=53) and 3<sup>rd</sup> group 86-95 kg (n=28). Animals were fed ad libitum from 25-60 kg with diet ST<sub>1</sub> (16.5% crude proteins), and further up to around 100 kg live weight with diet ST<sub>2</sub> (14.5% crude proteins). For further investigation right sides of the carcasses were taken (100 half-carcasses in total). Measures of pH<sub>45</sub> were taken from warm carcasses (within 45' post mortem) by probe in the region between 13<sup>th</sup> and 14<sup>th</sup> rib on m.longissimus dorsi (MLD). After this carcasses lengths were taken (os pubis – atlas) as well as the thickness of muscle and fat. Cooled right halves of the carcasses were cut (Weniger et al. 1963) on main parts (ham, back, belly-rib part, neck, shoulder), further precisely dissected on muscle tissue, fat with skin and bones. Less valuable parts included head, glands, legs, tail and kidneys. On the loin cut (between 13<sup>th</sup> and 14<sup>th</sup> rib) muscle and belonging fat area (cm<sup>2</sup>) was measured by Comberg (1978) method. These measures were used in calculation of fat/MLD ratio. At the same place pH<sub>24</sub> value (24 hours post mortem) and colour of the meat (Göfo) were measured, and the sample was taken for determination of water holding capacity – w.h.c. (cm<sup>2</sup>) by compression method according to Grau & Hamm (1952). Statistical analysis was performed using STATISTICA ver. 6.0 program.

**Results and discussion**

Absolute weight of the main parts was significantly increasing ( $P < 0.05$ ) related to carcass weight (Tab. 1). The carcass weight has influence on relative shares of ham, belly-rib part and less valuable parts. The highest ham yield (29.43%) was found in 1<sup>st</sup> carcass group; statistically significant decrease of ham percentage (28.89% and 28.13%) was established in groups with heavier pig carcasses. Since ham is characterized by high lean percentage it is understandable that decrease in relative share of ham decreases relative share of muscle tissue in carcasses (Table 3). Increasing carcass weight consequently increase back fat thickness and thickness of the fat over MLD ( $P < 0.05$ ). This study showed that fat/MLD ratio is significantly increased with increasing carcass weight. This is in accordance with previous results of Senčić et al. (1995, 1996), Kralik et al. (1997) and Kušec et al. (1998). These authors stated that fat/muscle ratio at MLD surface is in negative relation with lean meat percentage in pig carcasses. They also found that correlation between fat/muscle ratio at the surface of MLD cut and lean meat yield of pig carcasses (determined by dissection) is very strong and that this ratio is good indicator of carcass quality. Meat quality indicators of pig carcasses are presented in Table 2. Values of pH measured 45 minutes *post mortem*, as indicator of glycolytic process velocity and values of pH taken after 24 hours of chilling have not depended on carcass weight. The same is valid for water binding capacity of meat. The study showed that carcasses of 3<sup>rd</sup> group had higher Göfo values of colour than meat of the 1<sup>st</sup> and 2<sup>nd</sup> group ( $P < 0.05$ ). The quality of muscle tissue from analysed meat samples taken from carcasses of the pigs from different weight categories was within boundaries for crossbreeds of lean breeds stated by Živković et al. (1992), Kralik et al. (1995), Senčić et al. (1995) and Petričević et al. (1999).

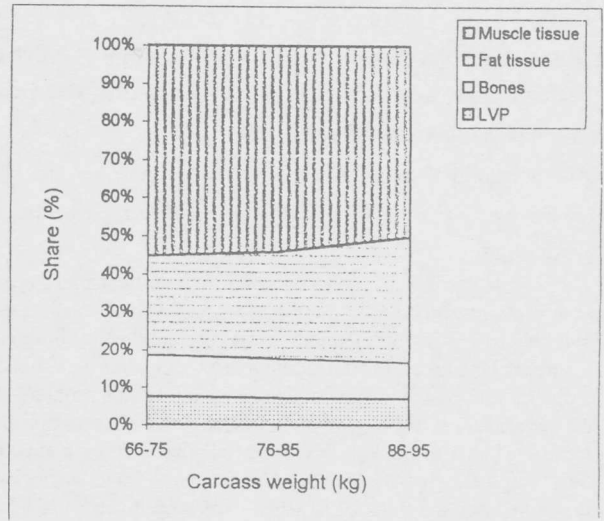
**Conclusions**

The study of carcass traits of triple crossed pigs (SLxLW)xGL, divided into three groups: 1<sup>st</sup> 66-75 kg, 2<sup>nd</sup> 76-85 kg and 3<sup>rd</sup> 86-95 kg, led to the following conclusions:

- By increase of carcass weight relative shares of ham, belly-rib part and less valuable parts were also increased ( $P < 0.05$ ).
- Lean meat percentages of pig carcasses were as follows: 1<sup>st</sup> group 55.19%, 2<sup>nd</sup> group 53.99% and 3<sup>d</sup> group 50.19%.
- Increase in carcass weight decreases shares of muscle tissue and bones and increases the share of fatty tissues ( $P < 0.05$ ).
- Meat quality indicators were within boundaries characteristic for the meat of satisfactory quality; only for colour statistically significant difference ( $P < 0.05$ ) between groups of carcasses was found.

