

FACTORS AFFECTING CARCASS QUALITY OF THAI-FRENCH BEEF

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Introduction

Thai-French beef or Pon Yang Kham beef is a well-known and acceptable brand which its quality is equal to imported beef from abroad. This product is from Pon Yang Kham Livestock Breeding Cooperative NSC.Ltd., Sakon Nakorn province that has effective system of beef production. Crossbred Charolais x *Bos indicus* steers (>50% Charolais) were fattened by small scaled farmers which initial weight of 350 kg, age of 2 yr and fattening period of 12-14 mo. This research is aimed to investigate the factors affecting carcass quality such as slaughtering weight, age at slaughter and fattening period as well as the effect of carcass weight on percentage of retail cuts of crossbred Charolais feedlot steers.

Materials and Methods

Four hundred and seventeen crossbred Charolais steers were fattened by members of Pon Yang Kham Livestock Breeding Cooperative NSC.Ltd. The slaughtering weight (<580,580-660,>660 kg), age at slaughter (<3,3,>3 yr) and fattening period (<350,350-450,451-550,>550 d) were grouped and recorded. All steers were slaughtered and fabricated into retail cuts according to French cutting system. Carcass quality and retail cuts were recorded during October 2005-February 2006 and analysed by GLM procedure of SAS programme.

Results and Discussions

Effects on carcass quality. The results showed that cold carcass weight and % fat significantly increased but % chilling loss decreased as higher slaughtering weight ($P<0.05$). However, % lean tended to decrease when steers were slaughtered at higher weight. There was no effect of slaughtering weight on % carcass, % bone and marbling score (Table 1). It was found that age at slaughter had not affected on carcass quality, in contrast to Dikeman et al. (1986) who reported that age affected on carcass characteristics especially marbling score and back fat thickness. For fattening period, % chilling loss decreased whereas marbling score increased ($P<0.05$) when steers were fattened longer (data not shown).

Table 1. Effect of slaughtering weight on carcass quality of crossbred Charolais steers

| Items | Slaughtering weight (kg) | | | P values |
|-----------------------------|--------------------------|--------------------|--------------------|----------|
| | <580 (98) ¹ | 580-660 (205) | >660 (114) | |
| Cold carcass weight (kg) | 307.9 ^a | 350.8 ^b | 391.4 ^c | 0.0001 |
| Cold carcass (%) | 56.7 | 56.7 | 56.4 | 0.6469 |
| Lean (%) | 68.7 | 68.2 | 67.7 | 0.0596 |
| Fat (%) | 12.4 ^a | 13.1 ^b | 13.2 ^c | 0.0423 |
| Bone (%) | 13.3 | 13.1 | 13.4 | 0.3074 |
| Chilling loss (%) | 2.9 ^a | 2.8 ^b | 2.6 ^c | 0.0001 |
| Marbling score ² | 3.2 | 3.2 | 3.3 | 0.1129 |

^{abc} Means in the same row with different superscript letter differ significantly ($P<0.05$).

¹ Number in bracket was number of steers ² Marbling score scale 1-5 (1= slight, 5 = abundant)

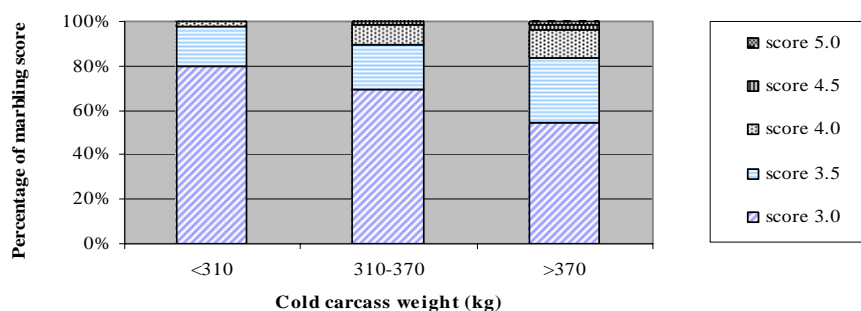


Figure 1. Distribution of marbling score (1-5) according to cold carcass weight

Effect of carcass weight on retail cuts. It was shown that % lean and % bone decreased whereas % fat and marbling score increased as cold carcass weight were higher (Table 2). In addition, % primal cuts such as rib eye, rib set, top round, sirloin tip, paleron and % rough cuts including shank and silver shank were significantly decreased but % brisket increased when carcass weight were >370 kg as shown in Table 2. The carcass consisted of 13% fat in this study whereas average Wagyu steer carcass contained about 35% fat (Longworth, 1983).

