THE RELATIONSHIP OF CARCASS MEASUREMENTS TO CARCASS COMPOSITION IN HANWOO STEERS

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I. INTRODUCTION

Beef carcass grading systems are to estimate the yield of saleable meat and to determine the eating quality (palatability) of the meat. The meat industry in developed countries is showing trends toward marketing individual muscle cuts to improve the value of retail meat cuts [1]. Ultrasound has been mainly used to estimate parameters such as *longissimus* dosi area, marbling and fat thickness (FT) in live animals, but there are few studies involving beef carcasses [2].
The objectives of this study were to determine the relationship between instrumental carcass measurements and fat content with carcass composition, beef retail product.

II. MATERIALS AND METHODS

A total of 61 Hanwoo steers slaughtered 28-35 month period used. After chilling for 21 h at 1 ℃, the carcasses were weighed (CW) was calculated. Carcasses were measured for carcass length (CL), fat thickness (FT) and fabricated into 10 primal cuts. The statistical analysis was performed by SAS program [3].

III. RESULTS AND DISCUSSION

Means standard deviations for carcass traits are provided in Table 1. The average live weight and cold carcass weight were 759 kg and 469 kg. The average primal cuts weight were tenderloin 8 kg, loin 38 kg, strip lion 10 kg, chuck roll 21 kg, clod 29 kg, top round 25 kg, bottom round 40 kg, brisket 44 kg, shank 13 kg and ribs 58 kg. Carcass characteristics and meat composition data are similar to those found in previous studies [4, 5].
Simple correlations between carcass measurements and carcass primal product are presented in Table 2. As carcass weight increased, carcass dimensions and primal product yield increased. Carcass fat thickness (FT) was negatively correlated to chuck roll, clod, top round and brisket. May et al. [6] found that fat thickness was the most useful predictor of percent retail product from the major primal, but an adjustment concerning the amount of fat in other locations was recommended.

Table 1 Mean, standard deviation (SD), minimum and maximum values of carcass traits and primal yields.

	Mean	SD	Minimum	Maximum		Mean	SD	Minimum	Maximum
LW (kg)	759.72	59.35	627.00	900.00	Tenderloin (kg)	8.16	0.89	6.61	10.39
CW (kg)	469.58	41.14	393.70	567.50	Loin (kg)	38.47	3.74	29.50	46.86
FT (mm)	16.33	6.71	7.00	40.00	Strip lion (kg)	10.39	1.09	8.37	13.31
LMA (cm^2)	94.48	8.74	75.00	112.00	Chuck roll (kg)	21.64	2.72	15.67	27.94
CL (cm)	264.46	8.57	244.00	285.00	Clod (kg)	29.39	3.49	23.43	39.25
FL (cm)	114.79	4.84	101.00	124.00	Top round (kg)	25.82	2.69	20.35	32.20
HL (cm)	150.28	5.55	139.00	163.00	Bottom round (kg)	40.73	4.30	32.53	48.67
CVL (cm)	45.89	5.54	38.00	84.00	Brisket (kg)	44.47	4.80	34.10	57.75
TVL (cm)	80.08	3.76	65.00	86.00	Shank (kg)	13.45	2.21	8.15	19.57
LVL (cm)	42.37	2.55	35.00	50.00	Ribs (kg)	58.14	6.89	42.53	75.02
SVL (cm)	35.52	3.48	27.00	42.00					

Table 2 Simple correlation coefficients between carcass grades, carcass weight, fat thickness, carcass size and yield of primal product.

Trait[2)]	Beef Primal cuts[1)]									
	Tenderloin	Loin	Strip lion	Chuck roll	Clod	Top round	Bottom round	Brisket	Shank	Ribs
LW	0.81***	0.76***	0.65***	0.46***	0.77***	0.81***	0.82***	0.75***	0.61***	0.65***
CW	0.78***	0.78***	0.72***	0.50***	0.72***	0.75***	0.76***	0.76***	0.67***	0.64***
FT	0.04	0.04	0.15	-0.16	-0.02	-0.07	-0.04	0.16	0.39**	0.05
LMA	0.54**	0.68***	0.73***	0.42***	0.50***	0.59***	0.59***	0.52***	0.24	0.55***
CL	0.69***	0.50***	0.41***	0.22	0.77***	0.70***	0.76***	0.55***	0.52***	0.43***
FL	0.56***	0.47***	0.33**	0.39**	0.57***	0.47***	0.56***	0.41**	0.41**	0.33*
HL	0.50***	0.31*	0.20	0.01	0.56***	0.50***	0.53***	0.38**	0.35**	0.30*
CVL	0.23	0.24	0.13	0.20	0.17	0.24	0.23	0.15	0.23	0.14
TVL	0.42***	0.32**	0.20	0.31*	0.34**	0.36**	0.41**	0.15	0.29*	0.23
LVL	0.29*	0.24	0.08	0.05	0.27*	0.28*	0.21	0.18	0.22	0.12
SVL	0.28*	0.19	0.34**	0.06	0.30*	0.32*	0.29*	0.40*	-0.04	0.32*

[1)]Beef primal cuts (KAPE, 2015) [7].
[2)]LW: live weight; CW: cold carcass weight; BT: 5th rib fat thickness; LMA: *longissimus* muscle area; CL: Carcass length; FL: forequarter length; HL: hindquarter length; CVL: cervical vertebrae length; TVL: thoracic vertebrae length; LVL: lumbar vertebrae length; SVL: sacral vertebrae length.
*P<0.05, **P<0.01, ***P<0.001

IV. CONCLUSION

These results show that other variables could in combination with carcass fatness or carcass length. Weight or variables derived from it, such as carcass compactness should be in the carcass grading system for predicting kilograms of meat of the different primal. Fat thickness and *longissimus* muscle area were the most desirable traits to include in the respective prediction equations. Therefore government and industry utilize all available tools when creating and evaluating beef grading systems.

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