CARCASS TRAITS OF BABY BEEF SIMMENTAL CATTLE

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SUMMARY

The objective of this investigation was to determine the distribution within EUROP classes and carcass traits (weight and measurements, dressing percentage, shares of separated fat and dissected muscle, fat, bone and tendon tissues) of young Simmental bulls (n=13) and heifers (n=13), which were produced as Croatian baby beef designed for export. The EUROP classification showed a favourable conformation of both, bulls and heifers with about one third of carcasses graded as highest E class. The heifer's fatness was less favourable and almost half of carcasses were classified as high fat class (4) and thus less valid. The amount of trimmed carcass fat was higher (P>0.001) in heifers than in bulls (6.68 % vs. 4.70 %) as well as the share of fat tissue after carcass dissection (10.58 % vs. 7.27 %). The share of muscle tissue in the carcass was higher (P>0.001) in bulls compared to heifers (70.45 % vs. 67.09 %). The bulls also showed a longer (P>0.05) carcass length (135.66 cm vs. 132.07 cm), as well as a larger (P>0.001) perimeter of the leg (122.65 cm vs. 116.38 cm) in comparison with heifers. The differences between bulls and heifers in dressing percentage, leg length, shares of Milanese cut, bone and tendon tissue in the carcass were small and not significant (P>0.05).

Key words: *Simmental cattle, baby-beef, EUROP system, carcass traits*

INTRODUCTION

Croatia has traditionally been the exporter of livestock and beef, with Italy as the most important export destination (Pankretić, 1998). The most exported product is the baby beef – meat from carcasses of corn-fattened Simmental cattle at the age of about 12 months (Kolega et al., 2003). It is usually cut and marketed in the form of Milanese cut, consisting of the most valuable carcass parts. Weight, conformation and proportions of lean and fat principally determine the market value of a beef carcass. Since 2004, the EUROP classification system for beef carcass evaluation has been introduced in the slaughter plants in Croatia (NN 20/2004). This system determines the carcass conformation (meat deposition) and adiposity (fatness) class by common grading scheme facilitating reasonable financial settlement with the producer and carcass trade on the European Union market for comparable prices (Kallwet and Henning, 1998; Florek and Litwinezuk, 2002; Wajda and Daszkiewicz, 2002).

The objective of this investigation was to determine the distribution within EUROP conformation and fatness classes and carcass traits of young Simmental bulls and heifers, which were produced as Croatian baby beef designed for the Italian market.

MATERIAL AND METHODS

The study was conducted in twenty-six Simmental cattle (a total of 13 bulls and 13 heifers). The animals were calved over the period Oct.-Dec. 2004 on the family farms in the north-western region of Croatia and bought at the beginning of May 2005 by Baby Beef Producers Association, Gudovec for fattening purposes. The fattening took place at the same farm in the two nearby fattening units under the similar conditions for all animals. The mean weight of bulls at the start of fattening was 294 kg, while that of heifers was 288 kg. They were fed corn grain silage ad libitum, complemented with approximately 1 kg of concentrate and 1 kg of hay per animal daily for about 5 months. The mean weight of bulls before slaughter reached 510 kg with an average daily gain of 1.4 kg, while that of heifers was 455 kg with 1.1 kg of average daily gain. At the time of slaughter the

