

Research Reflection

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Author for correspondence:

Marta Brščić, Email: marta.brscic@unipd.it

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Refining consumer attitudes to milk and dairy product purchase and use to reduce food waste and improve animal welfare on-farm

Marta Brščić

Department of Animal Medicine, Production and Health (MAPS), University of Padova, Viale dell'Università 16, 35020 Legnaro (PD), Italy

Abstract

This Research Reflection raises awareness of the need to broaden perspectives and levels of multidisciplinary and interdisciplinary approaches when considering on-farm dairy cattle welfare. It starts with a brief overview of current animal welfare issues on dairy farms and how they are perceived by different stakeholders. Some divergences in points of view are discussed in more detail and the first steps in networking are mentioned. Particular emphasis is given to both milk and dairy product waste in industrialized countries and the potential effects of its reduction on changes in the production system. The needs for a quantification of such quota and retailer involvement are also analyzed from the perspective that on-farm animal welfare is directly linked to the amount of milk that might be removed from the food chain by adoption of welfare-friendly management, such as cow-calf systems.

Increasing consumer awareness of production-related welfare problems that include early cow-calf separation and low longevity could significantly strengthen the market pull potential of specific dairy products that address these issues with transparency that inspires trust. Previous examples of market pull were cage-free eggs and antibiotic-free poultry. Their advertisements, however, increased confusion among citizens while raising expectations for all other products and farm-animal production systems. This is evident from the amount of new labels developed in some countries (e.g. France) and retailers' greater interest in animal-welfare labeled products than in the past (e.g. Lidl Spain). The fact that dairy cattle protection on intensive farms is unregulated by species-specific legislation in the EU means that improvements in the current state of the art cannot rely on regulation (Nalon and Stevenson, 2019). Discussion is increasingly centered on the fact that dairy cattle welfare improvements should start by lowering production due to the industrialization of the dairy production system, which has removed the cow from its context as a living entity in harmony with its biological function and environment. Because dairy cows have been selected for high milk yields for over fifty years and are repeatedly inseminated and separated from their calves, Engmann (2018) suggests using dairy cows as models in the research field of non-genetic inheritance revising the evidence from human and rodent studies. This advances some very relevant contexts of the renewed interest in the topic of humans' relationships with animals that are receiving steady attention in many disciplines ranging from biology, anthropology, and psychology to geography and cultural studies. In revising such relationships, we should not forget the benefits the modern dairy industry has brought to humans by bringing milk from local level to widespread availability and sale in the mass market to those who would not have had access otherwise. The sector is in need of radical change, however, because as recently discussed by Brombin *et al.* (2019) in a perspective paper it is no longer sustainable. Consumer awareness of production-related operations, high replacement rates, the issues of antibiotic resistance, environmental impact, bio-conservation and bioethics is rising just as the world's demand for animal protein keeps growing.

Although there is no panacea solution for all the issues above, several aspects suggest the need for a multidisciplinary approach in promoting sustainable, ethically produced foods. DairyCare COST Action has united multiple disciplines in promoting dairy animal welfare by developing new technologies. This research reflection aims at raising awareness of the need to broaden perspectives and levels of multidisciplinary and interdisciplinary approaches when considering on-farm dairy cattle welfare and the first step of refining consumer attitudes to milk and dairy product purchase and use to reduce food waste.

Discrepancies in points of view

Different actors throughout the production chain have different points of view and interests. When animal welfare is involved, however, these discrepancies diverge even more. When

