Importance of marbling for the prediction of beef eating quality in France and Europe

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Introduction: Beef quality has a multifactorial determinism. This is why various inputs (i.e. ossification and marbling scores, muscle cut, ageing time, hanging method, cooking method etc.) have been introduced in the Meat Standards Australia (MSA) grading scheme to predict beef eating quality at the consumer end. Among them, marbling score is an important trait which significantly contributes to beef eating quality. However, it is not considered so far by the European beef industry except by a few plants. Indeed, in Europe, the main factors of carcass grading are European conformation and fat scores despite there are very poor or even no relationships between these scores and marbling score, as well as with beef eating quality. Thus, the French meat sector represented by INTERBEV decided to promote marbling assessment on beef carcasses and developed its own marbling sensory grid. However, in many countries, marbling is assessed at the 10th-13th thoracic vertebrae whereas, in France as well as in European abattoirs, the preferred carcass grading site is at the 5th rib and cutting at the 10th-13th rib could lead to a lower economic value of the carcass.

Materials and methods: An experiment was conducted to assess willingness of French consumers to purchase beef depending on marbling score. This score was also compared between the 5th and the 10th thoracic vertebrae by using the MSA tools on M. longissimus thoracis et lumborum from 208 French cattle mainly Limousine cows.

Results: We observed that the willingness of French consumers to purchase beef decreased from 70% (before tasting) to 55% (after tasting) when beef samples were low-marbled; whereas the willingness to purchase beef of the same group of consumers increased from 30% (before tasting) to 80% (after tasting), when beef samples were high-marbled. This indicates that, even if consumers prefer the visual appearance of low-marbled beef, the better eating quality of high-marbled beef could ultimately meet their eating expectations. Furthermore, there was no significant difference in marbling score, between the 5th rib and the 10th rib, and hence in the global quality scores (namely MQ4 score, which is a combination of tenderness, juiciness, flavor liking and overall liking) of the different muscles nor in carcass MSA index (which indicates the overall eating quality of a carcass). In addition, the contribution of marbling score to the variability in global eating quality (estimated through the MQ4) varies between 37% to 51% for three cuts from M. longissimus thoracis et lumborum. **[Conclusions]** The grading of marbling can be conducted on M. longissimus thoracis et lumborum at the 5th thoracic vertebrae for a routine assessment and potentially use of the MSA system in Europe.

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