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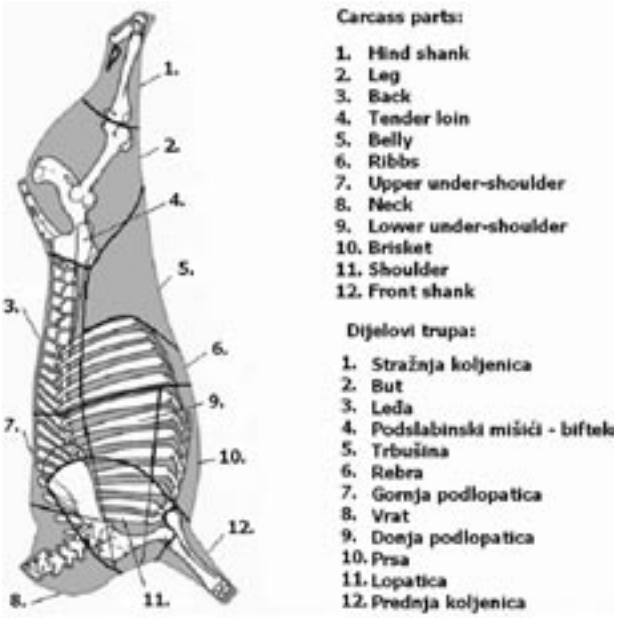
animals were at the age of about 12 months. The slaughter was carried out in five batches during 6 weeks (September – November 2005) in the Meat Industry IMI, Ivanec. This abattoir is approved for export to the European Union (Export number 214, registered 5.5.2004). The animals were transported and slaughtered according to the established regulations (NN 20/04, NN 116/05). Hot carcass weight (HCW) was measured without removing the subcutaneous fat and maintaining the kidney and pelvic fat. The tail was removed. Dressing percentage (DP) was calculated according to the formula: (hot carcass weight / live weight before slaughter) x 100. The excessive covering fat on round and groin area and internal fat depots (kidney and pelvic fat) from the right side were trimmed and weighed together to obtain the average value of separated fat. Once the dressing was finished, the classification according to the EUROP system was performed on hot carcasses by an authorised classifier (Agroinspekt d.o.o.). The classification included the determination of carcass conformation (CONF, expressed as E-excellent, U-very good, R-good, O-fair or P-poor) and carcass fatness (FAT, fat cover expressed as 1-very low fat, 2-low fat, 3-average fat, 4-high fat or 5-very high fat). Several carcass measurements were taken on the right half either by meter: carcass length (measured from the anterior edge of symphysis pubis to the anterior edge of the first rib), length of hind leg (measured from the middle of knee joint in the straight line to the anterior edge of the symphysis pubis) or by tape: perimeter of leg (measured as maximum horizontal contour of a leg at the symphysis pubis level). After cooling for 48 hours at 4°C, the carcasses were weighed once more to determine the cold carcass weight. The carcass tissue composition was assessed by full dissection of the right half of each carcass. The halves were first divided into quarters by cut between the eighth and ninth rib and then into parts, according to scheme presented in Figure 1 (DLG method, Scheper and Scholz, 1985). Each joint was weighed and dissected into the muscle (M), bone (B), fat (F) and tendon (T). The total weight of separated tissues was used as the denominator for calculating the share of a particular tissue in the carcass. The evaluation of the so-called Milanese cut (as % of hot carcass weight) included hind shank, leg, back and tender loin. The carcass traits of bulls and heifers were compared by t-test using PROC TTEST Statement of Statistical Analysis System (SAS Institute, 1999)

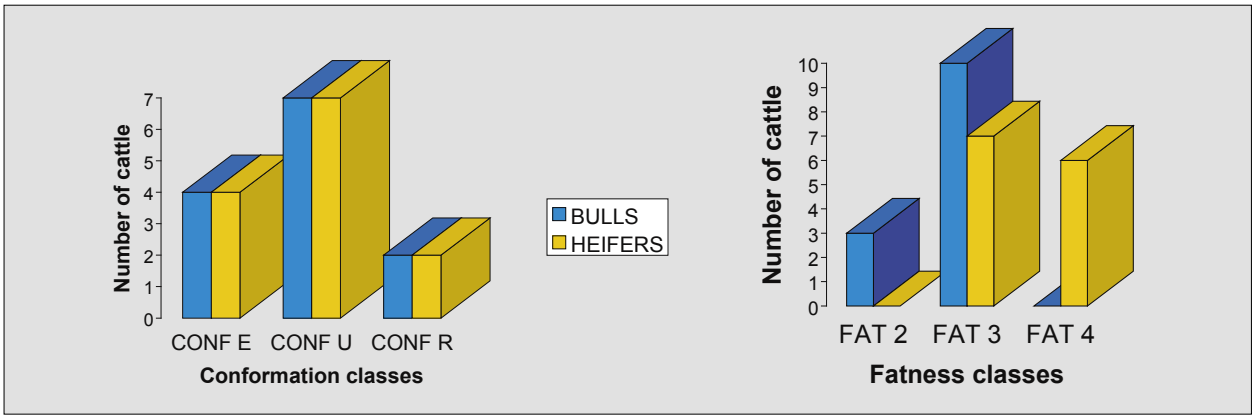
Figure 1. Carcass parts
Slika 1. Dijelovi trupa