recently applying thematic analyses in qualitatively studying the opinions of people with different levels of involvement in the sector regarding the ideal dairy farm, Cardoso *et al.* (2019) observed fairly good correspondence in views between the dairy farmers and agricultural advisors directly involved in the sector, while also noting that lay citizens were more likely to question the real state of the animal. Several studies aimed at investigating consumers' and farmers' perceptions of animal welfare in the past have shown the wide variability among them (Lagerkvist and Hess, 2011), whereas only few documents have discussed the issue from the retailer's point of view (Payne *et al.*, 1999). The need for bridges that connect them all arises just as alarm bells from the social sciences and the arts have begun bringing in the attempt to awaken a new world conscience. At the 58th Biennial International Art Exposition in Venice *May You Live in Interesting Times*, which according to its curator Ralph Rugoff was focused on works of art that revised current ways of thinking and opened minds to new interpretations and readings of things, images, actions, and situations, Chinese artist Nabuqi questioned whether a life-size plastic cow on a track perpetually circling a patch of artificial grass could be perceived as part of reality or whether it would revoke the emotion of encountering the real. These questions could well be passed on to the scientific community for answers on how consumers perceive real milk production, how much they know about it, what they accept as real, and what their emotions of this reality are, while bearing in mind that when shopping for or consuming food of animal origin most consumers dissociate any thoughts they may have on animal welfare from their minds (Lagerkvist and Hess, 2011). Answers to some of these questions would address the issue that in the industrialized world there is a considerable amount of food waste, including meat and dairy products (FAO, 2013). Food loss and waste, defined as edible material intended for human consumption that is instead discarded, lost, degraded or consumed by pests or intentionally fed to animals or used as a by-product of food processing diverted away from human food occurs throughout the entire production chain. The waste that occurs at the end of the food supply chain, however, is more costly because it makes a higher number of completed chain sub-processes invalid (Eriksson *et al.*, 2016). Rough estimates of dairy loss amount to 20% of the produced quantities (FAO, 2013), and the largest fraction of wasted food is estimated to occur at the post-purchase consumer level (53–71%), followed by producer and manufacturer waste (17–30%), carrier and transporter waste (9–12%), and with the lowest waste recorded at retail level (2–9%). A number of strategies are implemented to reduce losses. Different preventive measures are taken at different levels of the food chain and by different stakeholders. Accordingly, Priefer *et al.* (2016) emphasize that mitigation measures must take every stage of the food chain into account, and discuss more rigorous approaches to increasing efficacy than the soft instruments of information and awareness. Schmidt (2019) introduces new approaches addressed to consumers and the need to change their habits toward more appropriate food use, with the specific targeting and discounting of dairy products close to their expiry dates as one useful method. One example of a direct implementation discussed by Schmidt (2019) is the use of messages on food product labels or refrigerators reading 'Please remember to test expired food for edibility before direct disposal' or 'Please use eyes, nose and mouth first before disposal' to enable informed behavioral decisions. A further advance in technology could directly associate the expiry date with the barcode on the product and the automatic printing

of a message label attached to the product at the time of barcode reading at the cashier scan.

From milk and dairy product waste prevention to animal welfare on farm

No quantitative studies that directly link milk and dairy product waste to on-farm animal welfare as theoretically discussed by Brombin *et al.* (2019) are available as yet. Although the quantification of milk and dairy product waste and its prevention has been previously addressed on the one hand (Eriksson *et al.*, 2016; Schmidt, 2019) and, on the other hand, different production-related pathologies in intensive dairy farming and their effects on animal welfare have been considered (Nalon and Stevenson, 2019), the reduction of waste has never been scientifically linked to the amount of milk that might have been removed from the production chain. This is confirmed by the fact that systematic scientific literature searches on the Web of science – Thomson Reuters™ (WOS) All Databases (Web of Science Core Collection and all Citation Indexes ticked in the search setting) in the entire timespan from 1985–2019 yield none or a very limited number of scientific documents (≤ 28) when different combinations of keywords related to milk waste ('milk waste'/'dairy product waste'/'dairy waste'/'dairy product loss') are paired with 'animal welfare' using the AND Boolean operator. A scientifically robust quantification of the amounts of milk wasted would be an essential starting point in quantifying the amounts of milk that could be removed from the production chain and made available for calves to suckle from their dams. For decades in fact, the main argument for opposing the cow-calf systems has been linked to the lower amount of sellable milk. The practice of early cow-calf separation is now being targeted by public opinion, and higher numbers of consumers are demanding ethically produced foods. In response, alternative dairy production systems that allow continued cow-calf contact to promote natural behaviors and cow-calf bonding to reduce distress associated with separation are receiving greater interest. The on-farm changes necessary have already been addressed in literature (Johnsen *et al.*, 2016; Beaver *et al.*, 2019 and later papers in this Special Issue) and are currently being investigated, yet little attention is being given to increasing consciousness throughout the entire production chain and its final stages in particular, as done by Markova-Nenova and Wätzold (2018). The involvement of the retailer sector is crucial if we are to promote ethical attributes, value creation, and the differentiation of milk and dairy products labeled as '*a fraction suckled by the calf*' as justification for higher prices due to the lower amounts of sellable milk entering the food chain. The marketing sector may have the lowest levels of waste, but the retailers have the highest power over producers and consumers, and their strategies of promoting sales and high product turnover levels is only likely to increase post-purchase domestic waste. Figure 1 provides an overview of the Strengths, Weaknesses, Opportunities, and Threats (SWOT) of the investigation of the amounts of waste at retailer level. The marketing differentiation of such ethically produced products is also important in gaining and maintaining consumer trust, and for such reason, an entire chain should be involved from the beginning to the end with no conventional milk quota included at any level. Controversial discussions should also involve the male calves born on dairy farms, the veal sector, and the potential development of the dairy and dairy-type meat hybrid production systems (Brombin *et al.*, 2019).