Steers with >370 kg of carcass weight had marbling scores (3.0-5.0) and 2.5% of this group was scored at the level of 5.0 (Figure 1). For steers with 310-370 kg of carcass weight, there were scored of 3.0-4.5 and only 1.3% of this group was scored to 4.5 but score of 5.0 was not found. Steers with carcass weight <310 kg had marbling score of 3.0 about 80% of this group but scores of 4.5 and 5.0 was not found. From the study of Opatpatanakit et al. (2004), it showed that Thai-French beef with higher marbling score of 4.0-5.0 had higher intramuscular fat and lower shear force value at 20 d of ageing than those with low marbling score of 3.0-3.5 (11.2 vs 3.8 % and 2.6 vs 3.6 kg, respectively).

Table 2. Effect of cold carcass weight on percentage of retail cuts of crossbred Charolais steers

| Items | Cold carcass weight (kg) | | | P values |
|-----------------------------|--------------------------|---------------------|--------------------|----------|
| | <310 (52) ¹ | 310-370 (241) | >370 (124) | |
| Chuck (%) | 5.01 | 4.93 | 4.94 | 0.6736 |
| Chuck arm (%) | 3.14 | 3.14 | 3.09 | 0.1855 |
| Paleron (%) | 1.57 ^a | 1.51 ^b | 1.45 ^c | 0.0002 |
| Rib eye (boneless) (%) | 4.78 ^a | 4.58 ^{ab} | 4.37 ^b | 0.0410 |
| Rib set (boned-in) (%) | 5.65 ^{ab} | 5.83 ^a | 5.62 ^b | 0.0337 |
| Striploin (%) | 3.43 | 3.53 | 3.46 | 0.3364 |
| T-bone (%) | 7.22 | 7.11 | 7.04 | 0.3661 |
| Filet (%) | 1.47 | 1.45 | 1.40 | 0.1281 |
| Sirloin (%) | 3.71 | 3.71 | 3.72 | 0.9494 |
| Agullette barrone (%) | 0.78 | 0.78 | 0.76 | 0.3365 |
| Top round (%) | 5.87 ^a | 5.80 ^a | 5.59 ^b | 0.0001 |
| Bottom round (%) | 5.41 | 5.49 | 5.40 | 0.1119 |
| Sirloin tip (%) | 3.61 ^a | 3.53 ^a | 3.43 ^b | 0.0001 |
| Brisket (%) | 4.71 ^a | 4.93 ^b | 5.12 ^c | 0.0005 |
| Flank (%) | 0.46 | 0.47 | 0.46 | 0.2010 |
| Bavette (%) | 0.99 | 0.99 | 1.00 | 0.9698 |
| Silver shank (%) | 0.36 ^a | 0.36 ^a | 0.35 ^b | 0.0172 |
| Hampe (%) | 0.33 | 0.33 | 0.34 | 0.6793 |
| Shank (%) | 4.40 ^a | 4.33 ^a | 4.18 ^b | 0.0006 |
| Ground (%) | 11.25 | 11.13 | 11.36 | 0.1457 |
| Lean (%) | 68.87 ^a | 68.12 ^a | 67.33 ^b | 0.0023 |
| Fat (%) | 11.57 ^a | 12.87 ^b | 14.11 ^c | 0.0001 |
| Bone (%) | 13.71 ^a | 13.36 ^{ab} | 13.13 ^b | 0.0421 |
| Scrap (%) | 3.94 | 4.00 | 3.88 | 0.2057 |
| Chilling loss (%) | 1.74 | 1.64 | 1.56 | 0.2421 |
| Marbling score ² | 3.12 ^a | 3.19 ^a | 3.33 ^b | 0.0003 |

^{abc} Means with different superscript differ significantly ($P < 0.05$).

¹ Number in bracket was number of steers ² Marbling score scale 1-5 (1= slight, 5 = abundant)

Conclusions

Higher slaughtering weight significantly caused lower percentage of lean but higher percentage of brisket as well as marbling score. To gain high quality grade as imported meat, steers had to be fattened for 14 mo to reach slaughtering weight 650 kg which age of 3.5 yr. It is needed for the Cooperative to improve breeding programme in order to increase % *Bos taurus* blood in steers. This will be leading to younger age of finishing (<3 yr).

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