RESULTS AND DISCUSSION

As regards conformation, the distribution of the carcasses (Figure 2) of bulls and heifers within classes was equally favourable. More than a half of carcasses (7 or 53.8 % in each category) were classified as class U, 30.8 % of carcasses (4 in each category) were classified as class E and the two carcasses per both sex categories were in the class R (15.4 %). The carcass fatness assessment (Figure 2) showed that bull carcasses had mostly average (10 or 76.9 % in class 3) and low fat (3 or 23.1% in class 2). The carcasses of heifers were characterised by clearly higher fat deposition (7 or 53.8 % in class 3 and 6 or 46.2 % in class 4). These findings, although limited due to small number of graded animals, were in accordance with the fatness class distribution pattern for bulls and heifers reported by Žgur and Drobnič (1998) and Florek and Litwinczuk (2002).

Figure 2. Distribution of carcasses within the EUROP conformation and fatness classes
Slika 2. Raspodjela trupova unutar EUROP klasa konformacije i zamašćenja trupa



As expected, the bulls exhibited higher carcass weights, in correspondence to their higher finishing and slaughter weight. Dressing percentages, however, were similar for both sexes (~ 57 %). The amounts of covering and internal carcass fat were visibly higher in heifers compared to bulls and this difference was evident from the percentage of trimmed carcass fat. The mean value of separated fat was significantly higher (P<0.001) in heifers (6.68 %) compared to bulls (4.78 %). As expected, the bulls exhibited longer carcasses (P<0.05) than heifers (135.66 cm vs. 132.07 cm) but the leg lengths were not significantly different between sexes. Very prominent difference (P<0.001) between bulls and heifers however existed in the leg perimeter (122.65 cm and 116.38 cm, respectively). The share of Milanese cut in the carcass was slightly higher for heifers (45.83 %) than for bulls (45.17 %) but the difference between means was not significant (P>0.05).

The carcass tissue composition determined by dissection of the right half of the carcass showed a significantly (P<0.001) higher share of fat tissue in heifers (10.58 %) than in bulls (7.27 %). The share of muscle tissue was significantly higher (P<0.001) in bulls (70.45 %) than in heifer carcasses (67.09 %). The differences in the shares of bones and tendon tissues between bulls and heifers were small and not significant.

Table 1. Carcass traits of young Simmental bulls and heifers
Tablica 1. Svojstva trupa mladih simentalskih bikova i junica

Carcass traits/svojstva trupa	Bulls/bikovi (n=13)	Heifers/junice (n=13)	Significance/ signifikantnost
Live weight/živa masa (kg)	509.92 ± 7.81	455.23 ± 12.80	**
Hot carcass weight/topli trup (kg)	291.00 ± 5.21	261.00 ± 8.04	**
Dressing percentage/randman (%)	57.06 ± 0.40	57.32 ± 0.51	ns
Separated fat/izdvojena mast (%)	4.78 ± 0.37	6.68 ± 0.29	***
Cold carcass weight/ohlađeni trup (kg)	275.15 ± 4.67	242.31± 6.99	***
Carcass length/duljina trupa (cm)	135.66 ± 1.06	132.07 ± 1.08	*
Leg length/duljina buta (cm)	41.68 ± 0.42	40.96 ± 0.55	ns
Leg perimeter/opseg buta (cm)	122.65 ± 1.13	116.38 ± 1.27	***
Milanese cut/milanski rez (%)	45.17 ± 0.55	45.83 ± 0.72	ns
Muscle tissue/mišićno tkivo (%)	70.45 ± 0.52	67.09 ± 0.49	***
Fat tissue/masno tkivo (%)	7.27 ± 0.50	10.58 ± 0.56	***
Bones/kosti (%)	16.33 ± 0.30	16.24 ± 0.25	ns
Tendon tissue/vezivno tkivo (%)	5.91 ± 0.27	6.13 ± 0.37	ns

