Key conclusion or impact for beef stakeholder

Overall, providing too much detail about safety improving interventions raises suspicion and a higher likelihood of rejection particularly in cases where consumers are not familiar with the technology and its related terminology.

Although consumers do not ask for technology application, they do ask for tangible consumer benefits. They want to take advantage of the eventual positive outcomes of technologies on beef products. Consumer benefits that are well-liked are improved healthiness and eating quality. Therefore, the impact of the application of beef technologies on taste, tenderness and palatability should always be considered to improve consumer acceptance of the resulting product.

It has been argued that consumers should be provided with consumer-oriented information about processing technologies used to produce beef products, in order to allow consumers to make more informed choices and to increase levels of consumer acceptance, as consumers found to be more receptive towards familiar technologies. However, our results confirm literature findings that only providing factual knowledge will not guarantee higher consumer acceptance as such. The studies also suggest that providing too much and too detailed information about beef processing may have adverse effects on consumer acceptance. Understanding consumers’ risk-benefit perceptions, knowledge and trust in information are crucial for the realisation and success of technological advances in the beef sector.

Main scientific publications:


Teagasc, Food Research Centre, Ashtown, Dublin 15, Ireland.

Consumer acceptance and perception of novel technologies for beef products

The consumer research within ProSafeBeef focused on assessing European consumer attitudes towards beef safety, healthiness and beef technologies. During February and March 2010, a second consumer study was conducted, combining an online consumer survey with an experiment. Consumer acceptance of technologies applied at different stages of the beef chain was assessed, as well as the effect of information on consumer preferences. A sensory study was then conducted in Belgium and Norway among 218 beef consumers during January and February 2011, assessing consumer expectations and liking of beef treated with different technologies under different levels of information.

The results showed that not all beef technologies were considered to be favourable. Product familiarity and traditional production methods were preferred. Invasive technologies and excessive manipulation of beef were rejected. Perceived industry benefits decreased consumer acceptance of beef technologies. Furthermore, consumers expressed some reserve towards processing technologies. Grass-fed beef production was evaluated more positively than innovative packaging, and both were evaluated more positively than enhanced beef products. Not all consumers equally accepted beef technologies.

On one side, a group of enthusiastic consumers existed, being heavy beef eaters with high confidence in beef and high food safety concerns. On the other side, beef technology rejecting consumers were relatively low beef consumers with less confidence in beef.
Providing information about beef technologies to consumers had diverging effects. Acceptance of beef technologies was lower when the applied processes was explained, compared to when only information about the application stage was available. However, the results from the sensory consumer survey showed that the provision of detailed consumer-oriented information can enhance consumer acceptance, although not unconditionally.

Background and need for data/technology/innovation

Following the occurrence of meat safety incidents during the nineties, considerable effort has been done to improve safety in the beef chain, both by policy and beef chain actors. Currently, a wide range of technologies to improve beef safety are applied at different stages throughout the beef chain. As a result, the microbiological safety risk has been significantly reduced. Although the benefits for the beef industry and consumers seem to be rather obvious, the application of technologies that are used to enhance beef quality and safety is not always communicated to consumers. Currently, communication to consumers related to technologies and processes used in beef production and processing is often driven by legal obligations (for instance traceability) or profit seeking (e.g. organic labelling). Consequently, information asymmetry between producers and consumers is the rule rather than the exception.

On the one hand, this asymmetry is maintained by the actors in the beef chain who prefer not to communicate about technical procedures that could possibly deter consumers. Industry often fears that consumers might not fully understand the technical details about production and processing techniques. This confusion caused uncertainty among consumers and might decrease industry profits. On the other hand, information about beef technologies to consumers who prefer not to communicate about technical processes used in beef production and processing is often driven by legal obligations (for instance traceability) or profit seeking (e.g. organic labelling). Consequently, information asymmetry between producers and consumers is the rule rather than the exception.

The consumer studies

A sensory study was conducted in Belgium and Norway during January and February 2011.

To adequately assess consumer acceptance of beef technologies, three consumer studies were performed among beef consumers across various European countries. The countries were selected because of their significant beef market volume and potential, as well as for their strategic geographical location within Europe. The consumer studies were executed independently of each other, including different sets of participants, and at different points in time.

In May 2008, eight focus group discussions were conducted in the capital cities of France, Germany, Spain and the UK. In each country, one group of men and one group of women participated in the study. Each group had seven to nine participants. In total, 65 beef consumers first discussed their perception of, and interest in, beef safety, beef healthiness and beef eating quality guarantee, and afterwards they discussed advantages and disadvantages of beef technologies. Not all participants considered the safety interventions acceptable in various conditions. In total, 218 beef consumers participated in the taste testing.

