

SusCatt - Increasing productivity, resource efficiency and product quality to increase the economic competitiveness of forage and grazing based cattle production systems

Eating quality of meat from dairy and beef × dairy bulls in forage-based production

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About

A high proportion (60-65 percent) of Swedish beef comes from our dairy herds. Although most cows are bred with dairy semen to supply replacement heifers, crossing some cows with beef breeds increases the value of calves and subsequent carcasses but could have impact on beef eating quality. This SusCatt study investigated the effect on meat eating quality of crossbreeding dairy cows with beef sires, for cattle fed different proportions of forage.

Objective

Another part of the SusCatt study identified crossbred dairy calves to have higher growth potential compared to purebred dairy calves - but does this influence beef eating quality? Therefore, in this part of the study we compared quality attributes of meat from crossbred and pure bred dairy bulls fed with two proportions of forage in their diets.

What did we do?

The study compared meat quality from 34 dairy × beef bulls (Swedish Holstein × Angus and Swedish Red × Angus) with 35 dairy-bred bulls (Swedish Holstein and Swedish Red), all raised indoors to slaughter. Half of the bulls from each breed group were fed a high-intensity diet (36% silage of diet dry matter (DM) for slaughter at 15 months. The others were fed a lower intensity diet (56% silage of diet DM) and slaughtered at 18 months. The total mixed rations consisted of grass-clover silage and rolled barley grain, with rolled pea and cold-pressed rapeseed cake initially, to meet



Measurement of ultimate pH_{24hours} in meat from the loin muscle (M. longissimus dorsi). Photo: Karin Wallin

higher protein needs of young calves. More details on rearing, performance and carcass quality are in SusCatt technical note 2.2.1; <https://bit.ly/2GT1OHF>

Post slaughter, chilled carcasses (aged for 7 days) were sampled from the strip loin muscles (M. longissimus dorsi) and frozen prior to assessing classical technological meat quality including;

- pH_{24hours}
- tenderness as Warner-Bratzler shear force,
- colour - values for lightness, redness and yellowness
- water holding capacity from thawing and cooking losses.

Since all these aspects of eating quality are influenced by post-mortem changes in the muscles, dictated by the pH, this alone gives a good indication of ultimate eating quality in fresh meat. Furthermore, sensory attributes were assessed by a trained expert panel and fatty acid composition was analysed.

Similarity in meat quality between breeds

In almost all respects, meat quality did not differ between the groups. With respect to tenderness, the most important meat quality trait, no difference existed between breed types. Angus crosses had greater thawing losses, but cooking or total losses were the same, which reflected in similar results for moistness and tenderness between the breeds. The only differences identified were in colour; meat from Angus crosses had a higher lightness (L^*), redness (a^*) and yellowness (b^*) compared to meat from pure dairy bulls. Greater lightness is most likely due to the higher degree of fat marbling. Meat redness, (red component of the total colour) explains the relative proportion of red and white muscle fibre type composition and hence the concentration of the meat pigment myoglobin and its chemical state. However, at this stage, these differences cannot be explained as an eventual muscle difference between these breed types.

Meat marbling was influenced by both breed and feed intensity

Low feed intensity, as well as Angus genetics, both gave higher degree of marbling fat in the meat, compared with the high feed intensity and dairy breed, which is positive for meat quality.

Feed intensity influenced thawing losses and sensory quality

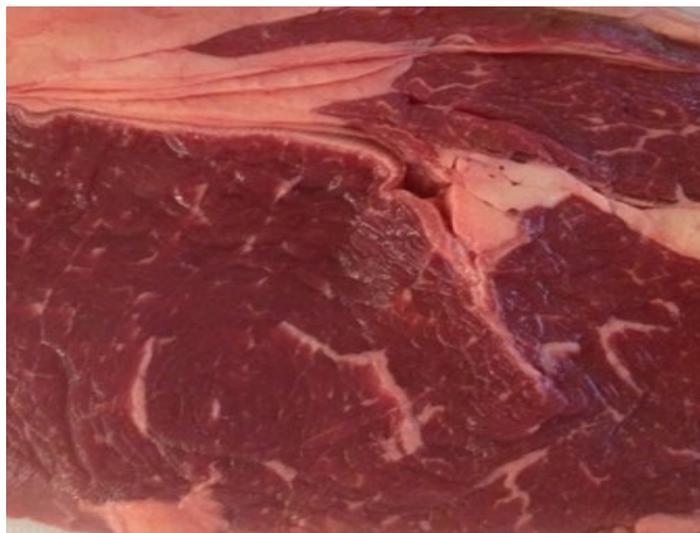
Meat from bulls fed at the high feed intensity had greater thawing losses and the sensory test showed higher values for 'visible tendon-fat' and mouth moist sensation but lower values for 'stable smell'.

Neither breed nor feed intensity influenced the fat composition

Fatty acid profiles were the same for meat irrespective of breed or finishing system.

Conclusion

Using Angus semen (rather than dairy sires) for dairy cows and the choice of feeding intensity for the resulting bull calves have only minor influences on meat quality. Angus genetics led to higher lightness and redness colour components, regardless of feed intensity and all meat, regardless of breed or feeding system, was tender.



Beef with fat marbling, which adds flavor and is therefore an important criteria for eating quality of meat; the more marbling it contains, the better is the eating quality. Photo: Karin Wallin

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