Expressed as a mean ± standard error / izraženo kao prosjek ± standardna greška,
*P<0.05; ** P<0.01; *** P<0.001; ns-not significant/nije signifikantno (P>0.05); t test, 2-sided/t-test, dvostrana provjera

CONCLUSION

The EUROP classification of baby beef car-

casses showed a favourable conformation of both, young Simmental bulls and heifers with about one third of carcasses graded as the highest E class. The heifer fatness classification, however, was less favourable and almost half of the heifer carcasses were classified as high fat and thus of lesser value. High amount of trimmed fat and a higher share of fat tissue and a lower share of muscle in comparison to bulls confirmed the over-fatness of heifers after carcass dissection. The differences between bulls and heifers in dressing percentage, shares of Milanese cut, bone and tendon tissue in the carcass were relatively small. These findings, however, need to be confirmed in the further studies in a larger number of baby beef cattle.

ACKNOWLEDGEMENT

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PROŠIRENI SAŽETAK

SVOJSTVA TRUPA SIMENTALSKE TOVNE MLADE JUNADI

Hrvatska je tradicionalni izvoznik baby-beef mesa intenzivno utovljene mlade simentalske junadi. Najviše se obrađuje u obliku milanskog reza i izvozi na tržište Italije. Od 2004. godine u klaonicama Hrvatske primjenjuje se jedinstveni EUROP klasifikacijski sustav ocjene goveđih trupova na liniji klanja. Prema njemu se konformacija i zamašćenost trupa ocjenjuju određenim klasama omogućavajući naplatu i promet trupova na EU tržištu prema usporedivim cijenama. Cilj ovog istraživanja bio je odrediti distribuciju unutar EUROP klasa i svojstva trupa mladih simantalskih tovnih bikova i junica proizvedenih kao hrvatski baby beef namijenjen za izvoz na talijansko tržište.

Istraživanje je provedeno na 26 životinja, 13 bikova i 13 junica, simentalske pasmine domaćeg podrijetla. Prosječna masa bikova na početku tova iznosila je 294 kg, a masa junica 288 kg. Tov je trajao oko 5 mjeseci uz uobičajeni režim hranidbe: silaža kukuruznog zrna po volji uz dodatak 1 kg koncentrata i 1 kg sijena po grlu dnevno. Završna masa bikova na kraju tova iznosila je u prosjeku 510 kg, uz prosječan dnevni prirast od 1,4 kg, dok je završna masa junica iznosila u prosjeku 455 kg uz prosječan prirast 1,1 kg dnevno. Pred klanje životinje su bile stare oko 12 mjeseci. Klanje i klaonička obrada obavljeni su u IMI Ivanec, u klaonici odobrenoj za izvoz u EU, prema propisanoj proceduri. Masa toplog trupa određena je zajedno s potkožnom, bubrežnom i zdjeličnom masti. Randman je izračunat pomoću formule: (masa toplog trupa / završna masa) x 100. Suvišno potkožno masno tkivo s butova i slabina, kao unutrašnji masni depoi (bubrežna i zdjelična mast) uklonjeni su s desne polovice i izvagani radi određivanja udjela izdvojene masti u trupu. Po završenoj obradi na toplim trupovima izvršena je klasifikacija prema EUROP sustavu od strane ovlaštenog klasifikatora (Agroinspekt d o.o.). Klasifikacija je uključivala vizualnu ocjenu konformacije trupa (iskazanu kao E-odlična, U-vrlo dobra, R-dobra, O-umjerena ili P-slaba) i zamašćenosti trupa (iskazanu kao 1-vrlo niska 2-niska, 3-prosječna, 4-visoka or 5-vrlo visoka). Na desnim polovicama određene su mjere trupa metrom: duljina trupa (mjerena od prednjeg ruba symphysis pubis do prednjeg ruba prvog rebra), duljina buta (mjerena od sredine koljenog zgloba u pravcu do prednjeg ruba symphysis pubis) ili vrpcom: opseg buta (mjeren kao maksimalna horizontalna kontura buta u visini symphysis pubis). Nakon hlađenja kroz 48 sati na 4°C, određena je masa hladnih trupova. Sastav tkiva u trupu određen je potpunom disekcijom desne polovice svakog trupa. Polovice su prvo rasječene u četvrti rezom između osmog i devetog rebra a zatim u dijelove prema shemi prikazanoj u slici 1 (DLG metoda, Scheper and Scholz, 1985). Svaki dio trupa je izvagan i diseciran na mišićno, masno, koštano i vezivno tkivo. Ukupna masa razdvojenih tkiva korištena je za izračun udjela određenog tkiva u trupu. Ocjena milanskog reza, kao postotka od mase toplih polovica uključivala je stražnju koljenicu, but, leđa i podslabinske mišiće. Svojstva trupa bikova i junica uspoređena su t-testom korištenjem PROC TTEST naredbe Statistical Analysis System (SAS Institute, 1999).

