

Sensory characteristics of meat from steers of various breeds and rearing intensities

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Conclusion

In this study, crossing dairy breeds with a specialised beef breed, resulted in inferior sensory characteristics in the meat. Further, the study shows that meat from younger, more intensively reared animals, regardless of breed, were more tender than the older, more extensively reared, animals.

Introduction

The most common category of young cattle slaughtered for beef in Sweden is bulls of dairy breed, most often reared indoors. There is however a potential in raising steers (castrated bulls) for slaughter on semi-natural pasture, which may have an impact on sensory properties of the meat compared to purebred dairy breeds. Furthermore, weight gain and carcass characteristics may be improved by crossing dairy breeds with specialised beef breeds. In combination with the new technique of sex-sorted dairy semen, beef breed semen can be used to the less superior cows in the herd without jeopardizing an adequate number of replacement heifers from the superior cows.

Aim

The aim of the study was to investigate whether there are any differences in sensory meat quality between cross bred and purebred cattle and between two rearing intensities including semi-natural pasture.

Material and method

The study included 64 steer calves born to a dairy breed dam and a dairy or beef breed sire in two production systems, both including grazing semi-natural pastures during summer. Groups comprising 16 purebred dairy steers (D) and 16 dairy x beef crossbreeds (C) were allocated to high indoor feed intensity with slaughter at 21 months of age, and while two corresponding groups of 16 D and 16 C animals were allocated to low indoor feed intensity, slaughtered at 28 months of age.

M. Longissimus dorsi was cooked in a sous vide manner to an internal temperature of 60°C. The meat was cooled, trimmed and sliced in 5 mm thick slices, placed in coded petri dishes and reheated to eating temperature before serving.

Sensory properties were evaluated by a trained, analytical panel consisting of six assessors by the use of descriptive analysis. The intensity of iron, sour, fatty, barny and milky odour as well as metallic, barny and gamey flavour and basic tastes were assessed in triplicate along with attributes describing the appearance and texture of the meat (table 1).

Results and discussion

The meat of beef breed crosses was of inferior eating quality compared to purebred dairy steers, exhibiting a coarser fiber structure ($p=0.009$) and less intense red colour ($p=0.001$). Further, the meat from crossbred steers was less tender, assessed as cutting ($p=0.029$) and chewing resistance ($p=0.05$), less juicy ($p=0.041$) and perceived as having a more sour flavour ($p=0.001$).

Meat from younger, more intensively, reared animals had less intense red colour and was considered to be more tender, i.e. Required less force to cut ($p=0.001$) and chew ($p=0.024$). Interestingly, they also gave meat with a more intense game flavor ($p=0.004$).

The meat quality results from this study will be combined with results from other disciplines such as animal science, business administration and environmental science. It is important to be able to demonstrate various possible added values that comes from pasture-based beef production systems under Swedish conditions.

Table 1. Sensory attributes and definitions established by the panel

Category	Attribute	Definition
Odour	Iron/blood	Odour associated with undercooked meat
	Sour	Acidic scent
	Fatty	Sensation associated with the smell of cooked fat
	Barny	Odours associated with feces/animal/stable
	Milky	Milk scent, associated to dairy cattle
Appearance	Fibre structure	Ocular assessment of coarseness of muscle fibres, from fine to coarse
	Pink colour	The intensity of pink in the centre of the sample, from weak pink to red
	Connective tissue appearance	The degree of white strikes in the meat
Texture	Resistance to cutting by hand	Force required to cut through meat using a table knife cutting three times across the fibres
	Tenderness	Degree of tenderness, from low to high, after chewing three times with molars
	Crumbliness	Disruption, from low to high, after chewing six times with the molars
	Juicyness	Sensation caused by meats with higher levels of juices, from low to high after chewing six times with the molars
Taste	Umami	Taste elicited by monosodium glutamate
	Sour	Taste elicited by acids
Flavour	Metallic flavour	Taste associated with various metal flavors found in meat
	Barny flavour	Aromatics associated with feces/animal/stable
	Game flavour	Taste associated with wild game meat