Main results

- Participants of the focus groups reported various perceived advantages and disadvantages of beef technologies. Not all technologies were considered to be favourable. In particular, invasive technologies and excessive interventions were rejected. Traditional and familiar technologies and processes perceived as natural were more easily accepted. The overall trend was ‘the closer to nature, the better’.
- Perceived industry benefits (e.g. increased profits) decreased consumer acceptance, although this effect was not uniform across technologies or countries.
- Information about the applied processes generally lowered acceptance levels compared to when only information about the application stage was available. For instance, while the decontamination of cattle hides seemed unacceptable for only 10% of the participants, up to 30% rejected the applied processes for hide decontamination. However, the results from the sensory consumer survey showed that the provision of detailed consumer-oriented information about beef technologies can enhance consumer acceptance, although this effect was not uniform across technologies or countries.
- Not all consumers equally accepted beef technologies. Groups of consumers were identified that differed in beef consumption and attitudes towards beef and beef technologies. The enthusiastic consumers (around 15% of the sample) were moderate to high beef consumers with a high confidence in beef. Their relatively high food safety concern can partly explain the high acceptance levels of interventions that specifically aim to enhance beef safety. On the other side of the spectrum, beef technology rejecting consumers (around 18% of the sample) were relatively low beef consumers, with less concerns about food safety and less confidence in beef.
Providing information about beef technologies to consumers had diverging effects. Acceptance of beef technologies was lower when the applied process was explained, compared to when only information about the application stage was available. However, the results from the sensory consumer survey showed that the provision of detailed consumer-oriented information can enhance consumer acceptance, although not unconditionally.

Given the consumer interest in consumer benefits, well-liked advantages of beef technologies such as improved healthiness and eating quality could be communicated to consumers by the beef industry. Understanding consumers’ perceptions, knowledge and trust in information are crucial for technological progress in the beef sector.

### Main results

- Participants of the focus groups reported various perceived advantages and disadvantages of beef technologies. Not all technologies were considered to be favourable. In particular, invasive technologies and excessive interventions were rejected. Traditional and familiar technologies and processes perceived as natural were more easily accepted. The overall trend was ‘closer to nature, the better’. Perceived industry benefits (e.g., increased profits) decreased consumer acceptance of beef technologies. The exploratory results of the focus group research were confirmed by the results of the quantitative consumer studies. Beef technology acceptance was not only influenced by product familiarity, but also by level of manipulation, convenience, perceived risk, perceived invasiveness and perceived consumer benefit.

- The majority of European consumers accepted the application of beef technologies at various stages of the beef chain to improve beef safety. In general, up to 65% of the participants considered the safety interventions acceptable in various stages of the beef chain. Consumers expressed some reserve towards technological interventions during the processing stage, reflecting low trust in processing industries and high perceived industry benefits. Nevertheless, even during processing the majority of the participants considered this intervention acceptable. Manufacturing characteristics were also found to affect consumer acceptance in the experimental setting. Beef products from pasture-raised production methods were evaluated more positively than beef in innovative packaging, and both scored better than their alternatives towards beef technologies. These discussions were transcribed and the content was analysed using NVivo software (a powerful research tool to analyse textual data).

A second consumer study was conducted during February and March 2010. An online questionnaire was completed by 2520 beef consumers in France, Germany, Poland, Spain, and the UK. The survey assessed consumer acceptance of technologies applied at different stages of the beef chain, as well as consumers’ beef consumption behaviour and attitudes towards beef. Additional to the survey, an experiment was included in the questionnaire, assessing different forms of information about beef production and processing methods, claimed benefits and various information sources on consumer preferences. The statistical software SPSS was used to analyse the obtained quantitative data.

A sensory study was conducted in Belgium and Norway during January and February 2011, assessing consumer expectations and liking of beef treated with different technologies under different information conditions. In total, 218 beef consumers participated in the taste testing.

### Background and need for data/technology/innovation

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Currently, a wide range of technologies to improve beef safety are applied at different stages throughout the beef chain. As a result, the microbiological safety risk has been significantly reduced. Although the benefits for the beef industry and consumers seem to be rather obvious, the application of technologies that are used to enhance beef safety and quality is not always communicated to consumers. Currently, communication to consumers related to technologies and processes used in beef production and processing is often driven by legal obligations (for instance traceability) or profit seeking (e.g., organic labelling). Consequently, information asymmetry between producers and consumers is the rule rather than the exception.

On the one hand, this asymmetry is maintained by the actors in the beef chain who prefer not to communicate about technical procedures that could possibly deter consumers. Industry often fears that consumers might not fully understand the technical details about production and processing techniques. This confusion caused uncertainty among consumers and might decrease industry profits. On the other hand, information asymmetry between producers and consumers is also maintained by consumers themselves. Consumers often show a considerable degree of scepticism regarding food technologies. As a result, consumers might prefer to remain ignorant about the details of food production and processing systems. This rational for consumer ignorance has been explained by the high cost and lengthy time required to process the information, in comparison with the marginal benefit from the processed information.

Consumers’ product preferences have become more dependent on process characteristics. Although Europeans are generally optimistic about the contribution of technology to their quality of life, they have been more sceptical about new technologies in the food sector. Without always understanding the technical issues, consumers often report preferences for particular practices, such as organic production systems and minimal processing, while disliking others such as genetic modification or irradiation. While food technologies are applied at different stages of the beef chain, consumer acceptance remains largely uninvestigated but is quite often taken for granted.

### The consumer studies

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Providing information about beef technologies to consumers had diverging results. Information about the applied process was explained, compared to when only information about the application stage was available. However, the results from the sensory consumer survey showed that the provision of detailed consumer-oriented information can enhance consumer acceptance, although not unconditionally.

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