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Graph 1. Shares of tissues and less valuable parts (LVP) in carcasses

Table 1. Traits of pig carcasses

Indicator	1 <sup>st</sup> group $\bar{x} \pm s\bar{x}$	2 <sup>nd</sup> group $\bar{x} \pm s\bar{x}$	3 <sup>rd</sup> group $\bar{x} \pm s\bar{x}$	
Weight of warm carcasses, kg	72.11 <sup>a</sup> ±0,64	80.51 <sup>b</sup> ±0,37	90.18 <sup>c</sup> ±0,52	
Weight of cooled carcasses, kg	70.64 <sup>a</sup> ±0,72	78.58 <sup>b</sup> ±0,49	88.16 <sup>c</sup> ±0,69	
Ham	kg	20.79 <sup>a</sup> ±0,35	22.69 <sup>b</sup> ±0,19	24.80 <sup>c</sup> ±0,30
	%	29.43 <sup>b</sup> ±0,39	28.89 <sup>a</sup> ±0,21	28.13 <sup>a</sup> ±0,28
Shoulder	kg	10.03 <sup>a</sup> ±0,20	11.42 <sup>b</sup> ±0,13	12.45 <sup>c</sup> ±0,18
	%	14.21±0,25	14.54±0,14	14.14±0,22
Back	kg	11.45 <sup>a</sup> ±0,25	12.90 <sup>b</sup> ±0,21	14.02 <sup>c</sup> ±0,33
	%	16.21±0,33	16.43±0,15	15.90±0,36
Belly-rib part	kg	13.32 <sup>a</sup> ±0,28	15.14 <sup>b</sup> ±0,21	17.90 <sup>c</sup> ±0,37
	%	18.86±0,33	19.25±0,20	20.27±0,32
Neck	kg	5.92 <sup>a</sup> ±0,12	6.53 <sup>b</sup> ±0,10	7.26 <sup>c</sup> ±0,18
	%	8.38±0,15	8.31±0,12	8.25±0,21
Less valuable parts	kg	9.13 <sup>a</sup> ±0,11	9.90 <sup>a</sup> ±0,09	11.73 <sup>b</sup> ±0,13
	%	12.91±0,13	12.58±0,11	13.31±0,14
Fat thickness, mm	17.74 <sup>a</sup> ±1,27	19.38 <sup>b</sup> ±0,85	22.21 <sup>c</sup> ±1,55	
Muscle thickness, mm	62.53±1,08	63.96±0,80	65.54±1,17	
MLD surface, cm <sup>2</sup>	37.48±1,24	39.52±0,97	38.24±1,22	
Fat surface, cm <sup>2</sup>	17.50 <sup>a</sup> ±0,85	21.39 <sup>b</sup> ±0,78	24.18 <sup>c</sup> ±1,52	
Fat/MLD ratio	0.48 <sup>a</sup> ±0,03	0.57 <sup>b</sup> ±0,03	0.65 <sup>c</sup> ±0,60	
Carcass length, cm	101.89 <sup>a</sup> ±1,21	104.00 <sup>b</sup> ±0,57	104.86 <sup>b</sup> ±0,47	

a, b, c Means in the same row with different superscripts differ (P<0.05)

Table 2. Share of tissues in carcasses

Tissue	1 <sup>st</sup> group $\bar{x} \pm s\bar{x}$	2 <sup>nd</sup> group $\bar{x} \pm s\bar{x}$	3 <sup>rd</sup> group $\bar{x} \pm s\bar{x}$
Muscle, kg	39.00 <sup>a</sup> ±0,80	42.36 <sup>b</sup> ±0,50	44.16 <sup>c</sup> ±0,89
	55.19 <sup>a</sup> ±0,95	53.99 <sup>a</sup> ±0,66	50.11 <sup>b</sup> ±0,98
Fatty, kg	18.43 <sup>a</sup> ±0,68	22.35 <sup>a</sup> ±0,61	29.13 <sup>c</sup> ±1,07
	26.11 <sup>a</sup> ±0,96	28.30 <sup>a</sup> ±0,69	33.02 <sup>b</sup> ±1,17
Bones, kg	7.73 <sup>a</sup> ±0,19	8.23 <sup>b</sup> ±0,12	8.51 <sup>c</sup> ±0,21
	10.96 <sup>a</sup> ±0,21	10.47 <sup>a</sup> ±0,13	9.65 <sup>c</sup> ±0,22

a, b, c Means in the same row with different superscripts differ (P<0.05)

Table 3. Indicators of MLD quality

Indicator	1 <sup>st</sup> group $\bar{x} \pm s\bar{x}$	2 <sup>nd</sup> group $\bar{x} \pm s\bar{x}$	3 <sup>rd</sup> group $\bar{x} \pm s\bar{x}$
pH <sub>1</sub>	5.95±0,06	6.01±0,04	5.98±0,06
pH <sub>2</sub>	5.66±0,05	5.66±0,02	5.67±0,03
Colour, Göfo value	59.42 <sup>a</sup> ±0,91	58.79 <sup>a</sup> ±0,82	61.80 <sup>b</sup> ±0,93
W.H.C., cm <sup>2</sup>	9.07±0,28	9.39±0,18	8.88±0,38

a, b, c Means in the same row with different superscripts differ (P<0.05)