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COMPARASION OF CARCASS YIELD AND WHOLESALE MEAT CHARACTERISTICS OF HOLSTEIN AND BROWN SWISS CATTLE

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Abstract

This study aimed to compare carcass and wholesale beef cut yields of Holstein and Brown Swiss male cattle. The data from Holstein (17) and Brown Swiss (17) cold carcasses were obtained from 34 animals in total slaughtered in a commercial slaughterhouse in Isparta province located in the west Mediterranean region of Turkey. For this purpose, carcasses were fabricated into four primal wholesale carcass bone-in cuts as combined with sub-primal retail cuts. Therefore, cold carcass weights (CCW), killing-out percentages (KO%), forequarter, hindquarter, chuck (combined with brisket), rib (combined with plate), loin (combined with sirloin and flank) and round were recorded in kilograms and as percentages of carcass weight (CW%). There were no significant differences (P>0.05) in CCWs and KO% between breeds. Average CCWs and KO% of each breed were 242.1 and 250 kg and 51.02% and 50.4% for Brown Swiss and Holstein, respectively. There were also no significant differences (P>0.05) in forequarter and hindquarter of breeds. Average weights and CW% of forequarters were 128.4 and 131.9 kg and (53.1% and 52.8%) for Brown Swiss and Holstein, respectively. Similarly hindquarters were 113.7 and 118.1 kg and (46.9% and 47.2%) for Brown Swiss and Holstein, respectively. While there were no significant differences (P>0.05) in other cuts only rib values obtained for Holstein cattle were significantly greater (P<0.05) than those of Brown Swiss cattle. It was observed that there was a tendency for all carcass characteristics of Holstein cattle to be higher than Brown Swiss cattle. However, both cattle could be recommended for beef producers in the region.

Key words: *Holstein, Brown Swiss, Carcass Cuts, Wholesale, Meat Traits.*

INTRODUCTION

Marketable different beef products has become a priority for beef producers in the last decade. Factors affecting ruminant carcass and meat quality are directly related to the animal and its environment (Dannenberger et al., 2006), and probably the most important are breeds and feeding strategies.

Differences in retail market value are available in different parts of the carcass (Morris et al., 1999). Farmers must be rewarded for the production of a larger amount of these high market value beef cuts.

The value of carcass cuts should recognise both the demand and reliability of the consumer as well as the marketing standards that emphasize meat quality, uniformity and consistency. For this reason, an assessment procedure to estimate the weight and yield of carcasses and beef retail cuts is of great importance to the beef industry (Cross and Belk, 1994).

Many published reports on carcass performance comparisons of different breeds have been well-documented and compared carcass characteristics of different breeds slaughtered at the same slaughter weight and fed under different feeding conditions prior to slaughter. It appears that the results of such comparisons including different breeds grown in different climate regions and environmental and marketable conditions are, however, limited in the literature. For the meat production purpose, production potentials of Brown Swiss and Holstein male cattle are usually measured in terms of growth performance, carcass yield and meat quality since the males of both breeds are kept for beef production purposes. Very limited studies are available to recommend and comprehensively compare the carcass and meat qualities of the breeds mentioned in this study.

Therefore, it was aimed to compare carcass and wholesale beef cut yields of Holstein and Brown Swiss cattle in this study.

MATERIALS AND METHODS

Animal

The animals used in this study were comprised of Brown Swiss and Holstein male cattle previously grown in a 12-month feedlot beef system.

Dried alfalfa and hay roughages, as well as ground barley and cattle fattening dietary coarse feed as a concentrate, were provided to achieve 1 kg daily live weight gain and rations were re-adjusted to live weight changes of animals. The study began in December 2011 and was experimented on animals in the university research farm and lasted for 12 months.

The data from Holstein (17) and Brown Swiss (17) cold carcasses were obtained from 34 animals in total slaughtered in a commercial slaughterhouse in Isparta province located in the west Mediterranean region of Turkey. Slaughter data collection and slaughtering process continued from December 2012 to March 2013 for 3 months.

Slaughtering procedure

After slaughter hot carcasses the animals were weighed and then chilled at a temperature of 4°C for 24 h and the cold carcass weights were recorded and used to calculate the killing-out percentage.

Each cold carcass was split into left and right sides by longitudinal sawing along the middle of the vertebral column and then the left side was divided between 12^{th} and 13^{th} thoracic vertebra into forequarter and hindquarter and weighed. Then killing-out percentage was calculated.

Carcass fabrication

Carcasses were divided into major cut groups based on their quality and were fabricated into four primal wholesale carcass bone-in cuts as combined with sub-primal retail cuts (Weniger et al., 1963). Therefore, CCW, KO%, forequarter, hindquarter, chuck (combined with brisket), rib (combined with plate), loin (combined with sirloin and flank) and round were recorded in kilograms and as percentages of carcass weight (CW%).

The retail cuts were weighed using a mobile weighing scale. All weights were taken by the same individuals throughout the experimental period.

Statistical Analysis

Student's *t* test was used to analyse the data and the differences in retail cuts in carcasses of each breed were determined by using statistical software program. (Minitab v.16)

RESULTS AND DISCUSSIONS

Carcass (bone in weight) performance means of breeds are shown in Table 1. Wholesale (bone in weight) beef cuts means of breeds are shown in Table 2.

There were no significant differences (P>0.05) between in all parameters studied.