EUROP klasifikacija pokazala je povoljnu konformaciju trupa i kod bikova i kod junica s oko ⅓ trupova ocijenjenih najvišom E klasom. Zamašćenost junica međutim, bila je manje povoljna i gotovo polovica trupova bila je klasificirana kao visoko zamašćena (klasa 4) te manje vrijedna. Količina izdvojene masti s trupa bila je viša (P>0,001) kod trupova junica nego kod trupova bikova (6,68 % prema 4,70 %) jednako kao i udio masnog tkiva nakon disekcije trupova (10.58 % prema 7.27 %). Udio mišićnog tkiva u trupu bio je viši (P>0,001) kod bikova nego kod junica (70,45 % prema 67,09 %). Bikovi su također imali duži (P>0,05) trup (135,66 cm prema 132,07 cm) kao i veći (P>0,001) opseg buta (122,65 cm prema 116,38 cm). Razlike između simentalskih tovnih mladih bikova i junica u klaoničkom randmanu, duljini buta, udjelu milanskog reza u trupu, kao i udjelima koštanog i vezivnog tkiva nisu bile značajne (P>0,05).

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BIOLUMINISCENTNE BAKTERIJE NA OSLIĆU (*MERLUCCIUS MERLUCCIUS*)

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SAŽETAK

Bioluminiscencija je zanimljiva pojava proizvodnje svjetla, koju posjeduju različite skupine organizama, kao što su bakterije, gljivice i životinje. Bakterije su najbrojniji bioluminiscentni organizmi, a zanimljivo je da ih većina obitava u moru.

Cilj ovog rada bila je izolacija i određivanje bioluminiscentnih bakterijskih vrsta koje u morskom okolišu žive na ribi. Izolacija bioluminiscentnih bakterija je obavljena s površine kože svježe ulovljenog oslića (Merluccius merluccius) 24 sata po ulovu, pohranjenom u hladnjaku na temperaturu od 4˚C. Izolirane kolonije luminiscentnih bakterija proizvodile su na hranjivoj podlozi intenzivno zelenkasto – plavo svjetlo. Rezultati dobiveni ispitivanjem njihovih morfoloških i biokemijskih osobina uputili su na zaključak da bakterije izolirane s površine kože oslića pripadaju rodu Vibrio, vrsti Vibrio fischeri, koja u određenim uvjetima može uzrokovati bolest kod nekih beskralješnjaka, odnosno kvarenje ribe po ulovu.

Ključne riječi: *bioluminiscentne bakterije, izolacija, određivanje, Merluccius merluccius, Vibrio fischeri*

UVOD

Pojam bioluminiscencije odnosi se na emitiranje svjetlosti od strane živih organizama, koje je rezultat oksidacije organskog spoja luciferina uz pomoć enzima luciferaze. Taj proces je široko rasprostranjen i bilježi se već preko 2500 godina. Najranija su zabilježena istraživanja starih Kineza koji su svoja dostignuća preko Grka proširili i na Zapadne civilizacije, uključujući i poznatog prirodoslovca i filozofa

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