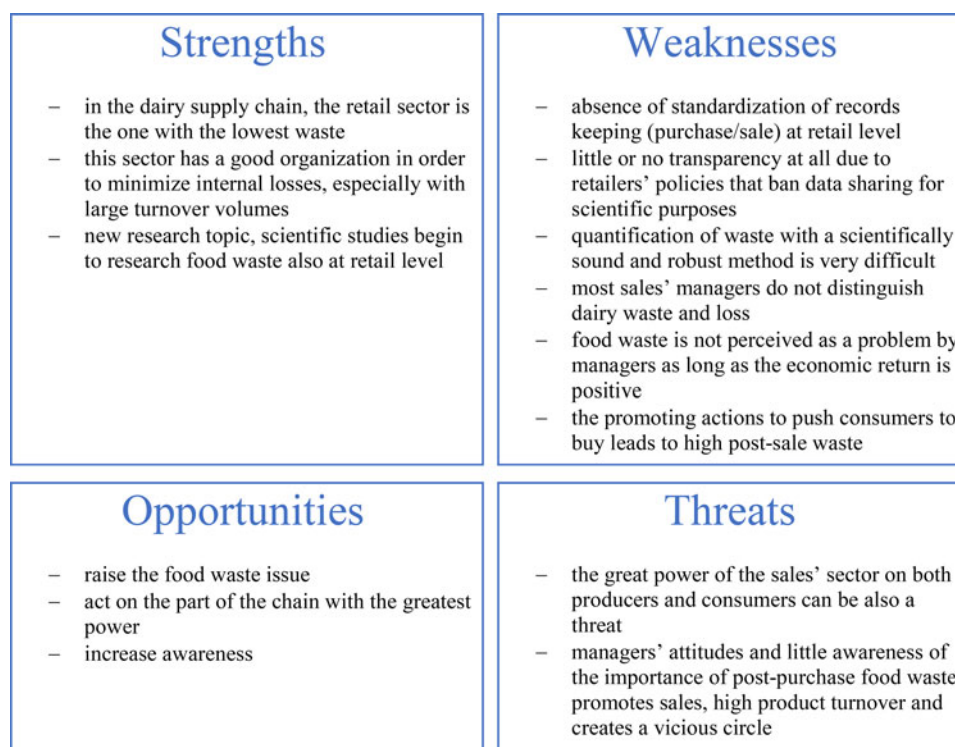


Fig. 1. SWOT analysis of the investigation of milk and dairy product waste at retail level.

The main point of the perspective paper by Brombin *et al.* (2019) was that if the scientific community ever managed to quantify in a robust way the milk wasted (which according to gray and web information amounts to as much as 90% of the milk produced in some countries) and consequently reduce it, there would be a lower demand from the people who waste it at post-purchase level. In such way, the quota of milk saved could stay on the farm for revised cow-calf hybrid rearing systems. This would translate into lower quantities of milk sold to the mass market and the sellable milk should be consequently paid a higher price to the producer. The correlation the authors make is not one between dairy waste and better welfare but instead between saving milk from the market and making it available for calves in cow-calf systems where animals are not deprived from forming their natural bonds and associated behaviors. The latter have beneficial effects on the welfare of both cow and calf, regardless of gender.

Although scientifically quantifying milk and dairy product waste at the end of the food chain and at post-purchase level in particular is rather hard to do, cross-sectional studies or numerous case studies across different countries could provide a starting point. A large random sample of households that provides a picture of each country would be useful in recording their milk and dairy product waste with no alternative use over a given time interval. A number of strategies requiring differing levels of effort providing more or less precise outcomes could be applied.

In conclusion, the intrinsic changes necessary to achieve sustainability in the dairy sector range from conscious purchase at higher prices to the use of more ethical production systems, and represent a market pull opportunity in which the retail sector is directly involved.

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