Table 1. Carcass (bone in weight) performance means

N (34)	BS (N:17)	BS (s.e.)	H N:17)	H (s.e.)	Coefficient of variation	
					BS	H
HCW(fat)	254.4	6.27	261.6	2.69	10.16	4.24
HCW(trimmed)	245.6	6.15	252.8	2.52	10.32	4.11
Chilling loss(kg)	12.25	0.60	11.62	0.55	20.22	19.58
Chilling loss(%)	4.82	0.21	4.43	0.19	17.52	17.77
CCW(kg)	242.1	6.02	250	2.48	10.26	4.08
KO(%)	51.1	0.27	50.4	0.35	2.31	2.82

HCW: Hot carcass weight, CCW: Cold carcass weight, KO: Killing-out percentages, BS: Brown Swiss, H: Holstein

The average HCW (fat) and HCW (trimmed) was 254.4, 261.6 and 245.6, 252.8 kg for Brown Swiss and Holstein groups respectively. There were no significant differences (P >0.05) in HCW (fat) and HCW (trimmed) between breeds.

The average chilling loss as kg and chilling loss as % were 12.25, 11.62 kg and 4.82%, 4.43% for Brown Swiss and Holstein, respectively. There were no significant differences (P>0.05) in chilling loss kg and chilling loss% between breeds.

The average CCWs and KO% of each breed were 242.1, 250 kg and 51.1%, 50.4% for Brown Swiss and Holstein, respectively. There were no significant differences (P>0.05) in CCWs and KO% between breeds (Table 1).

The killing-out percentages found in this study for Holstein (50.4%) groups and for Brown Swiss (51.1%) were higher than the results of reports (Alpan, 1972; Tüzemen et al., 1990; Çatıkkaş and Koç, 2017), but lower than the results of some previous reports (Akbulut and Tüzemen, 1994; Koç and Akman, 2003; Önenç, 2003; Sağöz et al., 2005; Aslan and Zülkadir, 2009; Garip et al., 2010).

The presented values in Table 1 for carcass performances of breeds in this study were found to be higher than the reported carcass yields for Brown Swiss and local breeds and Holstein breed crosses (Akcan and Alpan, 1984; Tüzemen et al., 1990; Karakaş, 2002; Özdoğan, 2007).

Table 2. Means of wholesale beef cuts (Bone in weight)

N (34)	BS (N:17)	BS (s.e.)	H (N:17)	H (s.e.)	Coefficient of variation	
					BS	H
Forequarter (kg)	128.4	2.97	131.9	1.44	9.55	4.51
Forequarter (%)	53.1	0.39	52.8	0.19	3.02	1.51
Hindquarter (kg)	113.7	3.28	118.1	1.21	11.89	4.22
Hindquarter (%)	46.9	0.39	47.2	0.19	3.41	1.69
Chuck (kg)	79.5	2.04	80.1	0.96	10.61	4.95
Chuck (%)	32.84	0.32	32.06	0.35	4.01	4.46
Rib (kg)	48.9	1.06	51.8	1.07	8.91	8.50
Rib (%)	20.25	0.23	20.69	0.28	4.60	5.66
Loin (kg)	32.2	1.10	33.3	0.44	14.15	5.46
Loin (%)	13.26	0.23	13.31	0.17	6.99	4.82
Round (kg)	81.6	2.28	84.8	1.08	11.51	5.23
Round (%)	33.65	0.28	33.94	0.25	3.46	3.03

BS: Brown Swiss, H: Holstein

Average weights and CW% of forequarters were 128.4 and 131.9 kg and (53.1% and 52.8%) for Brown Swiss and Holstein, respectively. There were also no significant differences (P>0.05) in forequarter and hindquarter of breeds.

Similarly hindquarters were 113.7 and 118.1 kg and (46.9% and 47.2%) for Brown Swiss and Holstein, respectively. While there were no significant differences (P>0.05) in other cuts only rib values obtained for Holstein cattle were significantly greater (P<0.05) than those of Brown Swiss cattle. These results found for forequarter and hindquarter in this study were in line with the findings of the studies conducted by Dikeman et al., (1977) and Pabiou et al., (2014).

The average weight chuck, rib, loin and round were 79.5, 48.9, 32.2, and 81.6 kg for Brown Swiss and 80.1, 51.8, 33.3 and 84.8 kg Holstein groups respectively.

There were no significant differences (P>0.05) in chuck, rib, loin and round between breeds. The average percentage of retail cuts chuck, rib, loin and round were 32.84%, 20.25%, 13.26%, and 33.65% for Brown Swiss and 32.06%, 20.69%, 13.31% and 33.94% Holstein groups respectively.

There were also no significant differences (P >0.05) in chuck, rib, loin and round between breeds (Table 2).

Plascencia et al. (1999) reported wholesale cuts yield some groups of feedlot steers, although, the breeds used were unknown, as a percentage were 32.81%, 8.8%, 5.85% and 17.98% for round, sirloin, short loin and chuck with bone, 8.75% and 12.11% for flank and brisket with trim, 9.06% and 11.15% for rib and plate, respectively. Some of the beef cuts mentioned in their study are almost similar with the results found in this study.

CONCLUSIONS

It can be concluded that as Purchas et al. (1999) emphasized that the importance of improvements in producing the high value marketable carcasses and carcass cuts. It is

believed that these improvements would allow the incentives and premiums paid to beef producers on carcasses of the best quality to be obtained in a country.

It was observed that there was a tendency for all carcass characteristics of Holstein cattle to be higher than Brown Swiss cattle. However, the results in this study indicated that both cattle could be recommended for beef producers in the region.

However, since there is a meat-based payment system exist in the region and also carcass grade is based on only killing out percentages can have a stronger market signal to the producer rather than recommendation of breeds because the viability of the beef industry in a value-based marketing system depends on the production of high quality, consistent carcasses with good confirmation and carcasses with high killing out percentages.

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